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The black market in China for tiger products

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Poaching of tigers is a major threat to the survival of the species. China is responsible for much of the demand for tiger parts. Poaching occurs because it is profitable and organizations able to procure transport and sell tiger products over thousands of miles and international borders also exist. Unfortunately there is little corresponding data on these organizations. It appears as if these organizations operate to minimize the most significant transaction cost along the supply chain. Tigers are a minority element in a portfolio of wildlife products assembled by smugglers in range states. Within China smugglers specialize in the skins and bones of tigers, and are most likely to operate in small, discrete groups. This is a function of the high coordination and evasion costs of operating in China. The demand for tiger parts has strong cultural and medicinal influences.

Keywords: China; organized crime; poaching; tiger; transaction costs

Introduction

This paper is focused on the Chinese black market for tiger products. The motivation for this work is that wild tigers in Asia are facing an elevated extinction threat. One of the significant extinction pressures is poaching. It is obvious that poaching occurs because it is profitable. It must also be the case that the organizations able to procure, transport and sell tiger products over thousands of miles and international borders also exist. It is the nature of these organizations that will be discussed in this paper.

The main issues this research will attempt to address are as follows. First, it will identify which tiger parts are smuggled into China. Second, it will discuss which factors influence consumer demand. Third, it will discuss whether the black market is homogeneous or in some sense separated by product-type and geography. Fourth, it will try to identify the relevant costs along the supply chain and the responses to these costs by criminal organizations. A transaction-cost economics methodology will be employed.

The illegal trade in wildlife is large in scope and importance.[1] It has been estimated as one of the largest illegal international trades in global terms, behind illegal narcotics and weapons.[2] A caveat is that such estimates cannot be calculated with either much accuracy or confidence.[3] Wildlife is a very heterogeneous good as it takes in a wide variety of

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1. Jacqueline L. Schneider, 'Reducing the Illicit Trade in Endangered Wildlife: The Market Reduction Approach', *Journal of Contemporary Criminal Justice*, 3 (2008): 274–95.
2. Steven Broad, Teresa Mulliken and Dilys Roe, 'The Nature and Extent of Legal and Illegal Trade in Wildlife', in *The Trade in Wildlife: Regulation for Conservation*, ed. Sara Oldfield (London: Earthscan Publications, 2003), 3–22.
3. Schneider, 'Reducing the Illicit Trade in Endangered Wildlife', 282.

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species. Wildlife products are used for food (e.g. bush-meat), for medicine (e.g. musk-deer oil), as collectable goods (e.g. butterflies) and in the manufacture of other goods (e.g. crocodile leather). Wildlife and their products are not produced to a uniform standard and considerable price variation can occur. This heterogeneity makes valuing traded wildlife products very challenging. Nonetheless, the trade in wildlife is apparently valuable to its participants and with fewer risks of apprehension than for illegal narcotics.[4]

Wildlife crime, however, frequently attracts low enforcement effort and offenders often receive weak sanctions. It is also not a trade that has attracted significant attention by criminologists or economists.[5] One of the major concerns of this trade is that it puts many endangered species under elevated extinction pressure.

Tigers are a species that is subject to severe poaching pressure. The research here is necessarily preliminary. It is currently difficult to supply definitive answers on this particular wildlife black market. This relates to the rather invisible way it operates, combined with infrequent arrest data. This is not actually unusual for wildlife black markets.[6] Nonetheless the tiger black market remains surprisingly poorly researched given the high profile of the species. For tigers however, policies are being proposed (such as education in China or more interdiction effort at international borders) to reduce poaching. The current international policy framework is based on assumptions about the market that have never been properly tested or analysed. A critical assumption is that the dominant effect of the Chinese domestic ban has been on the demand for tiger parts rather than the supply. A better understanding of the black market, even if incomplete, may increase the effectiveness of measures to reduce poaching.

This paper is also a result of several trips to China to investigate their black market in tiger products. It included a covert investigation of Traditional Chinese Medicine (TCM) shops in Hekeu (Yunnan) and Xi'an (Shaanxi). Chinese citizens were employed to inquire about purchasing genuine tiger-bone medicine from these shops. This research also makes use of the Chinese arrest data of black-market offenders. This data has not been used by other researchers. This data set dates back to 1999 but is unlikely to be exhaustive. There remain significant challenges to collating data in a large country like China, where wildlife crime is policed by several different enforcement agencies (e.g. Customs, Forest Rangers and Police). An important consequence of this is that the information in each case was not consistent. Prices were not usually recorded. Bones were reported either in weights or in terms of the number of pieces. Linking the seizure data to the sanctions was also rarely possible. This meant that any robust statistical testing of this data was not possible. As a consequence, only very general statements could be made about the location of the arrests, number of offenders, types of tiger products seized and the subspecies of the tiger involved.

Background

Tigers (*Pantheris tigris*) are a large cat species endemic to Asia. There are six remaining extant sub-species.[7] These are the Amur (or Siberian), Bengali, Indo-Chinese, Malayan,

4. Ibid.
5. Ibid.
6. Ibid.
7. Eric Dinerstein, Colby Loucks, Eric Wikramanayake, Joshua Ginsberg, Eric Sanderson, John Seidensticker, Jessica Forrest, Gosia Bryja, Andrea Heydlauff, Sybille Klenzendorf, Peter Leimgruber, Judey Mills, Timothy G. O'Brien, Mahenddra Shrestha, Ross Simons and Melissa Songer, 'The Fate of Wild Tigers', *Bioscience* 57 (2004): 508–14.

Sumatran and South China. The three extinct sub-species are the Javan, Balinese and Caspian. Tigers face a range of extinction threats. These include habitat loss, genetic depression and illegal hunting.[8] The most numerous sub-species is the Bengali but recent Indian population estimates indicate serious declines. The Siberian population is currently the most stable, and its range includes Russia, northern China and possibly North Korea. The South China population is possibly the most imperiled, as no wild population remains. A relic population of South China tigers exists in captivity in China.

In the recent past tiger populations were larger and more widely spread. Declines, however, were very rapid during the twentieth century.[9] The latest extinctions all occurred in the twentieth century. Some of this decline was a product of government policies. Tigers for many years were seen as a threat to livestock and rural human populations. Hence policies to reduce tiger densities have actually been the norm. This culminated in Chinese efforts in the 1960s to severely cull the South China tiger populations.[10] Tigers have also struggled to maintain viable populations in Asia, as they require large areas with plenty of prey items to hunt. Large wilderness areas that are free of human impact are increasingly rare in Asia. Even where tigers receive legal protection, the loss of prey items to forest-dwelling human hunters can generate an ongoing survival threat.

The concern about the speed and scale of the decline in tigers has led to measures to avert extinction. The scale of these efforts is possibly indicated by reports that about US$100 million are being spent annually throughout Asia to prevent decline.[11] It is not clear that these conservation efforts are making an impact on the rate of decline.[12] Disagreements about the appropriate policies have emerged following two initiatives from China. The first initiative is to restore habitat for the South China tiger and embark upon an ambitious re-wilding trial of this sub-species. The second initiative is a proposal to resume tiger farming. This is motivated by the hypothesis that farmed tiger products may reduce demand for wild tigers, hence poaching. This is a much more controversial proposal and has secured little support outside of China.

