

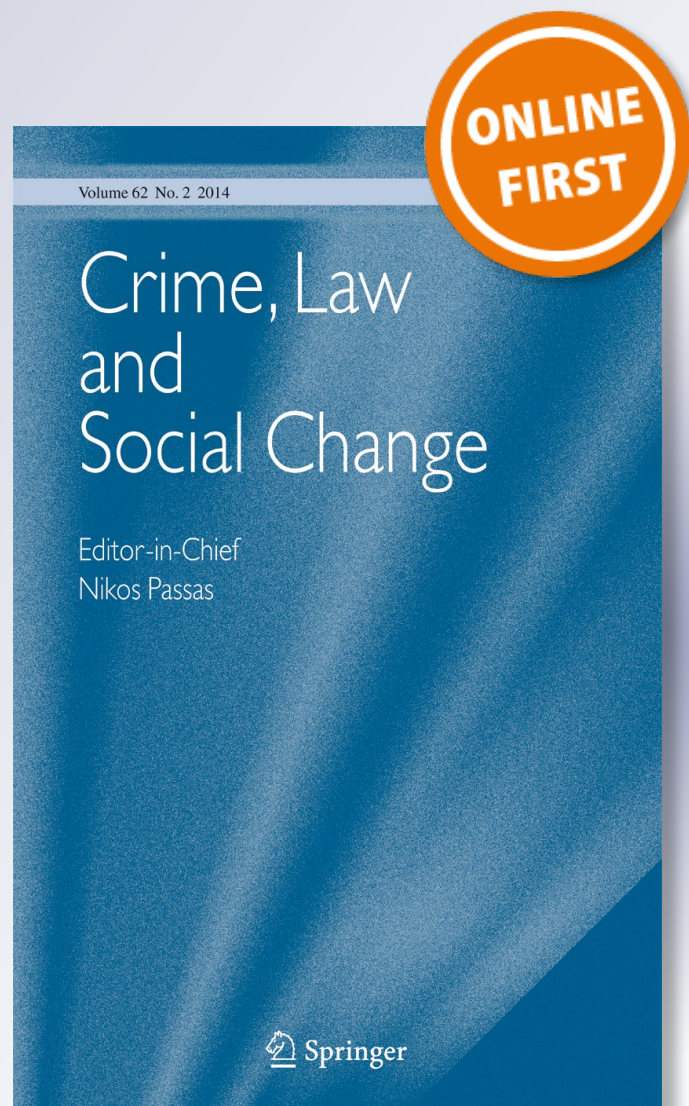
Illicit arms transfers to Africa and the prominence of the former Soviet bloc: a social network analysis

David Kinsella

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Illicit arms transfers to Africa and the prominence of the former Soviet bloc: a social network analysis

David Kinsella

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Abstract Small arms and light weapons are the primary causes of death in the violent conflicts raging today. Although the small arms trade is difficult to track, and the illicit trade doubly so, a wealth of information is available. This article applies some basic tools of social network analysis (SNA) to reveal the high profile of former Soviet bloc countries in the illicit arms trade with Africa. I set up this analysis with a discussion of the features of social networks that allow them to facilitate the transfer of illicit weaponry, and follow the presentation of my findings with some explanations for the prominence of Russia and other post-communist countries in this trade. My discussion focuses on the importance of relationships, their quantity and quality, as providing opportunities for, and constraints on, the flow of material and social resources between the actors and locales that comprise the illicit arms trade network. I also highlight the extent to which the positions of key players may account for their power within the network and their roles in security governance, which in the illicit context requires the maintenance of secrecy and redundancy.

Introduction

Despite the downward trend in the total dollar value of the arms trade since the end of the cold war, there is no such trend in the international transfer of small arms and light weapons (SALW). Comprehensive and reliable longitudinal data on the volume of the SALW trade are only now becoming available, but developments over the past two decades point to an increase in the flow of this type of weaponry. The proliferation of low-intensity warfare, conflicts in which SALW figure prominently, is a source of increased demand, while stocks of military surplus created by the dissolution of the Warsaw Pact and the collapse of the Soviet Union vastly increased supply. Light weaponry continues to be produced—by an expanding number of manufacturers, many

D. Kinsella (✉)
Hatfield School of Government, Portland State University, 1825 SW Broadway, Portland, OR 97201,
USA
e-mail: kinsella@pdx.edu

of them driven to export in order to achieve economies of scale—and some of this is added to the second-hand equipment circulating in today's war zones.

Of this trade in SALW, the value of which has been estimated at roughly \$4 billion per year, probably 10–20% occurs in the black and gray markets.¹ Information about the illicit arms trade abounds, particularly in the form of investigative journalism and reports on the field activities of nongovernmental organizations involved in small arms control and disarmament. Although much of this information has been gathered, collated, and examined by researchers in the academic and activist communities, systematic data collection and analysis has yet to proceed very far. Data collection itself is a formidable task. Aside from the obvious difficulty deriving from the efforts of black marketeers to keep their activities out of view, the variety of actors, locales, equipment, and forms of transaction involved in the illicit arms trade presents a major challenge for any attempt to catalog them in a systematic way. Nevertheless, some progress is being made and it is not too early to begin mapping the structure of black market transfers of SALW.

I do three things in this article. First, I discuss illicit arms transfers in the context of illegal markets and social networks. Scholars who have examined social networks as distinctive forms of organization offer insights that I find useful for understanding the illicit arms trade, the role of social capital in the functioning of these trafficking networks, and their resiliency despite the efforts of militaries and law enforcement to curtail this lethal trade. Second, I make use of some descriptive procedures, from among a set of quantitative and visual tools known as social network analysis (SNA), to illuminate some of the structural features of the illicit arms trade to Africa. For this purpose, I employ data drawn from an evolving database I have been assembling on illicit arms transfers worldwide. Finally, because former Soviet bloc countries appear to be prominent in the illicit arms trade, I consider some of the explanations that have been offered to account for this and other transnational criminal activity. I also offer some concluding observations on the challenges of data collection for systematic research on the illicit arms trade.

Supply of illicit arms

Virtually all illicit arms transfers are SALW, and in this category of armament researchers generally include pistols, rifles, assault rifles, carbines, machine guns, hand-held and mounted grenade launchers, portable anti-tank and anti-aircraft guns, portable missile launchers, and small caliber mortars. In any given geographic space, the stock of illicitly acquired weaponry may come from three basic sources: government stocks, local manufacture, and imports.²

Weapons may leak from government stocks because they are either stolen or sold. In the context of domestic unrest, armories and ammunition depots are often the target of raids by rebel fighters [45, 58, 41]. Government arms shipments are susceptible to

¹ On the SALW trade, see [14, 78, 25, 16, 27, 26, 7]. The estimate of the illicit portion of the overall SALW trade is reported in [57]. Although one might want to distinguish between illicit and illegal arms, I do not do so in this paper. But see, for example, [38, 1].

² This discussion follows [56].

interception in transit as well. Of course, the vulnerability of government stocks to theft is a function of the regime's capacity to guard weapons facilities and its legitimacy in the eyes of the guardians. Not all theft is the consequence of overwhelming force deployed by raiding parties; military or security personnel may offer various levels of assistance, even by simply looking the other way, when their allegiances or sympathies begin to lean away from the sitting government. Soldiers, police, or other officials may be similarly motivated to sell the arms at their disposal, but typically these illicit sales are driven by personal gain, or just necessity borne of dire economic circumstances. Lastly, because taking up arms against the government is illegal, weapons captured from government forces during the course of battle are also gotten illegally.

