

# Trading with Bandits

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## Abstract

Is it possible to trade with bandits? When government is absent, the superior strength of some agents makes it cheaper for them to violently steal what they desire from weaker agents than to use trade to obtain what they want. Such was the case with middlemen who interacted with producers in late precolonial west central Africa. In the face of this threat, producers employed two mechanisms to make exchange with middlemen possible. On the one hand, they used credit to alter middlemen's cost-benefit structure of engaging in plunder versus trade. On the other hand, producers demanded tribute from traveling traders as a risk premium. By transforming traveling traders' incentive from banditry to peaceful trade and reducing producers' costs associated with interacting with middlemen, these mechanisms enhanced both parties' ability to capture the gains from exchange.

How wonderful is commerce. (David Livingstone [1963, p. 32], nineteenth-century British explorer of the remote interior of west central Africa)

## 1. Introduction

No sane economist would argue that it is possible to trade with bandits. We have all learned that the market alone is insufficient to prevent the strong from plundering the weak. Indeed, the threat of violence is perhaps the oldest, most well accepted justification for government. Even Adam Smith ([1776] 1965, p. 670) believed this was true: "It is only under the shelter of the civil magistrate that the owner of . . . property . . . can sleep a single night in security. He is at all times surrounded by unknown enemies, whom, though he never provoked, he can never appease, and from whose injustice he can be protected only by the powerful arm of the civil magistrate continually held up to chastise it."

The market, however, might be better at negotiating threats of violence than

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we once thought. Could economists have underestimated the market's power and beauty in this regard?

A growing body of research considers how agents can overcome dishonesty where state enforcement is absent (see, for instance, Clay 1997; Greif 1989, 1993; Kranton 1996; Landa 1994; Leeson 2006; Milgrom, North, and Weingast 1990; Zerbe and Anderson 2001). These studies, however, exclusively consider commitment problems that involve the potential for what might be called "peaceful theft" in that recourse to physical violence is not used to take advantage of the wronged party. For peaceful theft, a separation of payment and provision, not a difference in actual strength, accounts for an individual's ability to defraud his or her exchange partner.

Equally important when government is absent is what might be called "violent theft." Here the perpetrator is a bandit who uses physical force to overwhelm his or her victim. His or her superior strength gives him or her the ability to defraud others.

Introducing bandits into standard models of peaceful theft can cause them to break down. These models rely in various ways on the folk theorem to work. The shadow of the future in conjunction with the threat of multilateral punishment can create cooperation if agents are patient enough. But when some agents are sufficiently stronger than others, multilateral punishment may no longer secure cooperation. Weaker agents can eternally boycott stronger agents who behave violently, but boycott does not prevent stronger agents from simply taking what they want from weaker ones.

This need not always be the case. If the stronger agent is stationary but the weaker agent is mobile, boycott is effective. This is the case, for instance, in the medieval situation described by Greif, Milgrom, and Weingast (1994). However, in situations where individuals have disparate strengths and stronger agents are mobile while weaker ones are not, multilateral punishment cannot work. Weaker agents may refuse to interact with stronger individuals who behaved violently toward them in the past, but if they cannot run and the stronger agents can, their refusal will not prevent them from being plundered again. Something other than the threat of lost revenue from repeated exchange is needed to create cooperation.

Unlike peaceful theft, the topic of violent theft has received relatively little attention. Existing models that consider the potential for violent theft assume that both parties can transform their resources into useful goods or coercive power (see, for example, Bush and Mayer 1974; Umbeck 1981; Hirshleifer 1988, 1995, 2001; Skaperdas 1992, 2003; Anderson and McChesney 1994; Anderson and Hill 2004; Skaperdas and Syropoulos 1997; Neary 1997; Grossman 1998; Grossman and Kim 2002; Bates, Greif, and Singh 2002).<sup>1</sup> While this assumption is reasonable in many cases, it is not in many others. For instance, if one player

<sup>1</sup> For a superb discussion of the emergence of property rights and their defense in the absence of formal enforcement, see also Anderson and McChesney (2002).

has a monopoly on the technology of greatest violence, the other may be severely limited in his or her ability to invest in strength for the purpose of defense or aggression. In these models, introducing severe limitations on the ability of certain agents to invest in additional strength leads to a situation in which those who are not so constrained plunder those who are. Permanently weak agents cannot avoid violent theft in equilibrium (see, for instance, Hausken 2004).

With both multilateral punishment and investment in greater strength eliminated as means for coping with the threat of violent theft, it would seem that there is no way for permanently weak individuals to exchange with stronger ones. Despite this, I contend that trade between permanently weak and permanently strong individuals is possible without government. Weaker individuals' inability to rely on mechanisms described by the folk theorem and to invest in force for defense or aggression does not prevent them from making exchange with bandits self-enforcing in the face of threats of violent theft.

To examine my hypothesis, I consider the case of late precolonial Africa.<sup>2</sup> European settlers on the west coast of Africa employed middlemen to collect the goods they needed for export from producers in the remote interior of Central Africa.<sup>3</sup> In addition to this, some Africans operated as middlemen on their own account—connecting European exporters and others with producers in the interior. Caravans of traveling middlemen were frequently stronger than the communities of producers with whom they interacted. They were thus tempted to overwhelm these communities with force and steal the goods they desired rather than trading for them.<sup>4</sup>

I argue that communities of producers used two mechanisms to transform middlemen's equilibrium strategy from banditry to peaceful trade. First, I discuss producers' use of credit as a means of enhancing the efficiency of producer-middleman exchange relations. Second, I look at producers' demands for tribute from middlemen as a kind of risk premium promoting producers' ability to interact with traveling traders. These mechanisms are new in that, until now, they have not been used to explain how agents make exchange self-enforcing in the face of threats of violent theft.<sup>5</sup>

Because multilateral punishment cannot create cooperation where one class is permanently weak, unlike most models of self-enforcing exchange, mine does not rely on reputation or repeated play to achieve cooperation. Similarly, since

<sup>2</sup> For a classic treatment of West African trade in the colonial period through the early 1950s, see Bauer (1954).