The current policy stance towards tigers is characterized by a total ban on the trade in tiger products. The international ban on the trade in tiger products was initiated soon after CITES (Convention on the International Trade in Endangered Species) was signed in 1973. Tigers were listed in 1975 as an Appendix I species. This meant that no commercial trade was permitted under any circumstances. An unfortunate consequence of the Appendix I listing is that no population monitoring need occur. This differs from an Appendix II listing where some trade is permitted (under quotas and a permit system). An Appendix II listing requires population monitoring. This Appendix I listing means that population estimates for tigers in their various range states are attendant with much uncertainty. Ironically (given the decline in tiger populations), participants of the first CITES meeting recall that one of the intended beneficiaries of the treaty was in fact, the tiger.[13]

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8. Ibid., 508, 510.
9. Ibid., 509.
10. Ronald Tilson, Hu Defu, Jeff Muntifering and Philip J. Nyhus, 'Dramatic Decline of Wild South China Tigers *Panthera tigris amoyensis*: Field Survery of Priority Tiger Reserves', *Oryx* 38 (2004): 40–47.
11. *The International Workshop on Strategy for Tiger Conservation*, Harbin, China, 6 July 2007.
12. Dinerstein et al., 'The Fate of Wild Tigers', 508–509.
13. Eugene Lapointe, personal communication, 6 July 2007.

China, however, still had a domestic market in tiger parts. CITES only placed a ban on the international trade in tiger parts. Within China, tiger products were still being traded. By the early 1990s, China was using about 4 tons of bone per year. A mature tiger yields between 10 and 12 kg of dry weight bone. Hence 4 tons represents about 330–400 tigers. This was well in excess of the wild tiger population within China. This was possibly only 50 animals, occurring as three small populations of Indo-Chinese, Bengali and Siberians. This situation generated concern amongst China's Asian neighbors that their tigers were being poached to meet this supply. China banned the domestic trade in tiger parts in 1993 in response to these concerns. To reinforce this ban, the description of tiger medicines was purged from published medical texts. The goals of this domestic ban were to suppress or reduce demand for tiger products. Penalties for trading in tiger products are also severe, and typically have a strong punitive component.

The difficulty of obtaining tiger products in China also led to a supply response. This was to embark upon tiger farming within China to meet the domestic demand for tiger products. China had given permission for two such large farms to begin operations before the ban. One of these is in Harbin in the very north (Heilongjiang) and one is further south in Guilin. The situation is further complicated by the subsidy the State Forestry Administration provides to the Harbin farm, in contrast to the lack of subsidy to the Guilin farm. Both farms are, however, are in a parlous financial state. They have been able to capture some revenue through tourism but by all accounts are losing money. The two farms mentioned have about half China's captive tiger population, which is estimated at 4000–5000 animals. It could expand rapidly because breeding has been restrained for cost reasons.

Nonetheless, the domestic and international ban has not been associated with marked declines in poaching in Asia. Indeed, poaching in India following the Chinese ban is believed to have increased.[14] While various strategies have been proposed to reduce this poaching, these strategies have not been well-informed by knowledge of the Chinese black market.

The lack of information about the Chinese black market is not surprising. Collecting market data on illegal activity is always challenging. This is complicated by the geographical scale of the problem. China's southern border stretches from Vietnam to Pakistan. This covers a large area often characterized by mountains and forests. This border also includes many ethnic communities on either side that have historically traded with each other and continue to do so. On the sea-board, China has three of the five busiest ports in Asia. Shanghai, Hong Kong and Shenzhen handle very high volumes of containers and freight. On the Siberian border, numerous large rivers and rail networks exist to move contraband. Concealing illegal activity from government agencies is aided by the problems of policing and inspecting the large volume of trade occurring. In effect, in the post-CITES period smugglers had an existing endowment of a distribution network between China and key range states. With such opportunities for concealment, opportunities to observe black-market activity are limited.

Developing an understanding of this market is reliant on having a model or framework to account for our observations. Given the lack of actual observations on this market, an appropriate model becomes a powerful analytical tool. The discussion in this paper is motivated by two main economic themes. The first is that the criminal organizations involved in this traffic are motivated by profit. They are not poaching tigers because they wish to see tigers become extinct. They are poaching and smuggling tiger-products in order

14. Belinda Wright, personal communication, 6 July 2007.

to make money. The second theme is that the limited observations we have can be fitted into a transaction-cost economics framework.[15] The fundamental argument of transaction-cost economics is that organizations are arranged so as to minimize production and transaction costs.

Economic issues

The supply chain from the individual poacher to the final consumer in China is long and involves transactions between different parties at different nodes. This international dimension is often true of other wildlife products.[16] The criminal organization has to make economic decisions at each node of the chain. Such decisions ought to reflect the production and transaction costs faced by the organization at these nodes.

In transaction-cost economics, there are two prevalent types of costs. The first are the *coordination costs*. In order for a sale to be completed, prices have to be negotiated and both buyers and sellers need to make their existence and location known to the other. Finally, buyers and sellers have to come together to complete the transaction. The second are the *motivation costs*. Both parties may be deterred from the transaction if they suspect the motivation of the other party. For instance, buyers may suffer from informational incompleteness (e.g. are not sure that the product being offered is tiger or a fake). This may discourage them from making a purchase, even if the product is real. In legal markets there are regulations and the possibility of court action to enforce contracts. In illegal markets recourse to such mechanisms are not possible.

In illegal markets it is useful to introduce a third type of transaction cost. This will be termed *evasion costs*. Tiger parts are an illegal product both domestically and internationally. This means that participants in this black market face costs associated with evading arrest or prosecution. Such costs may include the loss of the product to law enforcement agencies and any associated criminal sanctions. Smugglers may modify their transport methods or the size of their shipments to compensate. Explicit costs such as bribes might be incurred to avoid arrest. The higher the evasion costs facing the conspiracy the more difficult it will be to complete the transaction. In many illegal markets these evasion costs are a significant burden to the criminal organization. For instance, in the international illegal narcotics market, the procurement costs are largely insignificant compared with the evasion costs.[17]

Evasion costs relate to economic theories of optimal deterrence. The economic theory of crime was first outlined by Becker.[18] This theory holds that criminal acts are rational, economic decisions.[19] Crime will occur more frequently when the benefit to the criminal is relatively high. It occurs less frequently when the benefit is low. One of the main policy tools to reduce crime is through law enforcement activity. This influences the cost to the criminal through the probability of arrest, the probability of conviction and the sanctions

15. Oliver E. Williamson, 'The New Institutional Economics: Taking Stock, looking Ahead', *Journal of Economic Literature* 38, no. 3 (2000): 595–613.
16. Schneider. 'Reducing the Illicit Trade in Endangered Wildlife'.
17. Peter Reuter and Mark Kleiman, 'Risks and Prices: An Economic Analysis of Drug Enforcement', *Crime and Justice* 7 (1986): 289–340.
18. Gary S. Becker, 'Crime and Punishment: An Economic Approach', *Journal of Political Economy*, 169 (1968): 176–77.
19. Bill McCarthy, 'New Economics of Sociological Criminology', *Annual Review of Sociology* 28 (2002): 417–42.

that apply if convicted.[20] For instance, the harsher penalties normally imposed on heroin traffickers causes a shift in behaviour to evade some of these costs. This includes more discrete behaviour, smaller shipments and fewer intermediaries.[21]

The factors that influence the demand for tiger products also need to be elaborated. The first issue is that tigers generate multiple products. The list of products includes bones, skins, teeth, claws, meat and penises. Poaching occurs to satisfy demand for these different products. Seizures and interdictions by law enforcement agencies show that the most important products for the Chinese market are skins and bones (see below). Skins have been used by many Asian communities for centuries. Within China the Tibetan community retains a large cultural attachment to the skins. One conspicuous use of these skins is as decoration on traditional costumes (*chupas*).