Most illicit weaponry was legally produced; it is only later that laws are broken by virtue of the manner in which possession has been transferred from one party to another. However, in areas of persistent conflict, illicit local production and refurbishment may emerge to help meet the high demand for small arms and explosives. Much of this takes place in private workshops or residences and is best characterized as craft production. As governments almost never sanction this sort of local manufacture, these arms add to a region's illicit stocks as soon as they leave the gunsmith's workbench [11, 50].

Illegally obtained weapons are often shipped across state borders. But not all illicit arms transfers start as leakages from the government arsenals. Governments themselves may covertly supply anti-government forces in other states; these transfers typically violate laws operating in the destination country, sometimes the laws of the supplying state, and, arguably, international law as well.³ Clearer violations of international law are arms transfers undertaken, authorized, or otherwise facilitated by governments that nevertheless contravene United Nations arms embargoes; they violate the UN Charter, which obligates states to accept and carry out the decisions of the Security Council. These transfers, along with sanctions-busting arms shipments by nonstate actors, whether motivated by political or economic considerations, add to the stock of illicit weaponry within a geographic locale.⁴

For an illicit international arms transfer to be completed, three types of actions must occur. First, the arms must become available for transfer through any of the sources mentioned above, namely government arsenals (whether by theft, leakage, or diversion) or illicit production. Second, they must be transported from one state locale to another. And third, they must be collected by a recipient (whether intended or unintended). An

³ The Iran-Contra affair involved the Reagan administration's covert and illegal sale of arms to Iran, which was subject to a U.S. arms embargo by virtue of the country's designation as a state sponsor of terrorism. Relevant international law may include the Friendly Relations Declaration (UN General Assembly Resolution 2625, October 1970), which asserts that "no State shall organize, assist, foment, finance, incite or tolerate subversive, terrorist or armed activities directed towards the violent overthrow of the regime of another State, or interfere in civil strife in another State." The Arms Trade Treaty, adopted by the UN General Assembly in 2013, but not yet in force, sets the bar higher, prohibiting arms transfers if the supplying government has reason to believe that "the arms or items would be used in the commission of genocide, crimes against humanity, grave breaches of the Geneva Conventions of 1949, attacks directed against civilian objects or civilians protected as such, or other war crimes." Neither instrument singles out illicit arms transfers, though. The Illicit Firearms Protocol to the Convention against Transnational Organized Crime, adopted by the UN General Assembly in 2001, does not itself prohibit illicit arms transfers, but directs state parties to adopt legislation criminalizing illicit arms manufacturing and trafficking.

⁴ For an analysis of the factors contributing to compliance and noncompliance with arms embargoes, see [61]; [32]. On the role of international norms and arms control regimes in curbing arms supply, see [36]; [31].

actual sequence of events may be, and typically is, complicated in various ways—for example, by the involvement of multiple brokers, transporters, and transshipment points—but these are the most basic components. The failure of any one of these components will thwart the transfer, and each is the target of those wanting to address the problem of illicit arms transfers from the supply side.

Against this seeming vulnerability is the fact that there are multiple sources and parallel transfer channels available to illicit arms traffickers, which makes supply-side approaches to arms control extraordinarily difficult. Illegal weapons may move through two or more state jurisdictions, as well as possibly ungoverned areas like the high seas or the territories of failed and failing states. As Markowski et al. conclude, “The odds are clearly in favor of illicit arms users and suppliers who, given the scope for channel redundancy, can easily tie the sources of supplies to their illicit destination. [T]o be effective, governments would have to cut/disable a large number of active and dormant channels. To achieve this would require both superior intelligence and massive resources [56: 188].”⁵

Illicit arms trafficking

Arms sales, in general, are economic transactions, but these transactions are typically governed by more than market forces. State-sanctioned arms transfers, especially those involving major weapons systems (aircraft, armor, missile systems, etc.), are often elements in an ongoing political-military relationship between governments. They are undertaken for the purpose of enhancing the military capability of the receiving state, but they may also afford the supplier some degree of political influence over the recipient—although frequently less than expected—and signal to third parties that the supplier has some interest in the military security of the recipient. On average, the political content of small arms sales is probably lower than major weapons transfers; they do not entail the transfer of high levels of military capability and need not represent a significant measure of commitment by the supplier to the recipient’s security. Other things being equal, we can suppose therefore that small arms transfers more closely approximate economic transactions in a free market.

It is difficult to know whether illicit arms transfers, which are almost always small arms transfers, have this same characteristic. Many of the actors involved in illicit arms supply are simply out to make a profit and have little interest in the security or political purposes of arms recipients. However, some suppliers (and brokers, transporters, and financiers) are very much committed to political and military aims of those on the receiving end of illicit arms shipments, something we would expect, for example, when diasporas are involved. In any case, whether driven on the supply side by economic or political considerations, or both, illicit transfers would seem to further require a degree of trust and shared commitment to an underground system of exchange. It is, of course, common to refer to the trade in illicit weapons as a black market, but the transnational flow of these goods is affected by a wider range of political, ideological, and/or ethnonational factors than other illicit flows, like illegal narcotics, stolen or counterfeit goods, or contraband minerals.

⁵ On the control of illicit arms transfers, see [40, 83].

Illegal markets

Some markets are illegal because the traded good or service itself is illegal (heroin, slave labor), while other markets are illegal because there are prohibitions on the commercial exchange of an otherwise legal good (like sex, in many jurisdictions). While both types of exchange are wholly illegal, other illicit markets coexist with legal counterparts. The exchange of stolen or counterfeit goods is illegal because legal goods have, in effect, become transformed into illegal ones by means of theft or forgery and may not be sold or bought. Other goods are exchanged illegally because the exchange itself has not conformed to the process stipulated by law—for example, absent the required licenses or tax payments. Exchanges in the illicit arms market involve one or both of these latter types of illegality: weapons are illegal because they are stolen or are otherwise ill-gotten (corruption, battlefield recovery) and are therefore unlawful to possess; weapons are illegal because their transfer to others subverts the law (unlicensed export, embargo violation).⁶

Illegal markets, for arms or anything else, form when supply and demand are sufficient to sustain profitable exchange among a collection of actors. As in legal markets, exchange will occur when the cost of participating in the illegal market are offset by the net gains from the exchange. But the transaction costs associated with illegal market exchange are invariably higher than in legal markets. There is a premium on information about availability, price, quality, etc., when goods must be traded out of sight because their exchange is unlawful. Likewise, the costs of bargaining and sustaining agreements are higher because they are extralegal and therefore risky; the parties to the exchange cannot turn to state authorities for purposes of enforcing property rights and contract law. Add to this the risk of penalty for participating in prohibited exchange and (for some) the accompanying moral costs. Yet for many goods and services, in many places, illegal markets thrive.

