

Counting guns – the NISAT datasets on the small arms trade

By Thomas Jackson and Nicholas Marsh of the International Peace Research Institute, Oslo and Julian Wagstaff of Edinburgh University.

Paper presented at the 11th Annual Conference on Economics and Security

Bristol, 5-7 July 2007

1. Summary

This paper gives an introduction to three unique datasets on small arms and light weapons (SALW) maintained by the Norwegian Initiative on Small Arms Transfers (NISAT) project at the International Peace Research Institute, Oslo. The first dataset concerns global SALW transfers over the period 1992-2005 and is based upon information from the UN's Comtrade database of trade statistics. It gives a snapshot of the evolution of annual global transfers, highlighting the top importers and exporters, as well as the types and values of arms traded. The second dataset has been built up using observations of black market Kalashnikov assault rifles prices. It has been used to examine trafficking of small arms by monitoring changes in the price of weapons. The final dataset concerns the average price of licensed gun imports and exports. It has been built up from government reports on their arms exports, and data from Comtrade and Eurostat (the EU's statistical agency).

The NISAT datasets are a part of an ongoing effort to collect and analyse data on the small arms trade. They are based upon the NISAT database of small arms transfers. This database is fully available online (at www.nisat.org) and contains information from a variety of sources (mainly customs data, national reports and press articles). The online database and datasets are the only such resource in the world on the small arms trade. While there is obviously much work to be done they present an opportunity for researchers to further study the dynamics of the small arms trade.

2. Global SALW trade datasets

2.1. Introduction

One of the core functions of the NISAT project at the International Peace Research Institute, Oslo (PRIO) is the maintenance of a database of global small arms and light weapons imports and exports. We look at the small arms trade, as opposed to major conventional weapons (MCW) for several reasons. First, because SALW are widely used in civil conflict (especially by armed opposition groups) and in criminal violence. Currently, the vast majority of wars take place within states. While MCW continue to have a profound place in the strategic relationships and occasional wars between states they are comparatively less relevant to civil conflict. Moreover, SALW are exclusively used by criminal organisations whose activities in many countries exact a death toll equivalent to some war zones. Second, there is considerable information already available on the trade in MCW (particularly from the SIPRI yearbook). When the NISAT project was set up in 1997 one of its goals was to fill an

information gap left by existing datasets concentration on the trade in MCW. Third, over a similar period there has been considerable international attention focused upon the proliferation and diffusion of SALW. Several international and regional initiatives, notably the UN *Programme of Action to Prevent, Combat and Eradicate the Illicit Trade in Small Arms and Light Weapons in All Its Aspects*, have brought governments and civil society together to discuss international and regional co-operation. Last, concomitantly, research into the dynamics of the SALW trade has expanded over the last 10 years. Although more work is clearly needed, one of the biggest obstacles to our understanding of the small arms trade and its effects is the dearth of reliable data.

NISAT's role in collecting data on the global small arms trade is an important aspect of wider research efforts. The database of authorised small arms transfers is the only such resource in the world, containing information on government licensed arms transfers collected from a variety of sources, including official trade statistics, national arms export reports and press article. It contains over 800,000 records detailing transfers between some 250 states and territories over the period 1962 until the present day. The objective is to gather together in one place all available information on small arms transfers and thus to put together as much data as possible as a resource for researchers. The key benefit of the database is that it allows inter-comparability of differing data sources (the data provided by individual states differs widely in terms of conventions used, detail, comprehensiveness, reliability, transparency and format). All the information is freely available online to governments, campaigners, researchers and members of the public.

Next follows a definition of small arms and an introduction to the online database. This is followed by a description of the three datasets.

2.2. Small Arms and Light Weapons

The term small arms and light weapons refers to portable weapons that one or two persons or a pack animal can carry. The weapons are licitly and illicitly used in a wide range of contexts – by criminals, terrorist groups, armed opposition groups, sports shooters, and state armed forces. In general it is not very useful to distinguish between 'military' and 'civilian' weapons. Small arms such as pistols are used by civilians and state forces. However, in most countries civilians are not permitted to own automatic firearms or light weapons. There is no internationally agreed definition of small arms and light weapons. However, the 'Report of the Panel of Governmental Experts on Small Arms' (United Nations, 1997) provides the most widely used definition. The following list is drawn from the 1997 report:

Small arms:

- a. Revolvers and self-loading pistols
- b. Rifles and carbines
- c. Sub-machine-guns
- d. Assault rifles
- e. Light machine-guns

Light weapons:

- f. Heavy machine-guns
- g. Hand-held under-barrel and mounted grenade launchers

- h. Portable anti-aircraft guns
- i. Portable anti-tank guns, recoilless rifles
- j. Portable launchers of anti-tank missile and rocket systems
- k. Portable launchers of anti-aircraft missile systems
- l. Mortars of calibres of less than 100 mm
- m. Ammunition and explosives
- n. Cartridges (rounds) for small arms
- o. Shells and missiles for light weapons
- p. Anti-personnel and anti-tank hand grenades
- q. Explosives

2.3. The online database¹

The database can be accessed through the NISAT website. The query engine allows users to make dynamic searches of a country's imports and exports, based on country, year, data source and weapon type. In addition to presenting the data in a user-friendly web format users can also download database reports in a .csv format. This can then be easily transferred for analysis by different computer programmes i.e. Excel or STATA.

A number of functions have been constructed that allow the production of detailed data searches. One key tool is the ability to view both the records declared by a given importing or exporting country and those of its partners. This is also referred to as "mirror data", and means that (for example) a query of German exports to the UK will also return data for UK imports from Germany. This important feature enables users to pinpoint discrepancies between the data supplied by various countries (this is described in more detail in section 3.3). It is also possible to ask the search engine to return information on regions (i.e. Middle East and North America), blocs (i.e. EU and NATO) and dependent territories (such as Greenland's imports in Denmark data).

Once the criteria have been established, the search engine will produce a dataset containing information in the following fields:

- Weapons type (and code)
- Year (including month)
- Number of units
- Value (in local currency or converted to US dollars)
- Number of licences issued or denied
- Weight
- Source of data
- Whether record represents an authorisation or delivery
- Whether the vendor is government or industry
- Reliability of data (high, medium or low)
- Accuracy of data (high medium or low)
- Whether the shipment contains only small arms (as opposed to mixed shipments of SALW and heavy weaponry)

¹ This section is based on the following document: Julian Wagstaff. 2002. 'User documentation for NISAT database manager software, NISAT query engine software (Remote versions)'. Memorandum prepared for PRIO. December.

It is important to note that for any search query some of the above fields will contain no information, due to differences in data provided by states. This is because the fields are an aggregation of the full breadth of information available. As none of the data sources specifies all of above information, several fields will be empty.

Below is a sample of the data produced by the online database for Austrian exports to Lebanon in 2005. The data source has been restricted to UN Comtrade:

Exports from Austria to Lebanon in 2005

Period Start	Period End	Weapons Type	Units	Value	No. of Licences Issued	Weight	Auth./Del.	Govt./Ind.	Data Source	Reliability	Accuracy	Small Arms Only
N/A	N/A	Small Arms Ammunition (930630)		4 251 USD		111	Del.	Not Known	@ Comtrade	Sec./Hi	High	Yes
N/A	N/A	Parts & accessories of revolvers or pistols (930510)		480 USD		5	Del.	Not Known	@ Comtrade	Sec./Hi	High	Yes
N/A	N/A	Sporting & Hunting Rifles (930330)	104	20 323 USD			Del.	Not Known	@ Comtrade	Sec./Hi	High	Yes
N/A	N/A	Parts & accessories of shotguns or rifles (930529)		13 129 USD		100	Del.	Not Known	@ Comtrade	Sec./Hi	High	Yes

Figure 1: Austria exports to Lebanon in 2005

Figure 1 shows four shipments of arms from Austria to Lebanon in 2005. For one record (Sporting and Hunting Rifles 930330) unit information is available. While the value is usually always specified in UN Comtrade data, the inclusion of unit and weight data varies from record to record. We also know that these are deliveries (rather than authorisations). The format of UN Comtrade data does not, however, include information on month, number of licences or whether the vendor is government or commercial (though other data sources provide this). Thus these fields are blank or ‘not known’. ‘Accuracy’ is defined as ‘low’, ‘medium’ and ‘high’ depending on approximations or rounding up of figures. In Figure 1, all records are marked ‘High’ because there is no evidence of estimation or rounding. The data source is named, along with a subjective judgment of its reliability. Original documents produced by the party involved in the transfer (such as a government report on its arms exports) are rated ‘Primary’ sources; information reported by a third party (i.e. UN Comtrade or press reports) are ‘Secondary’. There is also an additional score for reliability of the source, divided into two categorisations - high and less. In general this is based upon an assessment of the veracity of the information provided by the source. Finally we can see that the shipments contained small arms only.