Tiger bones were also used in TCM and have been employed since the Han dynasty (about 2000 years ago). Tiger bone is believed to have a unique pharmacological effect. This is in the treatment of severe bone diseases. The closest substitute to tiger bone is leopard bone, but more leopard bone is needed to achieve this effect. It is the demand for the treatment of bone diseases that continues to drive the demand for tiger parts on China. People with severe bone diseases are frequently in pain. The desire to find an effective treatment for the disease motivates people to obtain the bone. It is alleged that there are 25 million people in China with bone diseases severe enough to benefit from tiger-bone medicine. In response to the 1993 ban, the Chinese TCM community has tried to develop alternatives to tiger bone. The two most common substitutes are leopard or sailong-rat bones. Neither of these is believed to be as effective (albeit they are not ineffective).

The demand for tiger penises and other parts (teeth, claws) is very weak in comparison. This is backed up by the arrest data from China. Such arrest data is based almost exclusively on bones and skins. Only one of the 22 seizures of genuine tiger parts in China involved anything other than skin or bone. This was in Qing Dao (Shan Dong province) in 2006. A similar situation exists in India, where only two of 26 seizures of tiger parts recorded by EIA included anything other than skin or bone.[22] The reason may well rest on the alleged unique medicinal effect of tiger bone. There are however, many substitutes for tiger penises, for instance (seal penises or viagra).

Another factor influencing demand is uncertainty about future supply. This is leading to some *option demand*. Some consumers are buying tiger bones even if they have no current medicinal demand. Rather they are storing bones in case the will need them for the treatment of bone diseases later in life. This option demand has been identified in a Chinese market survey. The two main sources of uncertainty are the possible extinction of tigers and the inability to find a seller when the need arises in the future.

There are two possible moderating influences on demand. The first is that the product is illegal and this may stigmatize its use. It is not clear, however, whether this stigmatizing effect exists, how strong it is, and even how to measure it. The second is that tigers are an endangered species. In a study of attitudes towards TCM products in Hong Kong, the vast majority of customers were motivated to avoid using endangered wildlife products.[23]

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20. Ibid.
21. Reuter and Kleiman, 'Risks and Prices'.
22. Environmental Investigation Agency (EIA), *Skinning the Cat: Crime and Politics of the Big Cat Skin Trade*, September 2006. Environmental Investigation Agency, *The Tiger Skin Trail*, October 2004.
23. Broad et al., ' The Nature and Extent of Legal and Illegal Trade in Wildlife'. The authors discuss a study on the TCM market in Hong Kong conducted by TRAFFIC.

About 2% of these customers, however, said they would continue to use products from endangered species despite the conservation consequences.

Analysis

The supply chain into China begins with procurement or poaching in neighbouring states. Tigers have to be killed for their parts. An important source of these wild tigers are those that live in natural habitat (often wildlife reserves). The procurement stage involves several production costs. The poachers need to have traps or firearms to kill the tigers. Poachers are also likely to need some knowledge of where tigers are, and possess some hunting skills. There will also be a coordination problem, as the poacher must find a buyer and arrange a physical transfer of the product. The poacher also faces an apprehension risk, as forest rangers, police or members of the public could discover the poached animals.

The other relevant aspects of this transaction are its complexity (which impacts on the ability to evaluate the performance of the involved parties) and its interconnectedness. That is, how does the procurement of tiger parts connect to other wildlife products or other illegal products? Information on the procurement stage has three possible sources. The first is the arrest data. The second is information obtained from covert observations. The third is implicit knowledge about poaching possessed by local inhabitants or law enforcement agencies. The main problem with the last source is that as it is implicit, i.e. it is not codified. Some locals may have knowledge of how much poaching is in their areas and what is being poached, but lack the motivation to ability to make this explicit. Covert observations are also rare. This means that currently the arrest data is the primary sources of information on procurement. Unfortunately relevant economic details are not recorded on a consistent basis.

At the outset, tiger poaching could be something requiring specialized search and hunting skills, or be an activity accessible to many. For many wildlife products, some specialized hunting skills are required. This is true in both legal and illegal harvest. Most of the butterflies harvested in Papua New Guinea, for instance, come from a minority of the more skilled harvesters.

The requirement for local specialists seems to be the case for tigers as well. Tigers have a secretive, largely solitary lifestyle. They occur in low densities in reserves of limited accessibility. An obvious way to reduce these search costs is to employ people with either local knowledge or hunting skills. Hence indigenous communities that have a strong hunting culture are often ideal candidates to recruit as poachers. Examples in India include the Bawariya and Behliya tribes.[24] Many well-known poachers in Asia, such as Sansar Chand and the Cambodian Yor Ngun, came from hunting cultures. Similarly a 1997 study on tiger poaching in Sumatra found that this was dominated by local inhabitants rather than exogenous poachers.[25]

This dependence on poachers with hunting skills or local knowledge has an implication for the connectedness to other illegal traffic. There is likely to be a higher connectedness to other wildlife crime. The skills required to poach tigers are broadly similar to those required to poach leopards and other protected animals. There is likely

24. Navin Singh Khadka, 'Double Trouble for Nepal's Tigers', *BBC News*, http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7607203.stm (accessed 20 September 2008).
25. Campell Plowden and David Bowles, 'The Illegal Market in Tiger Parts in Northern Sumatra, Indonesia', *Oryx* 31 (1997): 59–66.

to be a low connectedness to other illegal traffic, such as drugs, as the skill sets do not match. The need to have access to specialized hunters may also create barriers to other criminal organizations (such as drug traffickers) entering this trade.[26]

The coordination problem of making poacher and buyer known to each other can be tackled in two ways. The first is for the poacher to attempt to find buyers. The second is for the buyer to try to locate the poacher. In legal wildlife markets, buyers typically seek out harvesters. Harvesters generally lack capital and knowledge of prices and the distribution network. This implies they lack the capacity to find buyers on their own initiative. The illegal market for tiger-parts appears to follow the same pattern. In addition the use of market mechanisms like advertising is not feasible for illegal activity. Poachers are essentially offered cash for tigers by middlemen. Presumably successful hunters can be identified and employed by these middlemen relatively easily.

Such cash transactions have the advantage of being simple to undertake. Both parties can easily evaluate each other's performance. Cash and tiger parts are uncomplicated goods. The reported payments for tigers also help motivate the poacher. In effect, they are offered cash sums very large relative to their current income.[27] This also makes them less willing to defect to law enforcement agencies. Such defections would mean forgoing very lucrative illegal payments.