The classic treatment of transaction costs is by Coase, who maintained that “the operation of a market costs something and that, by forming an organization and allowing some authority (the ‘entrepreneur’) to direct the resources, certain marketing costs are saved” ([20]: 392; see also [21, 86, 87]). Transactions costs deriving from uncertainty—for example, about continued access to specialized inputs into the production process—can be mitigated by entering into contracts, as long as property rights are sufficiently well-defined and enforceable. But the continual negotiation and renegotiation of contracts is also costly. Such transaction costs, at least some of them, can be eliminated if the parties enter into an exchange relationship governed according to the bylaws of a hierarchical organization, like a vertically integrated firm. The mechanisms of governance available to firms overcome certain market efficiencies, making production and exchange more profitable.

Although it is certainly the case that firms and governments—both hierarchical forms of organization—are sometimes counted among those participating in illegal market activities, this is most often attributable to rogue individuals or entities within the organizations. Such organizations are not very well suited to achieve the efficiencies necessary to offset the additional transaction costs associated with exchange in illicit markets. This is not necessarily because they are hierarchical, although that may be true

⁶ This discussion is based on the typology presented in [9]. See also [64, 34, 3, 66].

in many instances; rather, it is because these organizations come under the scrutiny of law, which by definition is anathema to the functioning of illegal markets.

Markets and social networks

A market is a social entity that governs transactions between producers and consumers by means of a price mechanism, and economists typically locate pure markets at one end of a range of possible arrangements for the exchange of goods and services. This is the unorganized, anarchic end. No authority is exercised in a pure market; economic production and distribution is governed by prices, which result from individual decisions manifesting in the aggregate as supply and demand. At the hierarchical end are organized social entities like firms. Within a firm, production and exchanged are governed by an entrepreneur, whether an individual or a collective, who directs the allocation of resources within the organization.

Patterns of exchange governed by more than market forces but by less than authoritative direction have been of considerable interest to sociologists. Granovetter, for instance, has echoed the common criticism of the neoclassical economic approach to organization as offering a utilitarian and “undersocialized” conception of human action in which little allowance is made for the impact of social relations on exchange (except as a drag on the efficient allocation of resources). At the same time, early sociological correctives tended to propose “oversocialized” conceptions of behavior whereby individuals simply, and somewhat robotically, internalize societal norms, also leaving little room for the impact of ongoing social relations. For Granovetter and others, economic behavior is governed not only by institutional arrangements designed to discourage malfeasance and reduce transaction costs, or by a “generalized morality” instilled through the socialization process, but also by trust. Economic behavior is embedded in ongoing social interaction and more emphasis needs to be placed on “the role of concrete personal relations and structures (or ‘networks’) of such relations in generating trust and discouraging malfeasance”([39]: 490; see also [90]).

Much of the sociological research that has been done on interpersonal relations in economic life focuses on the creation and maintenance of networks as forms of social organization. Where price serves as the mechanism of governance in markets and formal authority serves that function within a vertically integrated firm, personal relationships, typically characterized by trust and a norm of reciprocity, facilitate the flow of resources within social networks [80, 69, 10, 15]. Powell maintains that some forms of exchange are inherently more social than others. They depend not so much on formal authority, but on shared interests and ongoing relationships. In networks, “the entangling of obligation and reputation reaches a point that the actions of the parties are interdependent.” The pattern of interaction “looks more like a marriage than a one-night stand, but there is no marriage license, no common household, no pooling of assets” ([71]: 301). Whereas market transactions are often undertaken to maximize returns in the short term, networks sustain sequential exchange and contribute to an overall pattern of enduring interaction. When the exchange of goods or services requires trust or a sense of obligation, networks function well, especially when composed of homogeneous groups of actors. The opportunism and guile contributing to high transaction

costs in the impersonal market setting is less common among those sharing professional, ethnic, or ideological backgrounds, and thus formal hierarchical organizations are less likely to emerge.

Social networks are the organizational forms most conducive to the generation and distribution of social capital, which I will define here as resources residing in the social relations of multiple actors that enable the production of either private or collective goods.⁷ Indeed, social networks would seem to be most important to those engaged in activities that must remain underground and beyond the reach of legal contracts and other regulatory mechanisms that attach to open market exchange. Family ties, personal friendships, shared ethnicity and religious belief—these give rise to interpersonal loyalties and the trust that reduce transaction costs when the rule of law is unavailable. While this sort of social capital is not absent from commerce in open markets, it becomes rather more essential to the movement of illicit goods [51, 85].⁸ If nothing else, suppliers, traffickers, and consumers must instill confidence among themselves that they share a commitment to keeping the joint enterprise hidden from scrutiny by the agencies of government. About the illicit arms trade, Naylor says that “discretion is a proverb, not only with respect to one’s own business but with respect to everyone else’s as well. By an unwritten code, gunrunners, however anxious to cut each other’s commercial throats, rarely rat out each other” ([47]: 129).

Illicit trafficking networks

Social network theory is proving useful in the analysis of “dark networks”—adversarial networks, like terrorists organizations or insurgencies, and criminal networks engaged in various forms of illicit trafficking and proliferation. Law enforcement and national security policymakers, in particular, have been interested in understanding the features of these dark networks that allow them to adapt to a changing environment, including efforts by police and military forces to defeat their activities and dismantle their organizations. Scholarship in sociology, economics, criminology, and political science is contributing to this understanding and providing a set of analytic tools to describe social networks, both their resiliencies and vulnerabilities.⁹

Dark networks typically face a trade-off between efficiency and security. As an organization, the network allows members to overcome barriers to collective action—the production and distribution of weapons, drugs, terror, etc.—thereby producing private and/or collective gains for participants. But these networks operate in risky environments and participants must be attentive to their exposure to external threats. Internally, trust and mutual commitment to a profitable covert enterprise may be enough to maintain the concealment necessary for network security. And when not, the threat of violence may suffice. A trade-off between efficiency and security exists because active networks are more likely to become exposed and fall victim to the disruptive efforts of military and law enforcement authorities. Although it is often

⁷ The concept of social capital is the subject of a large and growing social scientific literature. See, for example, [22, 13, 70, 72, 89].

⁸ For a skeptical view, see [63]

⁹ See, for example, [73, 59, 6, 52, 76, 67, 53, 30, 60, 43, 84: appendix B]

assumed that dark networks prioritize security over efficiency, Morselli et al. suggest that this is the case only for networks with particular types of objectives:

When the objective involves a monetary outcome, action in the criminal enterprise context is more limited in terms of time because participants expect a payoff for their involvement in the network, and as a result, action must be played out within a reasonably short time frame. When the objective is ideological, time is a more extensive resource and action may be prolonged—the ideological cause it prioritized over any episodic action and, as a result, a network may lay low and wait for the right moment to act ([62]: 145; see also [54]).

Some illicit arms trafficking networks have long-term political or ideological goals, especially those connected to diasporas supporting armed groups operating in their homelands. However, most participants in the supply side of the illicit arms trade are out to turn a profit in a competitive black market. That is, following Morselli et al. [62], arms trafficking networks are more likely to function in a ways that compromise their security, all else equal. Some suppliers, brokers, or transporters may operate in market niches, most likely attached to particular geographic locales, and therefore face little competition, but others must devote some of their energies to outmaneuvering others for clients. They also increase their take by squeezing those they must deal with up and down the supply and distribution chain. Such imperatives are not different in kind from the competitive forces operating in legal markets, but the temptation to defect and “rat out each other” is undoubtedly present and may threaten to undermine the mutual trust and reciprocity that seem essential for the functioning of dark networks.