3. Global authorised trade (UN Comtrade) dataset²

² This section is drawn from Marsh, Nicholas. 2005. ‘Accounting guns: The methodology used in creating data tables for the Small Arms Survey.’ Memorandum prepared for the *Small Arms Survey*. 15 November.

3.1. UN Comtrade

A significant proportion of the customs records held in the NISAT database comes from UN Comtrade (or the United Nations Commodity Trade Statistics Database of the UN Department of Economic and Social Affairs/UN Statistics Division), currently the world's most comprehensive source of comparable information on the global trade in small arms and light weapons. This customs data is broken down by chapter according to commodity type and, within each chapter, by sub-categories, which are classified by a set of six-number codes. When extracting data, NISAT looks at Chapter 93 'Arms and ammunition; parts and accessories thereof', using only those codes which refer to small arms and ammunition to populate the database.

Although UN Comtrade is the most comprehensive customs data currently available, it still has its limitations. Some states are more transparent than others and coverage varies widely between regions. For example, in some conflict areas there is very little information, such as the Democratic Republic of Congo, whereas for others (Colombia and Nepal) there is much more information available. In general, there is low coverage of sub-Saharan Africa. Many states also censor their data. The real value of the global trade in small arms is further distorted because many transfers do not pass through customs (i.e. government to government transfers transported via the military). Also, many countries only submit data for 'non-military weapons' or only declare monetary value or weight where the number of weapons (units) would be the most indicative of a shipment's size. Despite its drawbacks, UN Comtrade is preferred as a basis for the dataset over other data sources because of the greater comparability it permits and the large number of countries that report to Comtrade.

3.2. Harmonised System (HS)

Customs data used by UN Comtrade, and other national and regional sources, is defined by a set of universal nomenclature known as the Harmonised System (henceforth referred to as HS). The HS defines, via a series of numeric codes, every good reported as being transported over applicable borders. Each numeric code refers to a defined category of goods, for example 930200 refers to 'pistols and revolvers'. The existence of such a universal system is of immense benefit to researchers on the small arms trade. Other data sources, such as national reports to parliament, use a variety of methodologies and variables. It is therefore very difficult to use them to develop a picture of global or regional patterns (Haug, Langvandslien, Lumpe and Marsh, 2002).

The HS derived customs data is not without complexities, though. The nomenclature are updated on a regular basis. In recent years, such revisions occurred in 1992, 1996, 2002 and 2006. The 1992 revision involved major changes to the categories used concerning the transfer of arms. It is therefore difficult to construct time series data that straddles 1992. The 2002 revision replaced two of the HS1996 categories 930100 and 930590 with new codes. Thus the code for 'Military weapons'- 930100- was replaced with four codes; 930111, 930119, 930120, and 930190. Similarly, the code for 930590 ('Parts and accessories of military weapons') was replaced with 930591 and 930599. Other 1996 codes were not changed in the 2002 revision of the HS nomenclature. A further complicating factor is that governments have not uniformly used the same nomenclature at the same point. For example, in 2003, countries such

as Indonesia or the Philippines continued to report using the HS1996 nomenclature, while other countries had started using the newer HS 2002 nomenclature. A list of the codes and their descriptions is given below:

HS	Description	Code
1996	Military Weapons	930100
2002	Artillery weapons	930111
2002	Cannon, Mortars, & others	930119
2002	Grenade launchers, Flame Throwers & other	930120
2002	Military Rifles, Machineguns, & other	930190
2002	Pistols & Revolvers	930200
2002	Sporting & Hunting Shotguns	930320
2002	Sporting & Hunting Rifles	930330
2002	Parts & accessories of revolvers or pistols	930510
2002	Shotgun barrels	930521
2002	Parts & accessories of shotguns or rifles	930529
1996	Parts & accessories of Military Weapons	930590
2002	Parts & accessories of Military Weapons	930591
2002	Shotgun Cartridges	930621
2002	Small Arms Ammunition	930630
2002	Bombs, Grenades, Ammunition, Mines, & Others	930690
2002	Parts & accessories of small arms and light weapons	930599

Table 1: UN Comtrade codes from Chapter 93 for classifications containing SALW.