Seizure data generally shows that poachers are not found further along the supply chain. This mirrors legal wildlife markets where harvesters transfer their products at initial nodes.[28] This use of a market-based transaction approach probably reflects the simplicity of the contracts and the unwillingness of the participants to be observed in each other's company. Such meetings may alert others to the illegal activity. It also ensures that the poacher has little knowledge of the other members of the organization. This is likely to lower the evasion costs for the criminal organization.

The cost of employing poachers from outside the organization still leaves the conspiracy with a defection risk by poachers. Poachers may owe little loyalty to the organization and behave with less discretion. For instance, the arrest of Yor Ngun followed an earlier amnesty in 2001.[29] He had undertaken to stop poaching during this amnesty, but was convicted of poaching over 600 animals afterwards. In this period his hunts ranged over 10 Cambodian provinces.[30] This is not consistent with discrete behaviour. If caught, poachers may also be more willing to defect to authorities and inform on other participants. This defection risk could be overcome if it was internalized in the organization. This could be accomplished if the poachers also occupied nodes further up the supply chain. For instance, if they have the capacity they may be able to also undertake the distribution and transport of tiger parts. This appears to be the organizational form adopted by Sansar Chand's conspiracy.[31]

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26. Schneider, 'Reducing the Illicit Trade in Endangered Wildlife'.
27. Biswajeet Banerjee, 'Tiger Poaching Ring Busted by Indian Police', National Geographic News, http://news.nationalgeographic.com/news/pf/47620673.html (accessed 2 November 2008). Cash offers of between $1400 and 1500 for each tiger are common. In rural communities living in or proximate to forests, this is typically well above average wages.
28. Broad et al., 'The Nature and Extent of Legal and Illegal Trade in Wildlife'.
29. BBC News, 'Cambodia Tiger Hunter Gets jail', http://news.bbc.co.uk/go/em/fr/-/2/hi/asia-pacific/4211506.stm/ (accessed 19 September 2008).
30. TRAFFIC, *TRAFFIC Bulletin Seizures and Prosecutions* 6, no. 3 (1997) to 21, no. 3 (2008), 91.
31. EIA, *Skinning the Cat*, 16–17. Sansar Chand began as a poacher and expanded his operations to eventually smuggle thousands of skins into Kashmir and Nepal.

The organizational form adopted at the poaching node appears to be influenced by coordination costs and search costs for tigers. There is little evidence that poachers are influenced by evasion costs. The risk of detection appears trivial. Law enforcement agencies manifest low detection, arrest and conviction rates of poachers. There are conspicuous examples of poachers operating for decades without getting caught. These include Sansar Chand, who was active for almost 30 years in India, and the Cambodian Yor Ngun, who began his poaching in the 1970s. Plowden and Bowles note that no poachers were arrested in connection to any of the poached tigers in their 1997 study.[32] A Sumatran conspiracy that was later convicted in Indonesia had operated for 10 years. In this period it had trafficked at least 60 tigers. Notably, this was the first case of its kind to be fully prosecuted in Indonesia. Conviction rates are low in other Asian countries. EIA notes that, of 1898 people accused or implicated in the illegal trade of otter, leopard and tiger in India, only 30 convictions resulted.

The black market is also supplied by two other sources. These sources are symptomatic of the high search costs for tigers and the coordination costs of bringing poachers and buyers together. One (likely) source is captive tigers. China has a large population of tigers distributed over a number of farms and zoos. Thailand also has a significant number of captive tigers. An important example is Sriracha Zoo, which exported 100 bengali tigers to Hainian in China.[33] Vietnam has recently recognized that the illegal breeding of tigers is occurring.[34] Finding evidence of these tiger populations supplying the black market is, however, difficult. The arrest in 2007 in China of someone trading a South China tiger skin shows that such supply has occurred.[35] South China tigers are only found in captivity so the skin would not have come from a wild population.

The tracing and verification of tiger numbers is not straightforward. Nonetheless tigers have been stolen and butchered from Chinese zoos.[36] There are persistent reports that the Chinese farm in Guilin and the Sriracha Zoo in Thailand has made tiger products for sale.[37] There is strong evidence that the Guilin farm has made tiger meat available for sale.[38] Given the financial pressure facing tiger farms in China, selling tiger products into a black market would certainly be attractive. Wildlife regulations typically do not enjoy a 100% compliance rate.

Another source of tiger products is fakes. Tiger bone can be faked by using the bones of other animals, such as cows (Figure 1). The bones may be embellished to add veracity to the claims that they are genuine. This includes gluing on fur dyed to resemble tiger and adding claws carved out of horn to the fake phalanges. Naturally this greatly lowers the search and production costs for tiger bone. It also lowers the transport costs. Hence it is undertaken by local Chinese who lack the resources and organization to import the bones themselves. Arrest data from China show that, to date, there is no overlap between those

32. Plowden and Bowles, 'The Illegal Market in Tiger Parts in Northern Sumatra'.
33. Han McGirk and Annabel Fallon, *Scandal of Zoo's Missing Tigers*, http://www.independent.co.uk/news/world/asia/scandal-of-zoos-missing-tigers-562656.html (accessed 19 September 2008).
34. Anh Tuan and Ha Nguyen, *Extinction Threatens Viet Nam Tigers*, http://vietnamnews.vnagency.com.vn/showarticle.php?num=02SUN250508 (accessed 18 September 2008).
35. TRAFFIC, *TRAFFIC Bulletin Seizures and Prosecutions*, 108.
36. China Wildlife Conservation Agency, 'Second Zoo Tiger Killed in Xchina', http://www.cwca.org.cn/Article/Showarticle.asp?ArtilceID=9493 (accessed 25 September 2008).
37. McGirk and Fallon, *Scandal of Zoo's Missing Tigers*.
38. CITES, *DNA Confirms Tiger Meat for Sale at Chinese Farm*, http://www.traffic.org/home/2007/6/12/cites-dna-test-confirms-tiger-mat-for-sale-at-chinese-farm.html (accessed 18 September 2008).

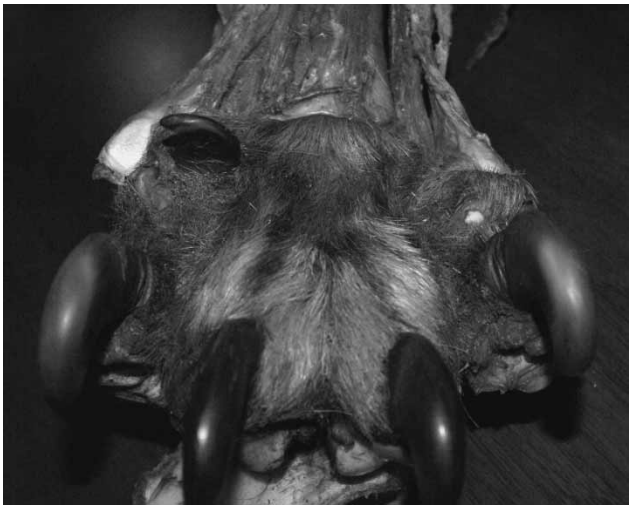

Figure 1. Fake Black-Market Tiger Foot (Harbin).

criminals that sell real bone (international in scope) and those that sell fakes (domestic in scope). Fakes are often sold alongside other wildlife fakes, in clusters of shops all participating in the same fraud. Prices also differ dramatically between fakes and real tiger products.[39] This confirms that the real and fake suppliers operate in completely different markets.