Such competitive dynamics, along with generally high levels of arms trafficking activity, work against concealment and create vulnerabilities. Bruinsma and Bernasco [17] have examined three criminal groups whose activities have two important features in common with illicit arms trafficking other than the need to operate underground. Heroin smuggling, human trafficking, and the transnational trade in stolen cars (i) serve a market and (ii) involve the movement of illegal goods and services across long distances. They find that activities characterized by higher levels of criminal and financial risk require collaboration grounded on substantial mutual trust, which is most likely to be a feature of cohesive social networks. In the case of heroin smuggling, the riskiest of the three criminal enterprises examined, that cohesion derives from ethnic and other demographic homogeneities. Turkish groups figure prominently in the heroin trade (at least destined for the Netherlands) and those that work most closely together at the different stages of the process tend to be of similar age and social class, and hail from the same regions of the country.

It is hard to say whether, in terms of criminal and financial risk, the illicit arms trade has more in common with heroin smuggling or purportedly less-risky trafficking in humans or stolen automobiles. And, as will become clear in a subsequent section, my data are not sufficiently fine-grained to allow me to illuminate the degree of ethnic, religious, or ideological cohesion—and, by implication, trust—present in illicit arms trade networks. But, as a hypothesis, it is reasonable to posit that illicit arms networks that operate in higher risk environments—for example, in geographic locales with a robust police and/or military presence, or spanning long distances with multiple sites of potential vulnerability—are composed of more socially homogeneous groups. The

social cohesion created by ethnic, religious, or ideological bonds reduces the likelihood of defection and thus the risks of exposure in an extralegal setting.¹⁰

Power in illicit arms networks

Network forms of organization seem to offer distinct advantages to those engaged in illicit economic, political, and military activities. As Kenney explains, compared to the hierarchically organized and bureaucratic state agencies—intelligence, law enforcement, or military—that typically oppose them, illicit networks:

contain relatively flat authority structures that facilitate rapid decision cycles and quick information flows. They compartment participants and information into separate, semiautonomous cells, often based on family, friendship, and geographic ties. They build redundancy into their operations by giving important functions to multiple groups, and they rely on brokers and other intermediaries to span “structural holes” between loosely connected nodes and networks ([47]: 203; see also [48]).¹¹

These organizational structures and practices foster secrecy and secure the distribution of information and other resources necessary to accomplish tasks. While state agencies enjoy a preponderance of coercive force and intelligence collection capacity, elaborate decision-making procedures, organizational checks, and other imperatives place limits on their ability to employ this capacity to penetrate illicit networks and track their activities. And when state agencies are successful—for example, when they capture or kill a drug kingpin or terrorist mastermind and consequently are able to dismantle a portion of illicit operation—this often proves temporary as others regroup, reorganize, and recruit new members into even more diffuse network structures. Thus, one conception of “network power” in the context of the illicit arms trade, as in drug trafficking and transnational terrorism, is the notion that networks provide organizational advantages that can be deployed against adversaries with superior resources but operating within the constraints of bureaucratic and hierarchical organizations.

Another conception of network power refers to an actor’s capacity relative to other actors within a network. Actors occupying particular positions have access to “social capital, information, coalitional opportunities, and other resources which can be exploited in order to pursue political purposes” ([5]: 9; see also [46, 42]). This conception is perfectly inconsistent with what Kenney and others identify as the power of networks vis-à-vis other organizational forms; the focus is simply on the individuals or collective entities that constitute nodes within a network, their relationships with other nodes, and the power and influence deriving from the nature and quantity of these linkages. That is, we can consider the power of illicit networks, or power within illicit networks. But coming from either a macro- or micro-perspective, what social network theorists and empirical

¹⁰ Economic theories of rebellion posit similar social dynamics. See, for example, [23].

¹¹ For a discussion of the disadvantages these organizations face, see [29].

researchers tend to emphasize as the bases of power and advantage are social ties, and not simply material capabilities possessed by actors or aggregated by organizations.

Of course, the resources that suppliers, middlemen, shippers, and anyone else involved in the illicit arms trade bring to bear in the competitive black-market environment are both material and social. Those who possess or can muster superior armament stocks, finance, transport, and other material resources are in a better position to exercise power within the network than those who do not. But one's connectedness is also a key source of influence and success. And compared to legal arms markets, where openly publicizing the availability of goods and distribution services is not a risky enterprise, the contribution of social connections to one's ability to survive and thrive in the black market takes on relatively greater importance. Larger numbers of relationships provide more opportunities for profitable transaction, but so do the right types of relationships. The pivotal activities of arms brokers, who bring together parties that would not otherwise come into contact in an underground environment, epitomize the role that social capital plays in black arms market [88, 18].

The differentiation of roles within the illicit arms trade means that some actors within the network exist in more symbiotic relationships, while other relationships are more competitive. Put simply, suppliers need buyers and vice versa, and both need brokers, financiers, and transporters to facilitate the deal and physical exchange. But arms dealers may find themselves in competition with one another to meet the demand for weapons by particular groups or in particular regions, while brokers and other middlemen face competition from those who offer similar services. An actor's social capital, accumulated by virtue of the quantity and quality of the actor's connections to others within the illicit arms network, is a resource for the exercise of power in both cooperative and competitive interaction.

However, better connected actors have higher profiles, which can become a vulnerability in the illicit arms trade network. High-profile individuals in dark networks, especially those who seem to be thumbing their noses at state security and law enforcement agencies—think of Pablo Escobar (Medellin drug cartel), Osama bin Laden (al Qaeda), or the arms trafficker Viktor Bout—provoke redoubled efforts to bring them to justice. Even from within the network, high-profile actors may come to be viewed as rogues that invite unwanted outside scrutiny of particular illicit operations and the other actors involved in them. Their connectedness and influence within the network thus becomes a source of resentment and even enmity, setting into motion a reversal of the social process that led to their network power. Other network actors will seek to minimize their contacts or sever their relationships altogether, to the extent that they can. In extreme cases, more than relationships are severed.

Mapping the illicit arms trade

Curwen's [24] examination of illicit arms transfers to Liberia provides a good illustration of the application of social network analysis (SNA) to identify key actors and their placement in these underground networks.¹² Based on UN reports documenting arms

¹² The figures and analysis discussed in the following paragraphs were generated from the raw data assembled by Curwen [24].

embargo violations, Curwen identifies the individuals and transactions involved in four arms-transfer events occurring between 1999 and 2002. All together, 38 individuals comprise the nodes of this network—brokers, transportation agents, buyers (including Liberian President Charles Taylor himself and his son, Chuckie), and so on. The 78 ties between the nodes are operationalized as the presence of contractual, business, or employer-employee relationships between individuals. This illicit arms transfer network is depicted in Fig. 1.¹³ From the mapping of actors (clustered according to role) and ties—a “sociogram” or “network graph”—we get a good sense of network structure and the most connected individuals.