<sup>3</sup> As Serpa Pinto (1881, p. 22) summarized it, “[T]rade in Africa was divisible into two branches, viz. the purchasing of goods from the whites and selling them the produce of the country, and purchasing such produce from the blacks and selling to them the aforesaid goods.” This trade was conducted by traveling middlemen.

<sup>4</sup> The problem I consider here is somewhat analogous to a violent version of the traditional holdup problem discussed by Williamson (1975, 1985), Klein, Crawford, and Alchian (1978), and Hart and Moore (1988), among others.

<sup>5</sup> For an excellent and pioneering discussion on institutions of credible commitment in the context of violent conflict, see Schelling (1960).

one class of players is unable to substantially affect its strength through investment, the emphasis of my analysis shifts from individuals' optimal investments in coercive capital (the focus in existing models that deal with violence) to the strategies employed by permanently weaker individuals to alter the incentive of stronger agents for trade versus banditry.<sup>6</sup>

To examine these strategies, I utilize primary-source materials regarding interaction between middlemen and producers in west central Africa in the latter half of the nineteenth century. These sources are composed from the in-depth reports of about 20 European travelers to the area during this period. Many of these travelers were themselves traders, while others were explorers interested in learning more about the state of African trade for their home countries and spreading the word of Christianity.

## 2. The Context of Producer-Middleman Relations in Late Precolonial Africa

In examining late precolonial interaction between middlemen and producers in west central Africa, this paper deals primarily with the inhabitants around the Upper Zambezi and Kasai, Portuguese-speaking settlers along the Angolan coast, and the middlemen they employed.<sup>7</sup> Middlemen typically traveled in caravans and were constantly on the move.<sup>8</sup> These caravans consisted of other free middlemen, security charged with protecting the caravan on the road, and often a great number of slaves who carried the items for sale. Caravans ranged in size from tens to thousands, although on the basis of the evidence available in travelers' reports, the modal caravan consisted of about 70 or 80 people (Miller 1988, p. 191; Cameron 1877, p. 251; Soremekun 1977, p. 87; Capello and Ivens 1969, 1:17–18; Dias de Carvalho 1890, pp. 186, 192, 193, 700; Harding 1905, p. 214; Johnston 1893, p. 34). Common imports carried by traveling traders to the interior included tobacco, gin, beads, shells, and brass, which were used as body ornaments, cloth, and firearms. As the sole suppliers of firearms to interior communities, middlemen controlled the weaponry reaching producers of goods and thus typically had the upper hand when it came to implements used in fighting.<sup>9</sup>

<sup>6</sup> Olson (1993) and McGuire and Olson (1996) consider the case in which the stronger party finds it in his or her interest to establish permanent hegemony over the weaker individuals. If his or her interest is stable and encompassing, and the ruler is sufficiently patient, he or she can make more this way than by sporadically pillaging weaker parties. This paper considers the use of informal mechanisms that create a cheaper means for stronger agents to credibly commit not to plunder weaker ones than establishing government over them.

<sup>7</sup> Interaction between middlemen and producers in the interior of west central Africa appears to have begun around 1790 (Botelho de Vasconcellos [1844] 1873).

<sup>8</sup> Capello and Ivens (1969, 1:103), for example, described the middlemen of Bihe as "eminently devoted to traveling."

<sup>9</sup> There is no evidence to suggest that middlemen were cartelized or in any way coordinated their actions to prevent arms from reaching producers. Nevertheless, they appear to have infrequently supplied firearms to producers.

Producers consisted of village chiefs, or headmen, and their citizens in the remote interior. These individuals rarely traveled far beyond the bounds of their communities where the resources used in production could be found.<sup>10</sup> Their immobility was strengthened by the costliness of spending significant time away from home, especially in light of the fact that, as producers, traveling for, say, the purposes of trade was not to their comparative advantage. In this way, specialization contributed to their immobility. Since I consider exchange in the postslave export era, commodities supplied by these individuals consisted mostly of ivory, beeswax, and wild rubber. Despite the fact that slave trading was prohibited in Angola in 1836, however, slaves continued to be a source of profit to traveling traders who obtained slaves both for illegal sale to coastal traders<sup>11</sup> and for sale to other African communities.

In the nineteenth century, most of interior west central Africa consisted of disparate communities ruled by chiefs who decided over disagreements among their citizens, including those that dealt with credit and exchange. The relationship of ruler to ruled in these societies was considerably less formal than a modern Western notion of government would imply.<sup>12</sup> Furthermore, the presence of numerous sovereigns created a vacuum of authority for interactions involving the members of different communities. In this sense, it is reasonable to speak of these societies as quasi stateless in that mechanisms of enforcement between communities and, to a lesser extent, within communities were overwhelmingly informal. As two European travelers characterized a portion of the interior they visited, for example, “[I]t is only in extraordinary cases that one can suspect that such a thing as a law exists” (Capello and Ivens 1969, 2:242; see also 1:183).<sup>13</sup>

On the European side, crown-established governors ruled Portuguese settlements on the coast and oversaw trade posts they set up slightly further inland. Of course, the laws of these settlements did not formally bind Africans in the interior. Nor did the customs of interior African communities formally bind the inhabitants of these settlements. The presence of multiple states in west central Africa—both those of indigenous communities and those of European settlements—created ungoverned interstices for interactions between these people.