From the conservation perspective, the most important black-market segment is that of wild tigers sourced from range states. This is also the most relevant for international crime. Once tiger parts have been collected the next step is to transport the tiger products up to international borders. The primary data we have for this stage comes from interception data and covert observations in Siberia, India and Nepal.

The organization of the products within range states does not use the same market mechanism as recruiting poachers. Rather, the transport and storage of the wildlife products are done by a single domestic organization. Transport and warehousing are not subcontracted to other agents. This would be influenced by both the motivation costs and evasion costs. Wildlife products have to be gathered at hubs where transport is available. This typically means organizing this activity in proximity to people (cities rather than forests). The risk of being observed and tip-offs provided to authorities will need to be reduced. If a single organization undertakes all these transport and warehousing tasks then it reduces this risk. It may also be more difficult or expensive to motivate agents outside the organization to remain loyal. There may also be increased difficulty preventing law enforcement agents infiltrating the firm.

39. One arrest in Nan Chang (Jiangxi) province involved a trader offering a piece of fake bone for 80 Yuan. The customer negotiated the price down to 20 Yuan. In Guan Zhou province another arrest involved fake tiger bone being sold for 5 Yuan a gram. By way of contrast, a seizure of one skin and 41 pieces of bone in Hai Lin (Heilongjiang province) had a value of 1.5 million Yuan. Given that a recent seizure of skin established a black market price of 500,000 Yuan, each of these pieces of bone would have had an average value of 24,000 Yuan.

This loyalty or motivation cost is inflated in criminal organizations. These organizations are unable to rely upon legal sanctions to enforce loyalty. Another approach is to rely upon family or ethnic community links to increase loyalty (reduce defections) and insulate the organization from infiltration. The family connections of the Indian poacher Sansar Chand for instance, pervaded his organization.[40]

The primary market transaction is between a foreign buying agent and the domestic criminal organization in the range state. For instance, Sansar Chand sold initially to Kashmirian buyers and then Nepalese buyers within India. Meetings were organized in New Delhi. In the Russian Far East, a Chinese national using several passports organized purchase of a number of wildlife products in Siberia. Evasion costs are the likely explanation for this preference for travel to range states. It is more difficult for foreign nationals to move freely through China and legal sanctions are quite punitive. Evasion costs (bribes, transport) are thus likely to be lower in range states than for China.

The criminal organizations show a high level of connectedness to other wildlife products. Tigers are in fact a minority product.[41] In 2007 Tibetan officials intercepted 32 tiger, 579 leopard and 665 otter skins in one shipment. Sansar Chand claimed to have sold 300 tiger skins, 2000 leopard skins, 6000 fox skins and 4000 cat skins to the Nepalese buyer Tsering Tamang. There is no evidence from seizure data in Russia, India and China that other illegal products (drugs, weapons) are being smuggled.[42] This point implies that poaching rings have specialized knowledge and skills that emphasized wildlife. Evidence that tiger poaching is done by larger criminal conspiracies with a large portfolio of illegal activities is lacking. This indicates that there are significant organizational barriers to other criminal firms engaging in this trade.

The use of vehicles to transport large volumes (hundreds of skins) of different animals implies that there are large coordination costs. That is, the cost of physically bringing the product to a node to transfer to Chinese-based conspirators is high. By transporting large volumes at a time, the criminal organization can exploit some economies of scale to reduce their transport costs. The evasion costs do not appear to be influencing these transport decisions. The risk of detection and apprehension is has not prompted a shift to more covert techniques.

The next stage in the supply chain is crossing the international border. Crossing the international border involves an increased detection risk. Law enforcement agencies like Customs concentrate interdiction efforts on these borders. In many illegal markets like narcotics or parrots, low-wealth people are corrupted and employed to take on this risk. Such couriers have little knowledge of the network and are unable to provide much information to law enforcement agencies. This has also occurred with tigers. Border crossings in Russia have been associated with the bribery of train or truck drivers and sometimes police. The courier is typically unaware of the identity of the main conspirators.

Outside of Tibet the trade is about two tiger products – bones and skins. Other potential products (teeth, claws) are not being exported this route. The other minor tiger products of teeth (Figure 2) and claws are still available in domestic markets in range states. These are sometimes sold to tourists who are often unaware that this trade is illegal.

40. EIA, *Skinning the Cat*.
41. EIA, *Skinning the Cat*, 23.
42. Schneider, 'Reducing the Illicit Trade in Endangered Wildlife'. Schneider also makes the point that it is rare for other illicit products to be distributed by organizations that specialize in wildlife.

Figure 2. Sumatran Tiger Canine (Indonesia).

Nonetheless, the main point remains. The black-market trade of wild tigers into China is being sustained largely by demand for two products. Criminal organizations are opting to specialize in the distribution of skins and bones. Hence while poachers and smugglers outside Asia are multi-species and multi-product, smugglers in China are single species and bi-product.

The use of trucks and other land routes is not the only way tiger products get across the border. China also has busy airports and seaports. The arrest data, however, is very sparse here. Illegal wildlife shipments are occasionally detected in Hong Kong, but there is only one instance of tiger. In 2000 a Chinese woman travelling from Bangkok was caught with pills worth 12,000 Yuan at Hong Kong airport. The pills contained tiger-bone and had been obviously manufactured prior to this trade. The ability to purchase tiger medicine in Thailand has been previously attributed to the Sriracha Zoo. If the practice of making tiger-bone medicines in range states like Thailand is more common then realized, then this has to be of concern. Detecting a tiger bone in a pill or bottle of wine is not straightforward. If air and sea routes into China have much lower detection rates than land routes, then it makes it difficult to infer that the land routes are the most common approach. The evidence from the entry of skins from Nepal into Tibet is that it has exclusively been via land routes.

There is comparatively little data on the organization of the tiger-part black market within China. There have been a number of recent investigations that have targeted TCM shops or surveyed TCM customers. There is also arrest data from China that has been collated by the Chinese State Forest Administration.

The arrest data has the following properties. In terms of the distribution of real tiger products, there is a strong geographical bias. About two-thirds of the arrests of conspiracies are concentrated in two provinces. These are Heilongjiang (seven arrests) in the far north and Yunnan (eight arrests) in the far south. The shared characteristic of these provinces is that they border range states. Heilongjiang borders Russia and the Siberian sub-population distribution (Heilongjiang also has a small population of wild Siberian tigers). Yunnan borders Vietnam, Laos and Burma. This geographic concentration is matched by the sub-species distribution. Most arrests in Heilongjiang involve Siberian tigers. Most arrests in Yunnan are for Bengali or Indo-Chinese sub-species (the Bengali is found in Burma). Heilongjiang also has the Harbin farm. Yunnan does not have any tiger farms. There have been no arrests in the Guangxi province, which has the Guilin farm. Hence, it is not possible to infer any effect caused by the proximity of farms to tiger-part consumption. There was one arrest of three conspirators in Tibet (Xizang) in this period.