Therefore, in order to present a comprehensive picture of the global trade in small arms and light weapons it is necessary to download data from the four nomenclature discussed above (HS 1992, HS 1996, HS 2002 and HS 2006). They must then be thoroughly filtered to ensure that only one record is present in the database, and that this record comes from the most recent nomenclature.

3.3. The process of creating a global dataset

In its raw state, however, UN Comtrade data is unfit to serve as a basis for analysing the small arms global trade. Using the methodology described below, NISAT filters and adjusts the records to produce a more representative picture of the trade. After the data has been entered into the NISAT database, there are several factors that make it unsuitable for the analysis of global and national trends. First, for every country there will, potentially, be two sources of data. These are the country's reports of its exports or imports (known as 'base data'); and its partners' reports of their exports to, or imports from, it (known as 'mirror data'). For example, Italy may report an export of category 930200 'Pistols and Revolvers' to Canada - this is the base data. Canada may also have reported an import from Italy of the same category. This report would be the mirror data.

Unfortunately, base and mirror data correspond very rarely. This problem has been analysed on several occasions.³ Explanations range from fraud (customs are used to levy tax), the dates of export and import occurring in different years (export in December 2004 and an import in January 2005), countries used as transit points

³ Interview conducted at the Small Arms Survey, Geneva with Friedrich von Kirchbach, Chief, Market Analysis Section, International Trade Centre, UNCTAD/WTO. 21 December 2004.

(exports declared to the Netherlands, for example, may simply transit through that country and ultimately be declared as imports by Germany), and human error.

Thus, a comprehensive answer to the question “What did a country export and import during 2002?” would require four different datasets. These are described below.

Exports base	Exports mirror	Imports base	Imports mirror
X	X	X	X

Providing four different answers to such a straightforward research question is not a very practicable way of evaluating global trends.

Another problem is that many countries censor or do not report any data (or only selectively) to UN Comtrade. For example, Austria has not reported any exports of 930200 ‘Pistols and revolvers’. This is an anomaly, as the Glock Company, located in Austria, is known to be one of the world’s largest producers and exporters of pistols. This problem can be solved by looking at the mirror data, in other words, which countries have reported imports of pistols from Austria. Some countries also censor the data by reporting that their partners were ‘unspecified’ countries. These include reported destinations such as ‘special categories’ or ‘Areas, not elsewhere specified’. We therefore have information that an export or import has been made, but no information on which country it concerns. In addition, as noted above, countries have reported using different nomenclature. In such a circumstance, it will be difficult to directly compare base and mirror data.

These problems are addressed by agglomerating the data. The agglomeration process filters, and slightly modifies, both base and mirror data, and so derives a single figure for a country’s exports and imports. For every country, matching records are compared and, using set of calculations to determine the reliability of each country’s data for each weapons type, a record from either the base or mirror dataset is chosen. This is achieved by comparing the value of each base transaction with its mirror counterpart. Countries that, on average, have base transactions that are closer in value to their mirror counterparts are viewed as producing more reliable data than countries for which, on average, there are very large discrepancies between their reports and the data supplied by their mirror partners.

This method is largely ‘self referential’. It would be preferable to compare each item of base data with an external data source (other than UN Comtrade). However, for the vast majority of countries, such an external data source does not exist. Even when we do have additional data sources, they are unsuited to be used to assess the veracity of UN Comtrade data. This is because alternate data sources, such as reports to parliament on arms exports, often use very different methodologies to UN Comtrade (such as reporting export licences or using different categories of weapons). Conversely, other sources of customs data (such as Comext) can not be used, as they are based upon the same ultimate source (national customs authorities) as UN Comtrade. Readers should see Haug, Langvandslien, Lumpe and Marsh (2002) for more information.

The next step is designed to avoid double counting. As noted above, many countries report trades, but do not state the country destination (stating instead destinations such

as ‘special categories’). This poses a problem, as such trades can not be filtered via the reliability calculator. However, they still represent a likely cause of double counting if they are combined with mirror data.