<sup>10</sup> While some indigenous precolonial agents inside the remote interior of west central Africa migrated within the areas composing this region, very few migrated outside of it, and these were not producers. According to Capello and Ivens, “The natives of T’Chiboco,” for instance, “seldom travel beyond their own country, and it is a rare sight to behold a caravan of Ma-quioco journeying westward for the purposes of trade” (1969, 1:225; see also Serpa Pinto 1881, p. 255; Harding 1905, p. 307).

<sup>11</sup> According to Crawford (1914, p. 28), for instance, the governor at Benguela allowed illicit slave trading to go on under his watch.

<sup>12</sup> As Livingstone (1963, p. 410) observed, for instance, “So far as I can at present understand, there are no such things as nations or kingdoms in the interior of Africa.” See also Capello and Ivens (1969, 2:49, 2:242).

<sup>13</sup> Even where colonial outposts had been established, formal authority was not really effective. For instance, as Arnot commented, “Though Bailundu and Bihe are within the province of Benguella, Portuguese authority has not very much influence there” (1889, p. 111; see also Harding 1905, p. 306; Johnston 1893, p. 59).

### 2.1. *The Threat of Violent Theft*

To profit, middlemen needed to obtain the goods of producers in the interior of Central Africa and bring them to outlying communities and coastal exporters. These goods could be obtained in one of two ways, peaceful trade or violent theft. In connecting stationary producers with people outside the narrow bounds of their communities, middlemen had the capacity to enable producers to realize significant gains from exchange they would have been otherwise unable to capture.<sup>14</sup> The fact that they tended to be stronger than the communities of producers with whom they interacted, however, created a situation in which middlemen were tempted to use force rather than trade to realize their ends (see, for instance, Harding 1905, pp. 93, 108, 124, 138; Cameron 1877, pp. 226, 253, 292, 331, 472; Johnston 1893, pp. 40–41; Gibbons 1904, 1:67; Livingstone 1874, 2:29; 1857, pp. 180, 297; 1960, p. 277; 1963, 1:12). As Cameron (1877, p. 393) observed, for example, left unchecked, caravans “profited by rapine and robbery in passing through countries where people did not possess guns.”<sup>15</sup> Thus, a potentially highly beneficial situation for producers could easily turn into a massively harmful one.

Like all behavior, the decision to engage in banditry over trade is guided by the relative marginal cost and marginal benefit of these alternative modes of action. Sufficiently superior strength lowers the marginal cost of plunder below that of trade as a means of obtaining desired goods. Where an individual is strong enough to take what he or she wants with little or no resistance, it is cheaper to steal than to pay for the desired objects. His or her payoff-maximizing strategy is therefore to violently overwhelm weaker agents.

Two primary features of middlemen accounted for the fact that they were often the stronger force in interactions with interior producers. First, as noted above, middlemen were the source of modern weaponry for producers. Producers by themselves had no access to guns except by way of those sold or given to them by traveling traders. By controlling the quantity and quality of firearms reaching interior communities, middlemen could effectively secure their strength superiority, giving them a decisive advantage should they decide to attack these communities. This advantage was heightened by the fact that usually “in the interior . . . the villages are open and unprotected,” making producers easy targets for better armed middlemen (Serpa Pinto 1881, 1:177). Clearly, this advantage was not always sufficient to ensure victory in an attack. If a caravan was sufficiently small and the community it attempted to plunder was sufficiently

<sup>14</sup> As two travelers to the interior put it, “Commerce, by obliging them [traveling traders] to make repeated journeys, carries with it, as a necessary consequence, the establishment of relations and the making of contracts with distant peoples” (Capello and Ivens 1969, 2:18).

<sup>15</sup> Caravan leaders often made this bad situation worse by encouraging their groups to steal from the villages to which they traveled. Leaders were usually responsible for providing their group’s provisions on the road, and provisions became very costly when caravans were large (see, for instance, Serpa Pinto 1881, 1:165). Theft was thus sometimes promoted as a cost-cutting measure. As Cameron (1877, p. 259) observed, for example, “At Kwakasongo there is an Arab settlement of some size. . . . [T]hey send out their caravans. . . . These fellows get no pay, but are allowed to loot the country all round in search of subsistence and slaves.”

large, better weaponry was meaningless. Of course, overcoming this potential obstacle to banditry was not all that difficult. Middlemen simply needed to be selective about the communities they targeted for attack.

Second, middlemen were highly mobile, and producers were highly stationary. This meant two things for middlemen's success in plundering expeditions. On the one hand, middlemen could always return to the coast or their home bases near the coast and gather additional members if greater numbers were needed to succeed in violently stealing from interior communities of producers. Perhaps even more important, however, the relative immobility of producers meant that middlemen could escape from conflict with their booty by fleeing to the coast without much worry that they would be overtaken later by bands of producers who would need to locate, track down,<sup>16</sup> and recover what had been stolen.<sup>17</sup>

## 2.2. Modeling the Threat of Violent Theft

Modeling the threat of the violent theft that producers confronted is straightforward. Consider an economy of complete and perfect information with one community of producers and one caravan of middlemen. Because it is stationary and sufficiently weaker than the caravan of middlemen, the community of producers does not have a choice about whether or not it will interact with middlemen. If the caravan approaches the community of producers, it cannot avoid interaction. Multilateral punishment, which requires the ability to terminate future interaction in the event of noncooperative behavior, is therefore not an effective strategy for preventing banditry here. While the community of producers does not control whether or not it will interact with the caravan that approaches it, it does control a different variable of the game—how much it produces.