The data on arrests for fakes (18 instances) has a different pattern. Only one arrest for a fake occurred in Yunnan or Heilongjiang. This was a case involving the sale of fake tiger meat in Harbin (Heilongjiang). Most of the arrests thus occur outside of the most important

Chinese provinces for black-market arrests. As alluded to above, the sale of fakes is often done more openly in clusters of shops all participating in the same fraud. State Forestry Administration (SFA) officials have noted that some vendors have been bold enough to attempt to sell fake tiger-skins outside their Beijing office. The culprits were not arrested. The price of such fake tiger products is also extremely low relative to value of real tiger products in the black market. Given that the sale of fakes is in practice not treated very seriously, the risks of selling fakes are much lower.

There have been covert attempts to find tiger bone for sale in TCM shops or markets in China. This was undertaken by TRAFFIC. Another smaller attempt was made by me with the Chinese SFA in March 2008. The goal of this latter visit was, however, primarily to scope out viable sources of information on the Chinese black market. The TCM shop and market visits were one of the sampling approaches taken. The other data sources that were examined were the un-codified knowledge local wildlife authorities have on smuggling and the level of detail accompanying the arrest data.

Both covert attempts used Chinese citizens to make inquiries about the availability of tiger-bone medicine. Both investigations concur on two main findings. The first is that there is very high knowledge of the illegality of selling tiger products and further that the reason the trade is illegal is because tigers are endangered. The second point is that an extremely small percentage of shops claimed to have real tiger bone medicine for sale. The veracity of these claims could not be tested. The TRAFFIC study found that 3% of the shops claimed to have tiger medicine for sale.[43] This means that most potential customers would not in fact, be able to find tiger bone medicine if they relied upon the shops and the time spent searching would be very high. For instance, Xi'an had 24 TCM shops during our survey. At an approximate 3% stocking rate (if true), the coordination costs for a customer would be very high. They would have to spend a lot of time searching for the product. Indeed, there would be a reasonable expectation that many potential customers would not find any tiger bone for sale. A city would need 30–33 TCM shops in order to average at least one TCM seller stocking illegal tiger bone.

There has also been a recent attempt to examine the end-user market for tiger products in China.[44] This surveyed households in seven major Chinese cities (1880 respondents). A key result was that 43% of the respondents said that they had used tiger products (most often tiger bone plasters), and most since the 1993 ban. Tests on tiger-plasters from 518 TCM stores in China (tigers appear as brand-images as per Figure 3), however, showed no evidence of tiger bone.[45] It was not stated whether consumers were using tiger products procured after the ban or consumed from product stockpiled in anticipation of the ban.

Other key results were that household income had no statistically measurable effect on consumption and that the geographical concentration of consumption (away from Heilongjiang and Yunnan) did not match Chinese arrests of 'real' tiger product. The lack of a household income effect seems difficult to sustain if prices are for genuine tiger-products. The ability of poorer households to obtain tiger products is far more likely at the prices at which fakes are traded. There was no attempt to verify that sales were

43. Kristin Nowell and Xu Ling. *Taming the Tiger Trade: China's Market for Wild and Captive Tiger Products since the 1993 Domestic Trade Ban* (TRAFFIC, March 2007).
44. Ibid.
45. Brian Gratwicke, Judy Mills, Adam Dutton, Grace Gabriel, Barney Long, John Seidensticker, Belina Wright, Wang You and Li Zhang. 'Attitudes Toward Consumption and Conservation of Tigers in China', *PLos ONE*, 3, no. 7 (2008): 1–7.

Figure 3. Tiger Plaster (TCM Shop, Hekeu).

of fakes or real. The geographical centres of consumption reported in this survey also conformed the pattern of arrests for the sale of fakes.

The distribution of tiger products in Tibet, however, is not consistent with the rest of China. Tiger skins have been observed openly available for sale in Tibet and out west to Gansu. The high visibility of tiger skins in markets suggests that the enforcement effort has been low and provides little deterrence. As a crude measure of law enforcement activity, SFA record only one arrest 1999–2007 period. This was from 2003 when three Tibetans were arrested when smuggling 31 Bengali tiger skins (but no bone). In an attempt to reduce demand, the Daili Lami called upon Tibetans to stop purchasing tiger skins in 2005.[46] The lack of enforcement effort may have a political basis. The trade in tiger skins in Tibet is influenced by Tibetan cultural practices. It is possible that Chinese authorities have accommodated this illegal trade rather than risk higher enforcement provoking the Tibetan population. There is certainly a striking difference between the arrest data in provinces like Yunnan and Heilongjiang (eight and seven cases) compared with Tibet (one case).

The geographical concentration of arrests, coincident with range-state proximity, implies that smugglers face significant transaction costs distributing their products.

46. EIA, *Skinning the Cat*, 23, reports three instances of seizures in the Tibetan Autonomous Region in the same period.

While smugglers apparently began the ban-period with an existing network, this endowment appeared to be based on local connections. An example of this is the Tibetan involvement with Sansar Chand's network. In fact the Tibetan community within China appears to be a broad transmission path of tiger products through Qinghai and Gansu. Increases in transaction costs to less proximate provinces are likely to need a new organizational form.

Getting black-market products to more distant provinces incurs two major transaction costs. The first is reducing the risk of detection (evasion costs are high). The smuggling of threatened wildlife (those that merit the highest protection under Chinese law) receives heavy sanctions. The death penalty has occurred for traffic of giant pandas.[47] Tiger smugglers also receive heavy penalties, with one of the Tibetans arrested in 2003 receiving the death penalty (later commuted to a prison sentence). Tiger smugglers can expect a combination of a lengthy prison sentence and heavy financial penalties. Sanctions in China are in general much more severe than those outside of China.[48]

Smugglers appear to have adopted two techniques to reduce this detection risk. The first is to reduce the size of their shipments. The volumes traded in shipments by smugglers outside of China are much larger than that within China. For instance, interceptions in Yunnan have involved: 11 tiger skins (1999); three skins and bones (1999); one tiger skin and bones (2000); 23 pieces of bone (2001); five skins (2002); two tiger skins (2005); and 175 pieces of bone (2005). Interceptions in Heilongjiang have involved one tiger bone (2004); six skeletons (2004); 1.75 kg of bone (2006); one skeleton (2006); one skin and 41 pieces of bone (2007). This can be contrasted with an interception in Nepal that had 32 tiger, 579 leopard and 665 otter skins in the same shipment.

The second technique is to specialize in tiger products. By operating in one market only, the customer base is relatively smaller and more insulated from other members of the public.[49] Of the 22 arrests in the Chinese data set, only three cases were multi-species. Only one case involved more than two species, and that was a Customs interception in Yunnan. This shipment included elephant, Indo-Chinese tiger, leopard, bear and red-panda parts. This specialization may also imply a shift in the connectedness of this market. Earlier in the supply chain, the procurement of tiger parts was shown to be strongly connected to other wildlife. The market for tiger parts, however, shows little connectedness to other species. This is despite leopard being one of the recognized substitutes for tiger bone in TCM.