For example, in 2003 the UK just reported exports of category 930190 to ‘special categories’ worth 5 385 129 USD. It did not report any other trades to individual countries. However, the ‘mirror’ reports of its partner’s imports of 930120 are:

Country	USD
Australia	217546
Canada	91876
Ireland	15009
Japan	877681
Korea; South	222345
Maldiv Islands	24658
New Zealand	1668
Norway	504046
Switzerland	7300
Turkey	13576
USA	310080
Total	2285785

If the UK export to ‘special categories’ were added to the value of the mirror data it would potentially double count UK exports. This is because the mirror trades are likely to have been included in the total reported as being exported to ‘special categories’.

The penultimate step involves the final deletion of duplicated data. As noted above, the agglomerated tables contain both the base and mirror data. This data has been slightly modified and a reliability score calculated for each country’s weapon types. It is now necessary to finally filter and delete either the base or mirror records, as appropriate, concerning each transaction (in most cases, each export will have a corresponding mirror import and vice versa).

The final step is the creation of one single dataset out of the circa 400 country tables. The transfers are read from the country tables and inserted, one by one, into the master table. This process will inevitably involve almost all the records being duplicated – an import from one country will have a corresponding and identical record from the exporter. The duplicates are then deleted. Once the programme has produced the global dataset there is an option to create reports listing either all records or the top five partner countries (or regions) by value, and the top five weapons types by value. It is in these reports that we can see the scale of the global trade in small arms and the types of weapons being traded. The top ten SALW importers and exporters in 2004 are shown below in charts 1 and 2.