Producers move first and decide whether to produce for trade or for subsistence. Producing for trade means producing a relatively large quantity of goods that producers may either consume or use for immediate trade with the caravan if it approaches them. Producing for subsistence means producing a small quantity of goods just larger than necessary for producers' personal consumption. Production for trade therefore involves a surplus stock of goods that affords producers additional consumption and additional trade, while production for subsistence involves a stock just large enough to sustain the population and permits only a minimal level of trade.

The caravan of middlemen moves second and chooses to do one of the following: stay home, that is, not travel to the community of producers at all; travel

<sup>16</sup> According to Crawford (1914, pp. 22–23), agents in west central Africa at this time also frequently changed their names. This, of course, would have contributed to the difficulty of tracking down violent middlemen. However, it remains unclear how pervasive this practice was.

<sup>17</sup> A third reason for middlemen's strength superiority could also be added. Namely, the fact that they were mobile and producers were stationary meant that middlemen had the ability to initiate surprise attacks on communities of producers. This may help to explain Serpa Pinto's (1881, 1:178) comment, "It is a noteworthy circumstance connected with wars in this part of the Africa, that the attacking party is ever the victor."

to the community of producers and trade; or travel to the community of producers and plunder. Following the discussion in Section 2, the caravan's attempt to plunder is always successful and met without resistance such that the community loses all it has produced when it is plundered.

If producers produce for trade and middlemen stay home, producers receive  $H_p$  and middlemen receive  $H_m$ —what each can earn without interacting with the other. If middlemen trade, both producers and middlemen earn a higher payoff from exchanging,  $E_p$  and  $E_m$ , respectively, where  $E_m$  is middlemen's payoff net of traveling expenses. If middlemen plunder, they receive an even higher payoff yet, which when travel expenses are deducted gives them  $P$ . Producers, on the other hand, receive their lowest payoff in this case,  $-H_p$ .

The situation is similar if producers produce for subsistence, but the payoffs change because a smaller stock of goods is available for producers to consume, for middlemen to violently take if they choose to plunder, and for producers to trade with middlemen if middlemen decide to exchange. Only middlemen's payoff from staying home, which is unaffected by the stock of goods producers keep on hand, does not change when producers produce for subsistence. Thus, if producers produce for subsistence and middlemen stay home, middlemen continue to earn  $H_m$ . Producers, however, earn less. Because the inconvenience of producing just enough to sustain the community is costly, producers receive a payoff of only  $h_p$ , where  $h_p$  is equal to  $H_p$  minus the value they place on the forgone stock in consumptive uses. If middlemen plunder, producers receive  $-h_p$ , which is their smallest payoff when they produce for subsistence but which is larger than what they receive when middlemen plunder and they produce for trade ( $-H_p$ ). Middlemen in this case earn  $p$ , which is more than they earn by trading but, because there is so little to steal, is smaller than the payoff of staying home ( $H_m$ ). Finally, if middlemen trade, producers earn  $e_p$ , which is smaller than what they earn from trade when they produce for trade (because there is a smaller stock available for trading) but which is still their highest payoff when they produce for subsistence. Middlemen in this event earn  $e_m$ , their smallest payoff, which includes the cost of travel. To summarize, for producers,  $E_p > H_p > e_p > h_p$ , and for middlemen,  $P > E_m > H_m > p > e_m$ , where  $E_p + E_m > P - H_p$ , which is to say that the higher level of trade is socially efficient. This game is depicted in Figure 1.

The unique subgame perfect Nash equilibrium of this game involves producers producing for subsistence and traveling traders staying home. If they produce more, producers increase middlemen's payoff from banditry by making more available to steal. This entices middlemen to plunder, which generates losses for producers. To avoid these losses, producers produce only what is needed to sustain themselves. As a result, there is little available for theft, which creates a situation for middlemen in which staying home yields a higher return than plundering. In equilibrium, producers earn  $h_p$  and middlemen earn more,  $H_m$ . Producers pay for their strength inferiority by incurring the cost associated with reducing stocks to a level that prevents middlemen from engaging in banditry.



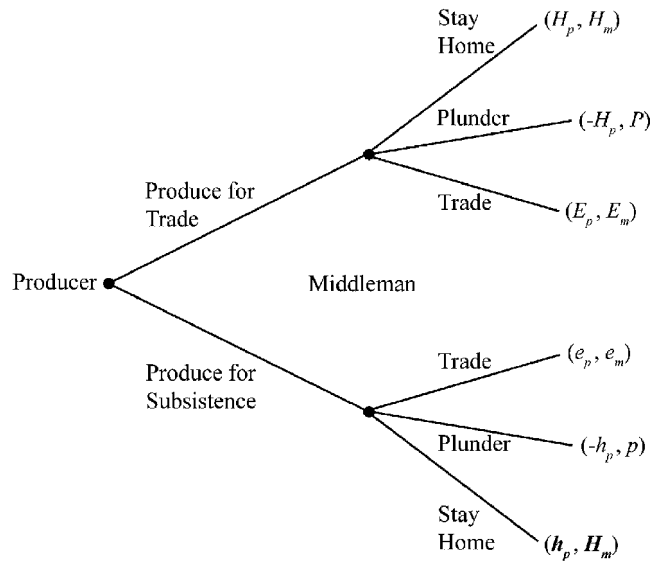


Figure 1. The threat of violent theft

In discouraging middlemen from interacting with them, producers also forgo significant potential gains from trade. The threat of being plundered, however, did not prevent trade between middlemen and producers in the late precolonial period. Indeed, legitimate exports supplied by remote interior producers leaving Angola alone amounted to close to \$4 million per year by the end of the nineteenth century (Vellut 1979, p. 101). How did producers overcome the threat of violent theft posed by trading with bandits?