Chinese law enforcement means that foreign-based smugglers face high risks if they try to market tiger products in China. Foreigners tend to be easily identifiable in China, and their movement is often tracked. Given the preponderance of arrests of Chinese nationals, this is consistent with a transfer to a Chinese organization occurring soon after the border-crossing. It would also be rational to use fewer intermediaries as this reduces the number of nodes an intercept could occur in. It also reduces coordination costs (fewer nodes require less negotiation with other middlemen). With fewer people involved in the smuggling there is less risk that informants will reveal the existence of the network. The reduction in intermediaries is signalled by the size of the arrested conspiracies in China. Only two of the 22 cases of seizures in China for real tiger parts involved more

47. Juan Carlos Vasquez. 'Compliance and Enforcement Mechanisms of CITES', in *The Trade in Wildlife: Regulation for Conservation*, ed. Sara Oldfield (London: Earthscan, 2003), 63–9.
48. Ibid., 68.
49. Chinese sources indicate that most arrests for trade in real tiger-parts came from tip-offs from the public.

than three offenders. One case was in 1999 (11 offenders in Yunnan) and the other was in 2007 (five offenders in Fu Dian). In contrast, seven of the 18 cases of seizures for fake tiger parts involved more than three offenders.

The second major transaction cost is associated with locating a customer and transporting the goods to them. The problem with transport costs may be reflected in the dominance of provinces that are near range states. Travel distance is a normal component of trade and can be expected to influence distribution decisions.

The biggest challenge for smugglers, however, is the distribution of tiger parts in China. Poachers in range states are a relatively small, geographically specific and easily corrupted segment of the population. Consumers of tiger parts, however, are geographically dispersed and may be motivated to tip off police to the presence of smugglers. This increases the coordination and evasion costs to complete a transaction. The challenges of distributing illegal products are not, however, unique to tiger smugglers. There are a number of options available to criminal organizations to distribute their products.

Trade in wildlife products such as elephant ivory in the 1980s took advantage of a legal distribution channel. Poached ivory was laundered into domestic markets in other countries. The legal market provided the least-cost way of distributing the product, solving the coordination problem for smugglers.[50] Customers bought the poached ivory using legal channels. They could not distinguish poached from legally sourced ivory. This made detection of smugglers by consumers practically impossible. It also lowered the evasion costs for smugglers.

Another option used in markets where laundering is not possible is to create a parallel market to distribute the product. Illegal narcotics like cocaine, for instance, may be sold at specific geographical loci. Customers can easily seek out these locations. The size and scope of these markets alongside the willingness of some drug traffickers to use violence to protect their market position makes suppression of these markets difficult. The market can have a sophisticated distribution structure with several intermediaries (wholesale and other middlemen) between the final seller and the customer.[51]

A third option is to 'sell to order'. The customer is organized before the product is smuggled. This has occurred in other wildlife markets. The NZ smuggler Freddie Angell first organized an Asian customer for tuatara (an extremely rare reptile), and then attempted to poach the animals.[52] 'Selling to order' has also been described for some Australian wildlife.[53] The common characteristics of this market are that it is a low-volume trade, dealing in high-value products. The low volume of this trade is likely to mean that demand is irregular.

It has been almost impossible to verify what distribution mechanism has been used to move tiger products within China. A transaction-cost economics approach would predict a mechanism that minimized coordination and evasion costs. This makes it unlikely that the legal TCM system is being used to sell tiger-bone products. A legal distribution network provides a convenient cover when the apprehension risk is low and the search costs for customers can be safely reduced. Nonetheless search costs are very high for customers, and smugglers are converting large bundles of multi-species products to a relatively small,

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50. Brendan Moyle, 'Regulation, Conservation and Incentives', in *The Trade in Wildlife*, ed. Sarah Oldfield (London: Earthscan, 2003), 41–51.
51. Reuter and Kleiman, 'Risks and Prices'.
52. NZPA, 'Tuatara Theft Man Held in Custody', *The Press*, 4 September 1997, second edition.
53. Raymond Hoser, *Smuggled-2* (Doncaster, Kotabo Publications, 1996).

single-species product in China. This does not suggest that they are using a legal transmission system.

To date investigations like those undertaken by TRAFFIC have presumed that TCM retailers provide the mechanism to distribute tiger products. If consumers have prior knowledge of which shops sell the product, then this has the advantage of lowering the customer's search costs. Nonetheless it necessarily assumes that tiger products are being imported for speculative sales. There is good evidence that in some Western provinces this has been employed for tiger skins. The major problem with this approach is that making it easy for customers to find you also means that law enforcement agencies can do so as well. In eastern Chinese provinces there is less evidence of tiger skins for sale in shops and sales of skins are more akin to those of bone, in that these transactions do not have a fixed trading locus.

This method of buying tiger bone medicine thus imposes very high search costs on customers. It is also associated with two major risks for the participants. First, the potential customer will leave a trail of witnesses behind of either shop staff or other customers. For a product whose traffic can involve the death penalty, this creates a tip-off risk to authorities and inflates the expected sanction. There is also a risk for the shop. They have to hold stock of tiger bone on the expectation that they can sell it. This is not something that can be advertised, so they are in effect hoping for the coincidence of a customer arriving when they have the medicine in stock. If no customers arrive they are stuck with their investment in the products (financial risk). Finally, the store has to be confident that none of their staff will alert authorities. There are thus high coordination and evasion costs associated with the shops. Most of these costs can be reduced by not using TCM shops or markets. Another issue is that to sell traditional medicines a paper trail from manufacturer to retailer must be followed. It is of course not possible to *launder* poached tiger products at the moment in China because there is no legal trade that would make laundering feasible.

Hence, if there is no evidence that the legal market is being used to distribute bone (unlike skins in Tibet, Qinghai and Gansu) then an alternative distribution mechanism is likely. The penetrability of this network is likely to be very low given that the consumers will tend to be wealthy (thus can arrange private trading loci) and that trade in tiger products is probably a low frequency event. This alternative distribution network does not have to depend on import for speculative reasons.

A parallel illegal distribution system, such as one modelled on cocaine, suffers the defect of needing high setup costs. This may be economic if the volume of goods traded is sufficiently high that unit-distribution costs fall. For a low volume product the unit-distribution costs are likely to be too high. This seems to be confirmed by the small number of offenders arrested selling real tiger products. A more elaborate distribution system would require the involvement of more personnel.

The type of transactions that are being undertaken (irregular, low volume, low frequency and subject to harsh penalties if caught) imply that 'selling to order' is an appropriate organizational form for distribution. This lowers the evasion costs by committing the buyer and seller to the transaction before the goods are physically transferred. There is no readily observable evidence that a criminal act is being negotiated. The physical transfer is also easy to coordinate. A transfer at a discrete location, such as the buyer's residence, is also less risky than stocking TCM shops.

The business model used by smuggling networks may well leverage off the Chinese culture of *guanxi*. This is a system where relationships between people are developed using trust-enhancing mechanisms (such as gifts) and creates an effective insider–outsider system. Hence a smuggling cell within China based on *guanxi* ties would have low

penetrability. If you are outside this *guanxi* trading relationship (as might be the case with law enforcement agents) then infiltration is going to be hindered. An existing *guanxi* network should also generate low transaction costs for marketing. For instance, such networks could buy tiger products to order and distribute to customers all insulated from scrutiny. Everything that was imported would have a pre-arranged seller. This system would also tend to make customers reluctant to reveal sources to Chinese authorities because of their personal relationship with the smugglers.