Social network data are arranged as a square “sociomatrix” in which there is both a row and a column for each node in the network. A cell in the matrix contains a 1 if the actor represented by row i , designated n_i , had a relationship with the actor represented by column j , designated n_j , in which case $x_{ij}=1$; otherwise $x_{ij}=0$. Curwen’s data are nondirectional in that a tie between two nodes represents a relationship rather than a sent or received communication or other exchange; thus, $x_{ij}=x_{ji}$. But in other SNA applications to the study of illicit arms transfers, it may be useful to consider directional ties. In this case, an actor’s *outdegree*, $d(n_i)$, is the number of other actors to whom that actor has directed some form of communication or exchange (for example, delivered weapons); *indegree*, $d(n_j)$, is the number of actors from whom a communication or exchange has been received. That is,

$$d(n_i) = \sum_{\forall i \neq j} x_{ij} \text{ and } d(n_j) = \sum_{\forall j \neq i} x_{ji} , \tag{1}$$

which are, respectively, the row i and column j totals of the sociomatrix. If there are s actors in the network, the maximum number of directed ties between them is $s(s-1)$.

In most social networks, certain actors are more prominent than others and the evidence of their prominence is often the number and type of social ties they maintain with other actors. The *centrality* of a network actor is sometimes indexed as its outdegree or indegree (or both), but since these measures are greatly affected by the number of actors in a network, it is useful to normalize the index. Thus, the normalized outdegree and indegree centrality indexes can be computed as

$$C'_D(n_i) = \frac{\sum_{\forall j \neq i} x_{ij}}{s-1} \text{ and } C'_D(n_j) = \frac{\sum_{\forall i \neq j} x_{ji}}{s-1} . \tag{2}$$

Again, because Curwen’s data are nondirectional—the sociomatrix is symmetric—the formulas in (2) give the same result. Fig. 2 arranges the nodes so that the actors with the highest centrality measures are positioned nearer the center of five concentric rings, while those with lower scores are positioned nearer the periphery.

¹³ Clearly, there were more than 38 individuals involved in these four events, so the network that Curwen reconstructs is represents only the most visible (to UN experts) of the real-world network. The study of illicit networks must therefore contend with questions of sampling. See [75, 35]

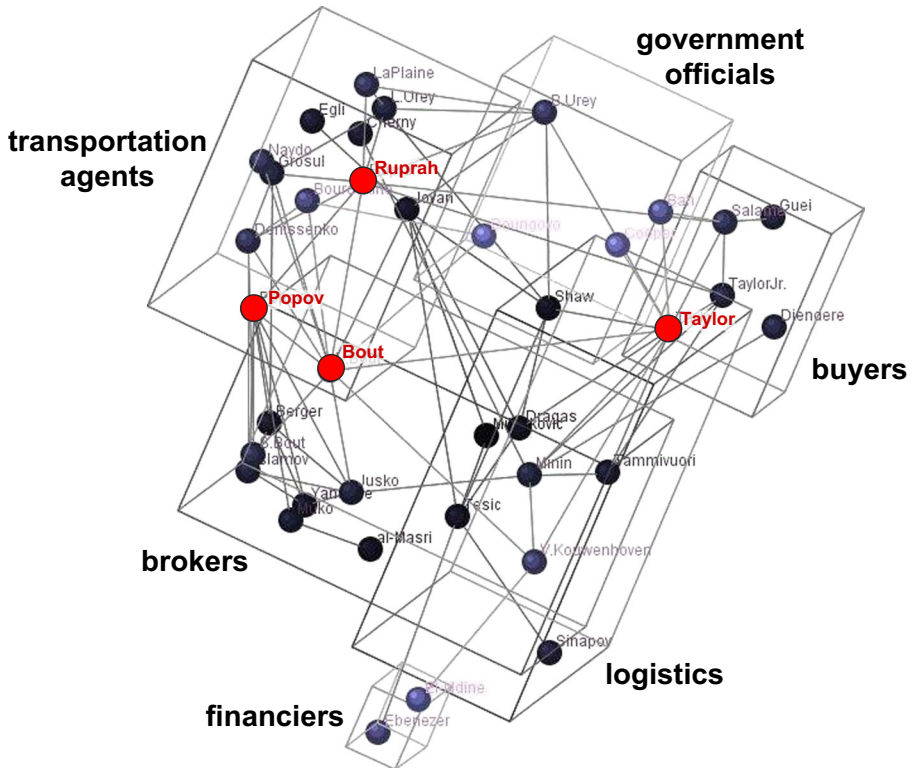


Fig. 1 Actors in the Illicit Arms Trade with Liberia

Not surprisingly, the most central actors in the network examined by Curwen are Charles Taylor, whose three-and-a-half year trial before the Special Court for Sierra Leone was concluded in 2012, and Viktor Bout, the high-profile Russian arms broker and transporter convicted by the United States on conspiracy charges and now imprisoned. Also centrally located in the social network are Pavel Popov (Russian) and Sanjivan Ruprah (Kenyan), both involved in Bout’s air transport operations.

Visual inspection of Figs. 1 and 2 suggests that nodes in a network may also be important to the extent that they are positioned between two other nodes. In the case of the illicit arms trade, when one actor, n_i , has links to two others, n_j and n_k , which are not linked directly, n_i may serve as a conduit for the transfer of arms from n_j to n_k . Such actors are located on the shortest paths, or geodesics, connecting n_j and n_k . Thus, another measure of centrality, *betweenness* centrality, starts with the number of geodesics, g_{jk} , linking nodes j and k , and the number of these that contain node i , $g_{jk}(n_i)$. Betweenness can be measured as the sum of the probabilities that node i will be pivotal in transactions between j and k :

$$C_B = \sum_{\forall j < k, j \neq i \neq k} \frac{g_{jk}(n_i)}{g_{jk}} . \tag{3}$$

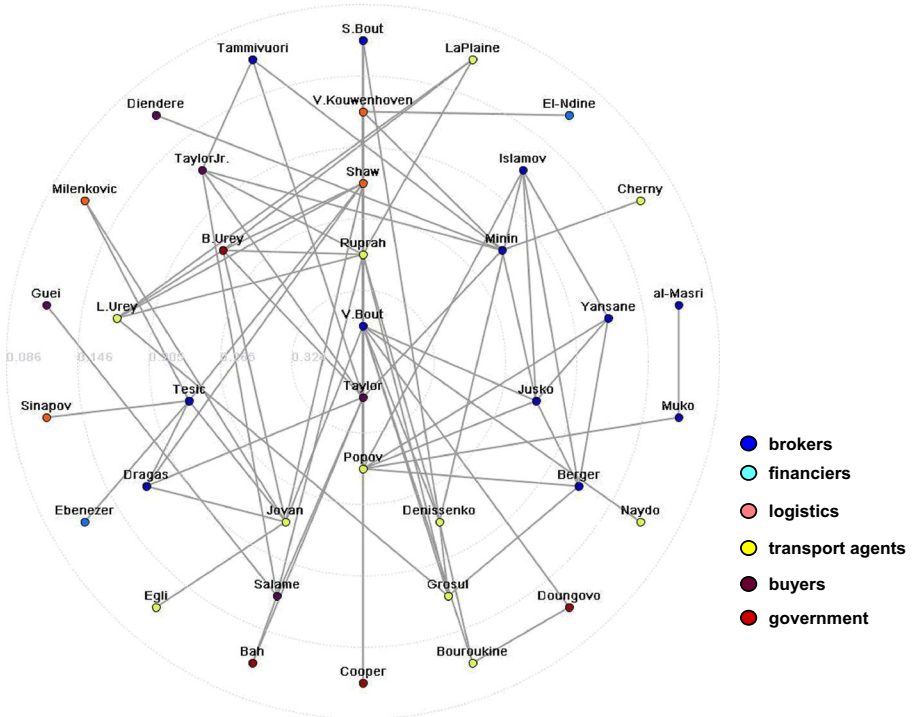


Fig. 2 Liberia's Illicit Arms Trade: Actor Centrality

This measure is at its maximum when node i is located on all geodesics in the network. Not including node i , there are $(s-1)(s-2)$ possible directional links, and half that number of possible nondirectional links. C_B can therefore be normalized as:

$$C'_B = C_B \left(\frac{(s-1)(s-2)}{2} \right)^{-1} \tag{4}$$

Not surprisingly, in the illicit arms network serving Liberia, Viktor Bout has the highest betweenness centrality score, based on Curwen's data. As is evident in Fig. 3, except for Charles Taylor, all of those with the highest betweenness scores are either brokers or transport agents, which is what we would expect this measure to show.

A closely related SNA concept useful for the study of illicit arms trade networks is "brokerage." Brokers, in network analytic terms, are nodes positioned on a directional path between nonadjacent nodes. Naturally, they tend to have high betweenness scores. Social network analysts have gone on to specify particular brokerage roles based on the actors' membership in groups or other attribute categories. For instance, a node occupies a "coordinator" role when it is interposed between nodes within its same group or organization; when the three nodes are members of different groups, the broker acts as a "liaison." Other brokerage roles are defined when the broker and one actor are members of one group and the other actor is a member of a second group: brokers that mediate inflows into their group are "gatekeepers"; those that mediate outflows from their own group are "representatives." Identifying important brokers in a

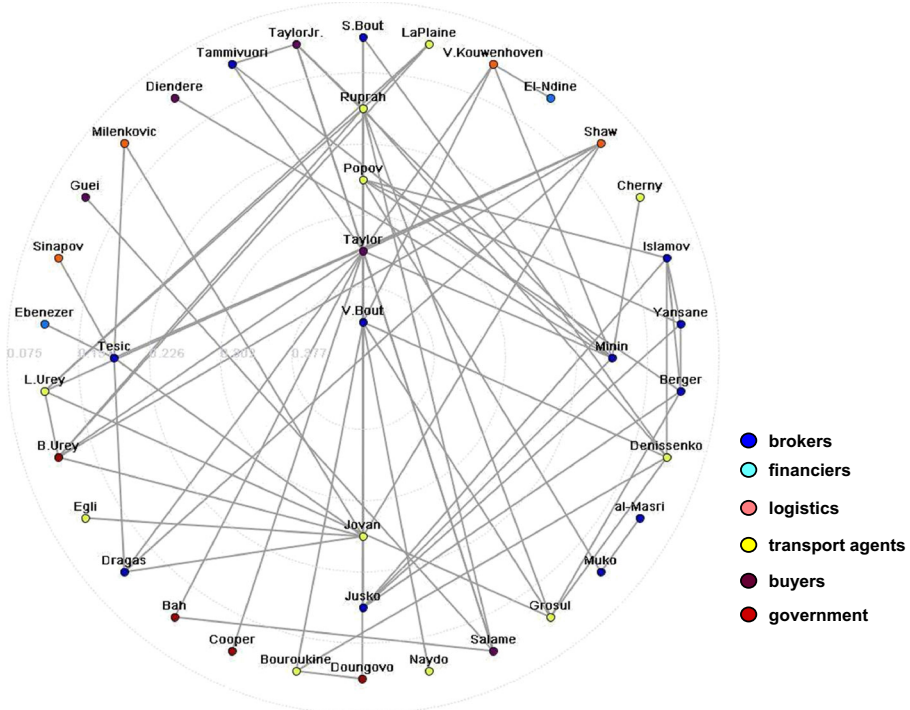


Fig. 3 Liberia's Illicit Arms Trade: Betweenness Centrality

social network involves counting the number of triads in which that node is positioned as an intermediary. Of the ten actors in the Liberian network with the highest brokerage scores, all but two are coded (a priori) by Curwen as either arms brokers or transportation agents.¹⁴ These are precisely the sort of intermediaries we want the analysis to identify.

Illicit arms transfers database

The Illicit Arms Transfers Database (IATD) is an evolving dataset consisting of information gleaned from news and other reports of illegal arms shipments crossing interstate borders. The goal is to systematize the large amount of information that exists about the international black market in armaments so that some of these data might be subjected to social scientific analysis.

The Norwegian Initiative on Small Arms Transfers (NISAT), affiliated with the International Peace Research Institute in Oslo, maintains an Internet database consisting of tallies of state-to-state transfers of small arms and light weapons. The primary focus of NISAT's data collection efforts is the legal trade in SALW. But NISAT also maintains a "Black Market File Archive," a collection of news stories and investigative reports on the illicit arms trade. These accounts, which range widely in content and format, are collated into country folders based on the locale of the events described therein. NISAT

¹⁴ These results are available upon request.

obtains reports from multiple news organizations, as well as other organizations providing information on the black market arms trade. These reports provide the raw information upon which the IATD is built.

The unit of observation in the IATD is an illicit arms transfer “event,” defined as coterminous with a particular arms shipment’s journey from source to recipient, possibly intercepted along the way. Each record in the database consists of data describing that event, including the actors and locations involved in the shipment’s journey from originator to recipient (or interceptor), as well as the information source. Most variables in the database are event descriptors and can be grouped as they pertain to (a) the *source* of the arms shipment, (b) those involved in the arms *deal*, (c) the *characteristics* of the arms shipped, (d) the *journey* that the shipment took after leaving the source, and (e) the shipment’s *destination*. Table 1 shows the categories of variables in the database and summarizes the type of information collected in each category. The table does not list every variable in each category—for example, actors like originators, recipients, dealers, etc., are also accompanied by information regarding their location and type—but it does indicate the range of information that the IATD must incorporate in order to capture the complexity of many illicit arms-transfer events. At present, there are over 60 variables in the database used to describe characteristics of different types of illicit transfers, although most records contain missing data for many of these variables simply due to the paucity of information on black market transactions.¹⁵

The stories and reports collected by NISAT vary widely in the amount of useful information they contain. Some articles include detailed accounts of arms shipments from manufacturer to purchaser, including any number of participating intermediate dealers, brokers, and shipping agents.¹⁶ Other reports include no codable event information at all. Some reports provide a wealth of background information, like previous events in ongoing arms-supply relationships. Others pick up a particular shipment’s journey midstream, as when one military organization supplies another organization, without any indication of where the first group acquired the weaponry. Even when reports contain complete information, the events themselves exhibit a wide range of forms. There is substantial variation in the number and type of intermediaries engaged in illicit transfers, the nature of the illegalities involved (forged end-user certificates, arsenal theft, etc.), and whether transfers were intercepted by state authorities or someone else other than the intended recipient. The appendix provides an example of the way events described in an article from NISAT’s Black Market File Archive are coded for purposes of inclusion in the IATD.