### 3. A Clever Use of Credit: You Can't Steal What's Not There, but You Can Trade with It

To capture the gains from trade with middlemen, producers required a strategy that would keep middlemen's payoff from plunder below the payoff from staying home, as in the case in which they produced for subsistence, but raise middlemen's payoff from trade above the payoff from staying home, as in the case in which they produced for trade. Credit made these two seemingly incompatible goals possible. Although middlemen could not steal goods that did not yet exist, credit enabled producers to trade with goods that did not yet exist. By keeping current stocks low but exchanging with middlemen on credit, producers could produce for subsistence, thus deterring plunder but still enabling trade, which would allow both sides to reap the benefits from exchange.

To see explicitly how the use of such credit arrangements enhanced producer-middleman exchange, consider the game in Figure 2. This game is like that from

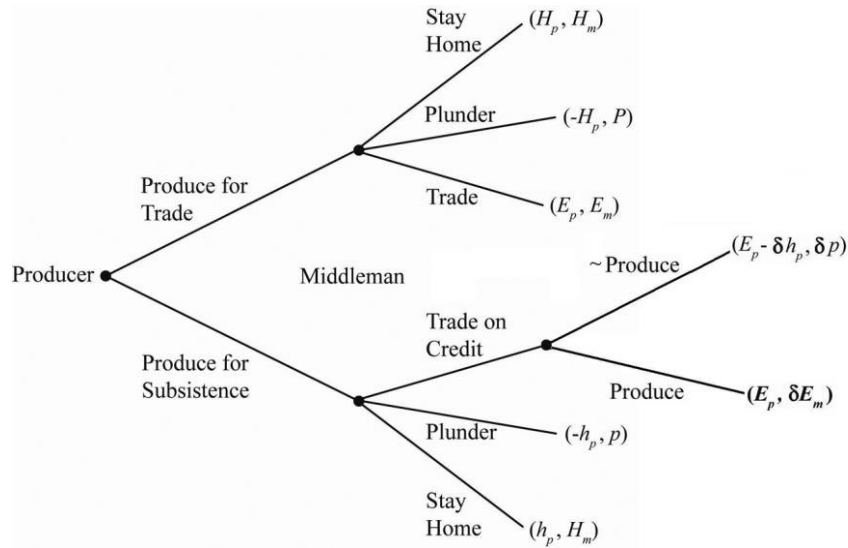


Figure 2. A clever use of credit

Figure 1, only now when producers produce for subsistence, let middlemen's trade strategy be trade on credit rather than simultaneous exchange. This modification makes the analysis dynamic. When trade on credit is chosen, each round is composed of two subperiods: one in which middlemen provide credit and another in which, if producers have produced, exchange takes place, and if they have not, they are plundered to clear off as much of the debt as possible.<sup>18</sup>

The payoffs on the Produce for Trade branch of the tree remain the same as before. Likewise, the payoffs from {Produce for Subsistence, Stay Home} and {Produce for Subsistence, Plunder} remain the same. However, because it now involves trading on credit, which increases the volume of exchange that is possible, the payoff of trade under subsistence production rises.

Since credit is provided in the first subperiod, middlemen receive what they are owed in the second subperiod only if production has actually occurred. If middlemen provide credit and producers subsequently produce, producers receive the same payoff as when they produce for trade and middlemen trade under the Produce for Trade branch of the tree,  $E_p$ . Middlemen, on the other hand, earn  $\delta E_m$ , where  $\delta$  is the caravan's discount factor and  $\delta \in (0, 1)$ . The reason for discounting middlemen's payoff is straightforward. Because trade in this case is conducted on credit in the first subperiod, middlemen only receive all or part of the gains from exchange via repayment in the second subperiod.

<sup>18</sup> For instance, when the traveling trader "Hassani of Dugumbe got [a] chief into debt" and the chief could not repay, Hassani "robbed him of ten men and ten goats to clear off the debt" (Livingstone 1874, 2:35).

If after receiving credit in the first subperiod, when the caravan arrives to receive payment in the second subperiod, producers have not produced, middlemen punish them by plundering what is available. If this happens, producers receive  $E_p - \delta h_p$ —what they received on credit in subperiod 1, less the discounted value of what is taken from them in subperiod 2. Middlemen, on the other hand, receive  $\delta p$ —the discounted value of what they are able to take as compensation in subperiod 2.

What course of action the caravan of middlemen now finds most profitable depends on its discount rate and the credibility of producers' promises to produce in subperiod 2. Where  $\delta > H_m/E_m$  and producers can credibly commit to produce, trade is more profitable for the caravan than staying home. Where  $\delta$  does not satisfy this inequality or producers cannot credibly commit to produce, the caravan finds staying home more profitable. Since  $E_p > E_p - \delta h_p$  for any  $\delta \in (0, 1)$  and  $E_p > h_p > -H_p$ , producers can credibly commit to produce for repayment in subperiod 2. Given this, for middlemen whose discount rates satisfy  $\delta > H_m/E_m$ , trading on credit is the payoff-maximizing strategy. For middlemen whose discount rates do not satisfy this inequality, staying home is payoff maximizing. In equilibrium, the caravan travels to the community of producers only if it is going to trade (on credit) and stays home if the caravan poses a threat of violence. Plunder is therefore avoided, and producers and middlemen who are sufficiently patient realize the gains from exchange.