The use of a network of interconnected personal relationships to smuggle tiger products almost certainly precludes the participation of casual or poor smugglers. Such a point was practically confirmed at the TCM market in Xi'an. One trader candidly noted that they simply did not have the money to enter the tiger-part trade. Overcoming the Chinese monitoring and enforcement system requires both a high level of organization and a large capital investment (to procure the product). This, alongside the reputed high prices for bone, makes this a product that is probably restricted to the wealthier segments of Chinese society.

To summarize, the evidence on the organization of the black market in tiger products is as follows. First, poaching is done often with local cooperation by poachers who face low apprehension risk. Second, tiger-products are combined with other wildlife products, actually make up a minor physical component of the trade and are transported in bulk to the Chinese border. The low frequency of interdictions at the border shows that the risk of apprehension is very low.

Third, the Chinese black market shows strong geographical association with the closest range states. This implies that the transaction costs facing smugglers are now relatively high (otherwise they could penetrate other provinces with ease). It also probably reflects the endowment of existing trade routes and middlemen that existed prior to the ban.

There are important differences between the Chinese market for skins in the West, and the market for bones and skin in the East. The eastern provinces are characterized by small secretive conspiracies using non-specific trading loci. This reflects the now much higher risks of apprehension given the severe nature of Chinese sanctions. Tiger products are also likely to be a low-frequency trade, which further reduces the penetrability of the network. The most common means of detecting smugglers is either a chance interdiction or a tip-off from the public. Apprehension risk, like other illegal markets, appears to account for many of the organizational shifts that are being manifested in this market.

An overarching problem is that data on the black market is very poor. That has led to a number of extrapolations. An example of this is use of the India–Nepal–Tibet nexus as a model for the black market in other parts of China. This has been compounded by several instances of poor analysis. Procurement costs by poachers are often employed as an estimate of supply costs. EIA says 'A poacher in India could be paid $US1,500 for one tiger skin, whilst a trader in China may offer the same skin for as much as $US16,000 – a profit margin of over 900 percent'.[54] This inflates the profitability of poaching, and to be true assumes poachers have a costless and risk-free way of getting tiger products from reserves in Asia to Chinese consumers. Given that procurement costs make up a trivial element of other illegal products with most of the costs generated by the supply-chain, it is absurd to suggest that wildlife poachers are insulated from subsequent supply costs.

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54. EIA, *Skinning the Cat*, 15.

Conclusion

It is possible to address the issues identified at the start of the paper. First, the arrest data strongly indicates that the trade is dominated by skins and bones. Other tiger parts make up an insignificant component of the trade. Second, the demand for bones is primarily driven by medicinal reasons. This medicinal demand reflects the long-standing TCM employment of tiger bones. The trade ban initiated in 1993 does not appear to have stigmatized the use of tiger parts in TCM. The high black-market prices for tigers are indicative that many consumers in China still have a high demand for these products.

The distribution of tiger parts within China remains poorly understood. The Chinese seizure data is not exhaustive but does indicate that there are regional differences. Tiger bone is more prominent in the east than the west. Tiger subspecies are generally found closest to their nearest range-state. Hence Indo-Chinese tiger parts are more common in Yunnan, Bengali in Tibet and Amur in Heilongjiang. This seizure data is not robust enough for statistical testing, however.

Smugglers appear to have a large set of options for crossing into China. Tiger parts have entered China via land, sea and air-routes. There is insufficient data to infer a preferred approach, albeit vehicles seem to be common through Nepal and Tibet. The geographical regularities in the trade point to the persistence of networks established before the ban, and the complicit involvement of border communities. The Tibetan community within China appears to provide a broad distribution network as far east as Gansu. This may mirror the way cocaine followed the migration of Colombians into the United States.[55]

Along the supply chain the criminal organization adapts the prevailing transaction costs they face. The distribution of tiger parts within China, however, remains the least understood. The logic of moving a low-volume, high-risk product would imply, however, the use of few intermediaries and discrete behaviour. This suggests that the criminal organizations within China have eschewed the use of the TCM retail system. The drug analogue here would be heroin, which also favours fewer intermediaries in response to the harsher penalties.[56]

In terms of developing anti-poaching policies, the prevailing problem is the lack of information. The ability to detect poachers in reserves is poorly developed. Successful poachers have been able to operate for lengthy periods without detection. This situation can be exacerbated by lack of or corrupt local law enforcement. A substantial commitment of resources to monitoring tiger populations and developing the support of local communities appears necessary to reduce poaching.

The benefits of increased interdiction, however, are less obvious. The border into China is very large and the criminal organizations involved have multiple entry methods and multiple entry points. There is considerable organizational scope for these conspiracies to switch entry strategies to evade detection.

There is a pressing need to develop better information about the nature of the conspiracies within China. Given that the traffic in tiger parts is already subject to very harsh punitive sanctions, increased criminal penalties are unlikely to have much impact. Increased effort at detecting the trade in tiger parts may be of value in the West. The reported sale of skins and low arrest frequency indicates that little effective deterrence has been achieved.

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55. Reuter and Kleiman, ‘Risks and Prices’.
56. Ibid., 292.

The original intention of the 1993 domestic ban was to reduce the demand for tiger parts. The price of tiger parts, however, has remained very high and this is consistent with a failure to stigmatize the trade. There is little basis to assume that the ban has been effective at reducing demand, albeit a reduction in the supply of tiger parts is likely. The high black-market price is consistent with a large supply effect on the market.

Education campaigns to reduce demand have been proposed. The difficulty here is in identifying the potential consumers. A blanket approach targetting the formal TCM sector may well have no effect. Existing black-market consumers may have little connection to this sector. It is also not clear what tactics will work to reduce demand. If the current consumers of tiger-products are not dissuaded by a US$50,000 price tag, a possible death sentence if caught and the knowledge that tigers are both endangered and threatened by this trade, what new information can an education campaign provide to reduce demand?

The use of tiger farms is a controversial proposal. The potential benefit is that it may cause some consumers to leave the black market and switch to the legally sourced bone. Farmed tiger-bone medicine eliminates the risk of criminal sanctions for consumers. The impact of such a policy shift will depend, however, on the distribution method employed and the types of medicines produced. For instance, limiting production to tiger-bone wine and distribution to some key TCM hospitals presents entirely different challenges to widening production and the distribution system. A restricted system would make monitoring easier and improve the barriers to laundered products.

This research, however, is not intended to identify the most effective strategies for reducing poaching. The intention is to identify what can be inferred about the organization of the black market. The reality is that conservation policy towards tigers remains poorly informed because knowledge of this black market is very incomplete. The cautionary message of this paper is that it appears to be organized along the supply chain to meet the critical transaction costs it faces. This makes it doubtful that the India–Nepalese–Tibetan nexus can be generalized to the entire black market within China, and it is also highly doubtful that the formal TCM sector provides the vehicle for the distribution of tiger parts in China. The challenges of finding information on small, secretive networks are, however, obvious. The effective deterrence of tiger poaching is going to require a better understanding of the Chinese black market.

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