A major aim of the data collection effort to this point, one that has largely been achieved, has been to develop a data structure that can accommodate the variety of forms that an illicit arms transfer event may take. The set of coding rules has evolved over the course of the Project’s lifespan and has proven workable as a methodology for processing thousands of articles to date. So far, the Project has

¹⁵ For a full description of IATD coding procedures, including a complete list of variables and definitions, see [49] The database itself is not yet available to the wider research community. See also [79]

¹⁶ Dealers are those middlemen who buy and sell the arms, in effect taking temporary ownership of the weapons along the way. Brokers are those who facilitate the arms deals. They bring parties together, perhaps helping with financing, and they usually profit from their brokerage, but they do not take possession or ownership of the arms shipment in route. Shipping agents are those who help arrange transportation of the arms, but who do not do the actual shipping. See [88].

Table 1 Information Contained in the Illicit Arms Transfers Database

<i>source</i>	<i>deal</i>	<i>characteristics</i>	<i>journey</i>	<i>destination</i>
originator	dealer broker shipping agent	type model manufacturer price quantity illegality	transporter transshipment point interception	recipient

examined about 6,800 articles from NISAT's Black Market File Archive, retrieving about 3,300 events.

Illicit arms transfers to Africa

The informational requirements for the analysis presented here are minimal. Nodes in this network are operationalized as the *state locales* from which, to which, or through which illicit weapons shipments have moved. Once the IATD is cleaned and cross-checked, the database will allow researchers to operationalize network nodes as *actors*—suppliers, recipients, brokers, etc.—involved in these transactions, with locale simply being one of their attributes, but a more refined analysis along these lines is not advisable given the IATD's present state of development. Here state locales are shown as nodes in the network if they were involved in at least one illegal arms transfer during the 1995–2005 period, the time span for which data have been most thoroughly coded, and if there is sufficient information to identify the state locale at both ends of the transfer. Although the database does contain a large number of additional descriptors, no other information is used for present purposes.

Figure 4 maps state locales (grouped by geographic region) involved in illicit arms transfers ultimately arriving in Africa. This network consists of 80 nodes (labeled with three-letter country codes) and 270 links. As with the network of individuals involved in illicit arms transfers to Liberia, the most prominent state locales in Africa's illicit arms trade can be identified by examining centrality scores. Fig. 5, like Fig. 2 above, places the most connected nodes at the center, but in this case the data are directional and the positioning is based on outdegree centrality scores. Thus, the figure identifies the most prominent exporter locales.¹⁷ It is noteworthy that several former Soviet bloc countries appear rather central in Africa's illicit arms trade: Russia (RUS), Ukraine (UKR), Bulgaria (BGR) and, to a somewhat lesser extent, Romania (ROM), the Czech Republic (CZE), Belarus (BLR), and Slovakia (SVK). The next section considers some explanations for their centrality. South Africa (ZAF) is also central in the illicit arms trade to other African countries, and West European countries—Belgium (BEL), Britain (GBR), and France (FRA)—are important locales as well. The United States (USA) is also a significant locale, but perhaps not as central as we might expect given its predominance in the international arms trade generally, including the small arms trade.

¹⁷ Here, "exporter" means the state locale serving as the starting point for a shipment of illicit weaponry arriving in an African country, not necessarily the country that manufactured the weaponry. Also, I am using the terms "prominent" and "central" to describe state locales that served a starting points for shipments of arms to the largest number of the other countries, not necessarily starting points for the largest volume of transferred weaponry. However, I suspect that there is a correlation.

Illicit arms transfers and the former Soviet bloc

Several factors have conspired to make individuals and organizations in Russia and other former Soviet bloc locales active participants in illicit arms transfer networks. The most common explanations focus on the role of Russian military and security forces, especially the incentives and opportunities associated with the political-economic transition that accompanied the end of the cold war. The dismantling of the formidable Soviet-era military-industrial complex was remarkable, and attendant dislocations have been documented by both insiders and outside observers [44, 37]. Among the outcomes were decommissioned weapons stocks, mothballed or underutilized military production facilities, and an uncertain future for many military and security personnel. Whether motivated by economic desperation or opportunism, many of the latter had access to post-cold war arms surpluses. They also had access to military transport facilities or found common cause with others who had logistical expertise and experience moving cargo surreptitiously. As Turbiville observed, “crime and corruption in the wake of Soviet dissolution quickly began to shape and influence every dimension of state and private life. Military establishments in the region—shrinking, impoverished, and demoralized—were far from immune to these pressures, and in the case of the Russian armed forces in particular, have become major participants in the illegal diversion of weapons as well as being profoundly affected by crime in other way” ([82]: 18). Illicit arms trafficking and other crime had become institutionalized within the Russian military, argued Turbiville, which was, in essence, a “mafia in uniform” [81].¹⁸

The former-Soviet arsenal was also hemorrhaging in the periphery. The phased withdrawal of Soviet armed forces from central and eastern Europe and the Baltic states in the early 1990s was, given the immense scale and logistical challenges, generally well managed, but huge volumes of weapons were moved rather quickly and inevitable leakages probably left large numbers of SALW in the wake [2]. The eruption of ethnic conflicts in the Caucasus—both inside Russia (namely, Chechnya) and in the post-Soviet states of Georgia, Armenia, and Azerbaijan—increased the demand for arms and presented Russian soldiers, whether deployed to put down rebellions or as peacekeepers, with opportunities to acquire much-needed cash. Violent conflicts elsewhere, like Moldova and Tajikistan, witnessed similar patterns. And it is well to note that this did not start with post-cold war deployments; Soviet military personnel returning from Afghanistan in the 1980s also sold arms and ammunition to make ends meet.¹⁹

Although research on the illicit arms trade has devoted more attention to Russia than to other former Soviet bloc countries, the analysis presented here also

¹⁸ Viktor Bout is a good example, although certainly not representative in terms of business acumen and success. Bout served as an officer in the Soviet Armed Forces—different sources place him in the Air Forces, military intelligence (the GRU), and the KGB (unlikely)—and, after being discharged at the end of the cold war, got his start in arms trafficking by acquiring transport planes. [33]

¹⁹ For a comprehensive overview of Russia's role in illicit arms transfers throughout the 1990s, see [12]. In addition to the Russian military, Berryman also considers the role of Russian arms manufacturers, but this is considerably less documented. See also [2]

highlights the prominence of eastern Europe. Phythian suggests that the same factors were at work: “Post-communist eastern Europe remains the prime source for black market small arms. Controls are weak and easily evaded, corruption is rife, and financial rewards are far in excess of the meagre salaries of most east European munitions workers or officials” ([68]: 30). In the case of the Balkans, however, where the Yugoslav wars were fed by both the import and internal trafficking of illicit weapons, Arsovska and Kostakos [4] suggest that the outflow of arms, even with the end of the conflicts, has been less pronounced than we might expect given the volume of illicit stocks circulating in the Balkans. They attribute this in part to the very high internal demand for arms driven by cultural factors and a historical distrust of state institutions; these social forces seem to trump an economic logic that would otherwise point to a substantial post-conflict expansion of arms exports in the face of excess supply. I note here that my analysis of illicit arms transfers to Africa suggests that former Yugoslav states are not as prominent as Russia and other eastern European locales (see Fig. 5).