The use of credit for this purpose in producer-middleman exchange was ubiquitous. As the traveling trader Henrique Augusto Dias de Carvalho put it, “[T]he trader sees himself forced to give credits, and this is indispensable for anyone who takes the risk of trading in such a region, if he wants to do it with any success” (1890, p. 700; translation from Oppen 1994). Producers' efforts to keep stocks of “thievable” goods low was considerably eased by the fact that many of the goods desired by middlemen—for instance, ivory, rubber, and wax—required harvesting before they were available in exportable form. These goods remained in the ground, so to speak, until collected by producers. To keep stocks perpetually low, producers protracted the process of debt repayment (see, for instance, Cameron 1877, p. 47; Livingstone 1874, 1:305; Dias de Carvalho 1890, p. 699). Consider, for example, the observation of a European traveler to the Upper Zambezi and Kasai, Paul Pogge:

The native would be little inclined to gather the products of his country, were he not given the payment in advance. . . . [Ambaquista middlemen—A.v.O.] can buy some products in the interior, these being brought to them by the natives and paid [immediately]. . . . In general, however, they cannot purchase very many commodities in this way but instead give the native credit. Where rubber occurs in the forest, and where the elephant occurs, the Baptist [Ambaquista] gives payment in advance to the elephant hunter for so and so many tusks, and to the one who wants to bring rubber or beeswax payment for so and so many pounds of rubber or wax. *These people then have to wait for months*

*and years until their debtors satisfy them* (Oppen 1994, pp. 397–98; emphasis added [translation of Pogge 1880, p. 16]; see also Buchner 1883, p. 82).

The goods that producers desired that middlemen extend to them on credit—for instance, alcohol, cloth, and tobacco—were typically the kind of goods that producers consumed shortly after receiving them. Middlemen were therefore not able to extend goods to producers on credit and then retake them by force when they returned to a village to receive an installment of debt repayment. Obviously, however, producers could not reduce their stocks of goods to zero. They needed to keep some provisions on hand to survive. In addition, some goods desired by traveling traders—for instance, slaves—could not be made unavailable in the way that others could. There was consequently always something available for stronger middlemen to steal if they so desired. Nevertheless, by significantly reducing their holdings, producers could concomitantly reduce the benefits of violent theft to middlemen bent on banditry. Furthermore, it was unnecessary for producers to reduce their stock of goods to zero to have the desired effect. As long as stocks were kept low enough that the value of the goods available for plunder was lower than the payoff from trading on credit, middlemen would trade with producers rather than plunder them.

The pattern of historical references to producer-middleman credit agreements closely tracks the declining importance of slaves and rising importance of ivory, rubber, and wax from the 1840s and 1850s onward following the abolition of Angolan slave trading in 1836 and then slavery itself in 1858. In the first half of the nineteenth century, credit agreements are rarely mentioned.<sup>19</sup> In the second half of the century, however, they are common. This reflects the fact that, for reasons discussed above, the credit mechanism was not especially effective in preventing plunder by middlemen seeking slaves but was highly effective in preventing plunder by middlemen seeking other goods.

While my model considers the bilateral case, in actuality multiple caravans of middlemen interacted with multiple communities of producers.<sup>20</sup> The presence of multiple communities of producers and caravans introduced the possibility of one caravan plundering the goods harvested by producers to repay another caravan as part of a previous credit agreement. For two reasons, however, it seems unlikely that caravans could effectively pursue this strategy. First, for such theft to be effective, caravans would require specific knowledge of when the goods produced to repay other caravans were available for stealing before they had been collected.

Second, caravans had strong incentives to ensure that other crews of middlemen would not plunder the goods owed to them. The use of credit created a stake for middlemen in the well-being of producers. By indebting themselves to

<sup>19</sup> Where credit is mentioned, producers rather than middlemen were the creditors. See, for instance, Baptista (1873).

<sup>20</sup> For instance, Buchner refers to Mwant Yav's "business relations with a number of traders from the coastal areas" (Oppen 1994, p. 360 [translation of Buchner 1883, p. 62]).

middlemen, producers transformed their status in the eyes of these traders from targets of violence to productive assets. To produce the goods necessary to repay their debts, producers needed to be alive and well. It was therefore in the interest of middlemen to ensure the health and safety of those to whom they made loans. To protect their valued investments, middlemen had an incentive to abstain from using violence against producers who owed them goods and to deter other middlemen from using violence against these producers. One way they accomplished this was by punishing middlemen who wronged them. For instance, as Arnot (1889, p. 179) records in one case, “[T]hree Garganze caravans had been plundered and many men killed—one at Bihe, another in the Lovale country, the third in the Lunda country, but all at the instigation of Bihe chiefs and traders, who thought that they had been unjustly dealt with in certain business transactions they had with Msidi.”

It is not clear whether certain caravans were able to establish monopoly control over some areas. Securing an effective monopoly would require a significant, lasting strength disparity between caravans such that potential competitors could be forcibly excluded from trade with particular villages. Such a disparity may have existed in some instances, but clearly did not in many others. A monopoly caravan would create quite unfavorable terms of trade for producers. In principle, monopoly middlemen could get away with paying producers just slightly more than their payoff of producing for subsistence and not trading on credit (producers’ equilibrium payoff from Figure 1). Where competition was absent then, it would be reasonable to expect poor bargaining power among producers and near-subsistence wages. However, the historical record indicates that for some producers quite the opposite prevailed. As one traveler complained about the villagers he encountered, for example, “[T]he people being satiated with cloth, owing to their constant intercourse with the coast, would sell us nothing, or asked higher prices than we could afford” (Cameron 1877, p. 390).