In addition to the factors already discussed relating to the post-cold war dislocations experienced by defense-industrial institutions in former Soviet-bloc countries, part of the explanation for their role in the illicit arms trade probably connects to their communist legacy. The inadequacies of central planning to direct resources so as to meet consumer demand were apparent long before the end of the cold war. Thus, “economies of favors” developed whereby needs were satisfied by way of personal connections and informal networks of exchange [55]. Such transactions were not at all rare and were not limited to party functionaries or other members of the political elite, nor were they regarded as illegal or illicit by the many rank and file who participated in them. Starting with this description of behavior under communism, we might hypothesize that post-communist illicit arms trade was able to draw participants from a population not unaccustomed to satisfying demand through social networks operating in the shadows of officially sanctioned practice. The argument has been put forth by Cheloukhine about Russian organized crime generally: “The growth of the shadow economy was the main catalyst forming organized crime. Racketeering, robbery, and other crimes were dangerous but predominantly secondary [during the Soviet era]. The roots of the Russian mafia lie in the innermost depths of the Russian shadow economy” ([19]: 363).²⁰ This is not to suggest that everyone who participated in the shadow economy is a potential arms trafficker, only that command economies nurtured individuals and networks that were well-positioned to take advantage of the forces of arms supply and demand unleashed by the end of the cold war and the collapse of communism.

Conclusion

The illicit arms trade shares some important properties with networked forms of organization studied by sociologists. The complex and convoluted nature of black

²⁰ The “Soviet inheritance” has also been used to explain organized crime in former Soviet republics. See [74, 77]

market arms transfers suits this realm of the arms trade especially well to investigation as a social network. Like any underground activity involving the exchange and transport of contraband (drugs, counterfeit currency, humans), the illicit arms trade operates within an informal organizational environment. The forces of supply and demand are mediated by the forces of trust, loyalty, and mutual commitment that govern the flow of information and material within a social network.

Since my dataset on the illicit arms trade are still at an early stage of development, my analysis employs only descriptive methods designed to explore the main structural features of social networks. The results are not definitive, but they are suggestive. The black arms market appears to be structured as a scale-free network, even when the network nodes are operationalized fairly crudely as state locales. The locales occupying central position in the network readily stand out. Among the countries where illicit arms shipments originate, former members of the Soviet bloc appear central, whether as weapons sources or as conduits linking other locales in the network. One explanation for their prominence in Africa's illicit arms trade might be found in the availability of cold war surplus and a black market infrastructure nurtured originally by their communist economic systems. This, at least, is a reasonable working hypothesis for subsequent empirical research.

The utility of SNA methods (or any other quantitative methods) for illuminating the illicit arms trade obviously hinges on the quality of data that can be collected. Mapping the structure of the black market is hampered by the secrecy with which deals are concluded and the duplicity of the actors involved. What we do know about it is due mainly to the perseverance of enterprising activists and investigative reporters and, as with any data source, this information is subject to measurement error and selection bias. The analysis of network dynamics often requires fairly complete information about nodes and links, particularly if the aim is to model network vulnerabilities. If the lack of information makes it necessary to restrict analysis to sampled data, important elements of the network structure may be missed. However, this danger should be less pronounced when examining scale-free networks because even incomplete information is likely to identify the most prominent nodes [8, 7]. That is, the same feature that makes these networks robust in the face of random failure also makes them more visible in the face of systematic efforts to reveal them. If I am right that the illicit arms trade is a scale-free network, then the fact that some of it remains hidden from view need not prevent us from mapping its basic structure.

More sophisticated SNA methods will become useful as our data collections improve. Rather than simply identifying actors and locales in the illicit arms trade, it will become possible to model the linkages among them as a function of factors on both the supply and demand side. The role of ongoing conflict, social and economic deprivation, weapons surpluses, criminal networks, and other conditions conducive to proliferation have been highlighted by small arms researchers and activists. The cause of arms control will be advanced to the extent that we can identify the most important forces driving proliferation, especially those that are most subject to policy intervention and manipulation,

and the actors and locales that figure prominently as hubs in the arms supply network. When resources are scarce and attentions divided, efforts must be focused where they will do the most good.

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Appendix: Coding Example

Coding text-based accounts of illicit arms transfers is a labor intensive task. Researchers have made considerable progress in the development of automated coding algorithms for the creation of events data in other areas of international relations research, which has drastically reduced the time and labor required to generate reliable data suitable for analysis. However, descriptions of arms-transfer events are typically too complex to parse with the software available at this time. But as further progress is made on the machine coding of international events, new opportunities may become available for automated coding of these events as well.

What follows is an example of an article appearing in NISAT's Black Market File Archive, and descriptors for two arms-transfer events identified from this account and entered into the IATD. The article is from *Haaretz*, the Israeli daily, and was distributed by the U.S. government's Foreign Broadcast Information Service (FBIS).

Israeli Businessmen Suspected of Selling Arms to Angolan Rebels

The United Nations is checking suspicions that Israeli firms and businessmen traded in arms and diamonds with UNITA rebels in Angola, in violation of the sanctions imposed by the UN Security Council. The impression of UN officials is that the Israeli Government is not very keen to cooperate in the investigation and is making no efforts to track down the suspects. A special monitoring committee set up by the Security Council in recent weeks approached the Foreign Ministry in Jerusalem via Israel's UN Ambassador Yehuda Lancry.

At the center of the investigation is Starco Investment and Trade of 13 Martin Buber St. in Haifa. The firm is suspected of having bought weapons for \$156,000 from Romtecnica, Romania's government arms company, in March 1996. According to the end-user certificates obtained by Ha'aretz, the final destination of the shipment was Togo's armed forces in the capital of Lome.

The shipment, flown aboard a cargo plane of the Bulgarian airline Avia-Service, consisted of 2,000 Kalashnikovs and pistols. However, the bill of goods stated that the shipment consisted of "technical equipment." A larger arms shipment from Romania to Togo three years later was again described as "technical equipment." This shipment included 40 RPG launchers and huge quantities of ammunition. The deal totaling \$0.5 million was mediated by East European Shipping Corporation, a firm based in the Bahamas and represented in Europe by Trade Investment International Limited, with an address in Britain. This shipment was transported aboard Coraca, a ship flying a Panamanian flag and headed for Lome. A check by the UN investigators, assisted by forensic experts, revealed that the end-user certificates of both shipments were forgeries.

Event 1

Originator: Romtechnica
 locale: Romania
 type: state manufacturer
Recipient: UNITA
 locale: Angola
 type: insurgent group
Dealer: Starco Investment & Trade
 locale: Haifa, Israel
 type: private company
Illegality
 sanctions violation: UN
 license violation: end-user certificate
Arms Shipped
 type: Kalashnikovs, pistols
 price: \$156,000
Date: March 1996

Event 2

Originator: Romtechnica
 locale: Romania
 type: state manufacturer
Recipient: UNITA
 locale: Angola
 type: insurgent group
Dealer: Starco Investment & Trade
 locale: Haifa, Israel
 type: private company
Shipping Agent
 East European Shipping Corp.
 locale: Bahamas
 type: private company
 Trade Investment International Ltd.
 locale: Great Britain
 type: private corporation
Transporter: Coraca
 home: Panama
Illegality
 sanctions violation: UN
Arms Shipped
 type: RPG launchers
 price: \$0.5 million
Date: 1999

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