#### 4. Tribute as a Risk Premium

In communities where wealth was predominantly held in the form of humans (slaves) and livestock, producers were constrained in their ability to reduce the size of their thievable stocks. As long as stocks were not so large as to make banditry more profitable than trading on credit regardless of a caravan’s discount rate, sufficiently patient caravans continued to find trading on credit the most profitable course of action. To see this, consider a community that, because it holds much of its wealth in the form of humans and livestock, cannot reduce its stock of goods as low as other communities that do not hold most of their wealth in these forms. The benefit of plundering this community is therefore higher,  $\Psi$ , where  $\Psi > H_m$ . Despite this, if  $\Psi < E_m$ , there exists some caravan that will continue to find the payoff from trading on credit ( $\delta E_m$ ) to be greater than the payoff from plundering ( $\Psi$ ). Specifically, where  $H_m < \Psi < E_m$ , caravans with discount rates that satisfy  $\delta > \Psi/E_m$  will trade on credit.

However, caravans with discount rates where  $\delta < \Psi/E_m$  will not. In fact, because  $\Psi > H_m$ , some caravans that would rather stay home than trade on credit with producers who can reduce their stock of thievable goods sufficiently would rather plunder producers who cannot do this than stay home. For these middlemen, banditry is the most profitable course of action in this case. Thus, while producers who could reduce their stocks sufficiently were safe from plunder and could trade with bandits, those who held their wealth in the form of humans and livestock could not. Sufficiently patient middlemen would trade with them on credit, but impatient ones would plunder them.

To overcome this problem, communities of vulnerable producers demanded tribute from traveling traders who approached them for exchange. Typically, village headmen<sup>21</sup> were the gatekeepers to producers and required middlemen to meet their tribute demands before trade relations could be consummated.<sup>22</sup> As the prominent middleman Antonio Francisco Ferreira da Silva Porto recorded, for example, tribute payment “*was necessary to open the door!* We tried to find the solution to this enigma and found out that it was necessary to give some pannos [yards of cloth—A.v.O.] to obtain permission for the people of the caravan and of the country to buy and sell provisions and other commodities, without which nothing could be done” (Silva Porto 1885, p. 580 [translation from Oppen 1994, p. 390]; see also Crawford 1914, p. 118; Harding 1905, p. 148).

The way tribute worked is straightforward. Let caravans of middlemen be heterogeneous in discount rates such that  $\rho$  is the proportion of caravans with discount rates that satisfy  $\delta > \Psi/E_m$  and  $1 - \rho$  is the proportion of caravans with discount rates that do not satisfy this inequality. Obviously, if a caravan of middlemen was excessively impatient and so intended to plunder a community, demanding tribute was worthless. The stronger caravan would simply overwhelm the community, refuse tribute payment, and go about violently stealing what it

<sup>21</sup> Tribute was sometimes kept and consumed by the chief, or headman, who received it. This did not, however, inhibit tribute’s usefulness as compensation for the cost imposed on villagers by violent middlemen. Occasionally, local rulers would declare a monopoly right to trade with middlemen who approached them. In this event, tribute functioned as a premium offsetting the ruler’s risk of trading with the outsider. In addition, tribute consumed by local leaders indirectly reached villagers in the form of public investments undertaken by the ruler, for which tribute was his pay. For instance, resolving community disputes (via arbitration) was a common duty of rulers, as was generally maintaining community order. Likewise, rulers could be charged with providing food in the event the community encountered hard times—a form of social insurance. Tribute collected and consumed by a chief functioned as payment for performing such public services, indirectly compensating community members for the risk posed by impatient middlemen.

<sup>22</sup> As noted previously, some chiefs, or headmen, had coercive power. When this power was greater than that of a visitor, he could use this to coerce tribute payment. More often than not, however, for reasons described above, it seems that this was not the case. Instead the power of chiefs was in (1) preventing access to their community. This was the case, for instance, if a river separated a chief’s community and those desiring to visit it and the canoe was on the chief’s side of the river (see, for instance, Cameron 1877, p. 266). The power of the chiefs was also in (2) refusing to furnish guides or assistants to visitors who did not know the area or how to safely get to the next village or who required additional protection when traveling between villages, and so on.

desired. For those caravans that were not too impatient, however, demanding tribute was effective.

These middlemen found peaceful exchange more profitable than plunder and were therefore willing to pay for the opportunity to trade. Where producers cannot reduce their stocks sufficiently and the resulting benefit from plunder is  $\Psi$ , their expected payoff of producing for subsistence and trading on credit is given by  $\rho(E_p) + (1 - \rho)(-h_p)$ , which is greater than producers' expected payoff of producing for subsistence and not trading on credit for any  $\rho > 0$ . Sufficiently patient middlemen earn  $\delta E_m > \Psi$  when producers agree to trade on credit and  $\Psi$  when they do not. This being the case, producers could demand tribute  $T$  from sufficiently patient middlemen in order to exchange with them on credit, where  $T \leq \delta E_m - \Psi$ , and these middlemen would pay this (in addition to those others cited here, see, for instance, Arnot 1889, pp. 71, 80, 102, 135, 136, 137, 151, 159, 204; 1893, p. 26; Harding 1905, pp. 81, 95–96, 142, 148, 290; Serpa Pinto 1881, 1:67–68, 1:90, 1:175, 1:228–29; Graca 1890; Johnston 1893, p. 111; Capello and Ivens 1969, 1:87, 1:116–17, 1:137–38; Livingstone 1963, 1:9, 1:33, 1:98; Cameron 1877, p. 77).<sup>23</sup> Thus, “it is not surprising that tribute is paid to the [every] village headman where one sets up the camp” (Silva Porto 1885, p. 577; translation from Oppen 1994).

Tribute demands acted as a risk premium charged by communities of vulnerable producers. They helped to protect producers against the risk of interacting with traveling traders who, as a general class, consisted of some patient and some impatient members. In particular, tribute acted as a tax on patient middlemen that was used to subsidize the banditry of violent impatient middlemen. By taxing middlemen who expressed a desire to exchange, producers were able to extract compensation from patient middlemen (who traded with them) to cover losses imposed by impatient ones (who plundered them).<sup>24</sup> This helps to explain François Coillard's (1897, p. 611) remark about the Luvale chief—Chief Kakenge—when he noted the “homage or rather a tax he exacts from black Portuguese traders who enter his country.”

Often, although not always, tribute took two forms: goods that producers consumed immediately or shortly after receiving them, for instance, an ox that would be slaughtered and eaten right away, alcohol, or tobacco; or European novelties (for example, a watch) that were not sought by middlemen to bring

<sup>23</sup> It should also be noted that as the proportion of impatient caravans in the population increases, the credibility of producers' threat to not trade on credit with those who refuse to pay tribute increases as well. As  $\rho \rightarrow 0$ , the gains producers forgo by adhering to this strategy fall.

<sup>24</sup> Where the total population of middlemen is  $\theta$ , producers generate  $\rho\theta T$  in revenue from demanding tribute, which is used to help offset losses in the amount  $(1 - \rho)\theta(-h_p)$ . To completely offset the losses imposed by impatient middlemen,  $T = -[(1 - \rho)(-h_p)]/\rho$ . As already noted, however, the amount producers could demand in tribute was bound at the upper limit by  $\delta E_m - \Psi$ . Whether or not full compensation was possible therefore depended on how much greater the payoff of trade was over the payoff of plunder for patient middlemen (which in turn depends on how patient patient middlemen are), the proportion of impatient middlemen in the population, and the value of the stock lost in the event of plunder (which, of course, depends on the extent to which producers are able to reduce their stocks).

to coastal European traders for export. The reason for this is clear—to avoid tribute payments contributing to vulnerable communities' stocks of thievable goods. If tribute was either consumed quickly or consisted of goods middlemen were not looking for, producers did not need to fear losing it to banditry by a violent caravan.<sup>25</sup>

Key to its usefulness as a risk premium, tribute also needed to constitute a net gain to recipient producers. This ruled out the possibility of present reciprocation, as was practiced in gift exchange arrangements between some villages.<sup>26</sup> Thus, although communities of producers often offered traveling traders food or temporary shelter after receiving tribute, these “gifts” were worth substantially less than those they demanded (Miller 1970, p. 193), which left a large effective premium in place. Noting this value discrepancy, Livingstone, for instance, complained, “[T]he Negroes do not seem to have the smallest idea of presents being reciprocal” (1963, p. 253; see also, Harding 1905, pp. 192, 290).

## 5. Conclusion

My analysis leads to three conclusions. First, individuals can in fact trade with bandits. Conventional wisdom underestimates the market's power to solve the problem of violent theft. Even in the extreme case where weak individuals cannot use multilateral punishment or invest in additional strength to fend off stronger ones, the absence of state policing need not bring exchange activities to a halt. While the potential for violent theft poses a significant threat to the ability of individuals to realize the gains from trade, the benefits of preventing this threat from becoming a reality compel agents to develop informal solutions to the problem of banditry. By altering the cost-benefit structure of trade versus violence, these solutions have in common the fact that they transform stronger agents' incentive from plunder to peaceful exchange.

Second, although credit is often the cause of commitment problems involving peaceful theft, it serves as a solution to the problem of violent theft where one party to an interaction is stronger and more mobile than the other. By minimizing stocks of desired goods and trading on credit, vulnerable parties simultaneously reduce the benefit of violent theft by stronger individuals who are tempted to take advantage of their superior strength and increase the benefit of exchange.

Third, to the extent that some stronger individuals are prone to use force to

<sup>25</sup> The fact that thievable goods were sometimes demanded as tribute is attributable to two possible factors. On the one hand, this may reflect that some communities of producers assigned a relatively low probability to being plundered by a caravan of violent middlemen. On the other hand, even though the tribute a community received—say, a slave—would ultimately be stolen by a violent caravan, in the time between when the community received it and the time it was stolen, the employment of the slave yielded some benefit to the community. If the slave were needed enough, this benefit could outweigh the benefit of a nonthievable tribute, even though its employment would not be permanent. In this case, the slave would be preferred as tribute to say, an ox, even though the former was at risk for theft while the latter was not.

<sup>26</sup> For an excellent analysis of the gift exchange system see Landa (1994).



obtain the goods they desire and others are inclined to trade (owing to a difference in discount rates), agents who are part of a weaker group may be able to protect themselves against the risk of interacting with members of a stronger group by demanding a premium from them in order to exchange. Although permanently weak agents cannot refuse to interact with stronger individuals who want what they have, weak individuals can refuse to exchange on credit with stronger individuals because the goods in question do not yet exist. Members of the stronger group who are inclined to trade rather than plunder will therefore pay this premium when it is required for them to enable exchange. This premium helps to offset the losses experienced by members of the weaker group when they interact with members of the stronger group who are prone to use force to obtain what they desire. By compensating vulnerable agents for the risk of interacting with unknown members of the stronger group, this premium makes exchange possible despite the risk inherent for permanently weaker agents.

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