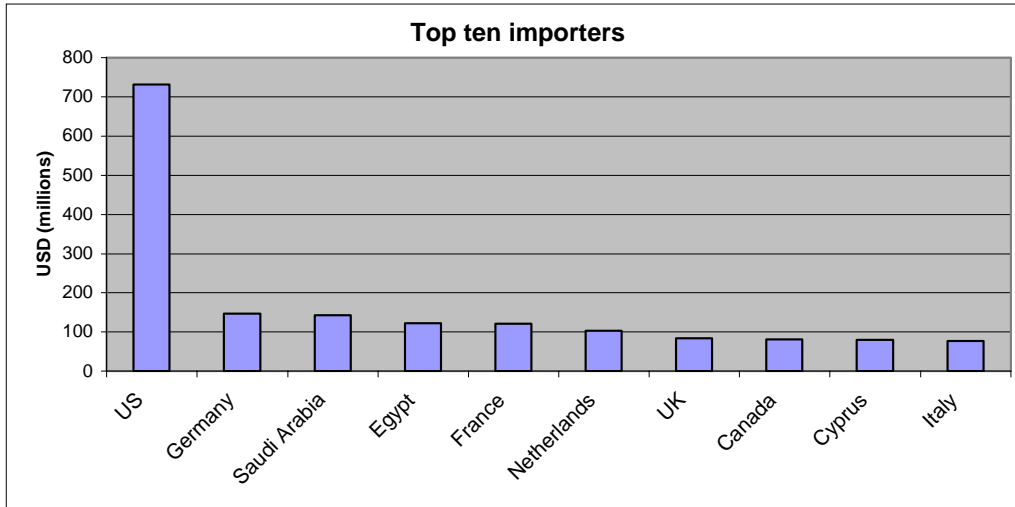


Chart 1: Top ten importers in 2004

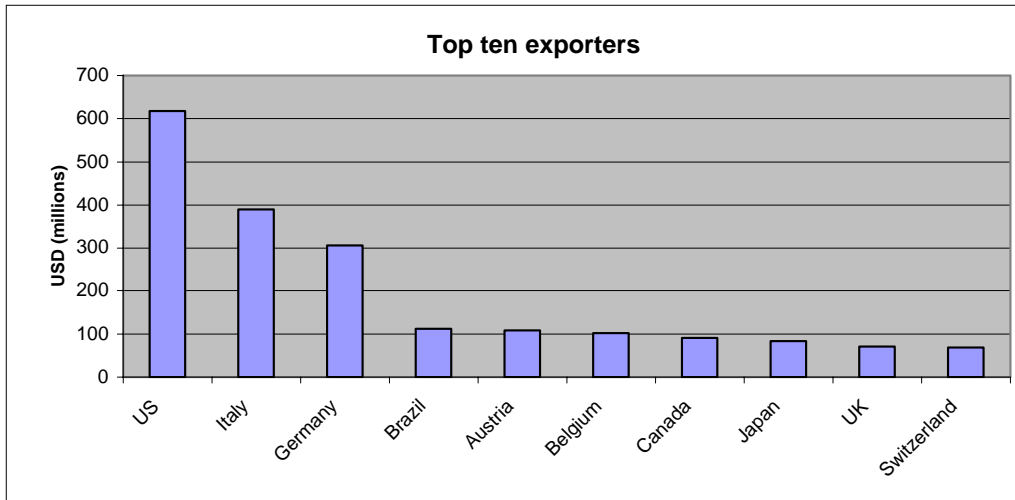


Chart 2: Top ten exporters in 2004

Further, it is interesting to highlight the varying levels in transparency between countries. The programme produces reports on which countries do not declare any customs records to UN Comtrade. It also produces reports on which HS nomenclature countries use, which weapons types and what level of information (i.e. units, value and weight) they provide.

1. The idiosyncrasies of using customs data

As mentioned above, two of the datasets described in this paper are based upon customs data. This is the only global and comparable data source. However, it has several subtleties which are examined here. First, as noted above, the declarations by two trade partners frequently do not match up. While this is a problem, it should be noted that the same phenomena is found in UN Comtrade concerning other goods, and other sources of data on the arms trade – in particular the UN register of conventional

arms transfers. The mismatch between exporter and importer data should therefore be viewed as a facet of trade data in general rather than specific SALW.

Second, it is important to note that customs data just reports the movement of goods rather than definitive ‘exports’ and ‘imports’. Weapons may be moved across borders for a variety of reasons. For example, they may be sent back to their country or origin for repair; samples or demonstration models may be sent (and later returned) to be exhibited at arms fairs or to be tested by a prospective purchaser.

In addition, weapons (like any other product) may take a circuitous route from the seller to the buyer. Weapons that are just being transferred from one ship to another, or transhipped to another form of transport, should not appear in the customs data. However, if they are temporarily imported (perhaps by a dealer) into a country and then re-exported to a third country the movements will appear in the trade data used to construct the NISAT datasets. The NISAT dataset therefore could be used to examine the re-transfer hubs in the international small arms trade. For this reason it is useful to include them in the dataset.

Users of the datasets, and the NISAT database, should therefore be aware that a record of a transfer from country A to country B is just that – the movement of weapons from one place to another. The overwhelming majority of trades are likely to be exports and imports. However, some transfers are likely to have some more convoluted explanations.

Another idiosyncrasy concerns the data coverage. There are two systematic problems. The first is censorship of certain weapon categories by governments. As noted below, there are far fewer observations of average prices for military firearms than pistols and revolvers. This represents a general trend that the trade in sporting guns (HS939330 and HS930320) is widely reported while military equipment is frequently not reported (presumably due to censorship). The trade in pistols and revolvers is in the middle – more widely reported than military firearms but still subject to censorship by some states.

The second systematic problem concerns the lack of any data being reported by many countries in the developing world. Users of the database interested in arms transfers to the Democratic Republic of Congo (DRC) in the early part of this decade will be disappointed to find that the DRC did not report weapons imports during the worst years of its civil war. A similar dearth of data affects many of the DRC’s neighbours. One of the consequences of extreme under-development is the lack of a capacity to collect and report data. (Other countries involved in war have reported imports – such as Colombia, Sudan or Sri Lanka).

When these two factors are taken into account the extent of data coverage in the world can be summarised as:

- Good: North and South America, Western Europe, other developed countries (Japan, Australia etc)
- Medium: Eastern Europe, Central Asia, South-East Asia, South Asia
- Poor: China, Middle East
- Very Poor: Sub-Saharan Africa

- Significant exporters that do not report at all include Israel, Bulgaria, North Korea.

Datasets based upon Comtrade therefore provide the best global resource for research on the trade in small arms and light weapons. However, their limitations and idiosyncrasies need to be recognised. The most important thing is to ensure that the research questions are appropriate to what the data can deliver.

4. Black market Kalashnikov prices⁴

A key indicator of the extent of the black market in weapons is the price that the weapons fetch. Similarly, changes in the price of weapons can indicate variations in the supply, or demand, for illicit arms. The price of illicit weapons is therefore an important focus of action orientated research. The Kalashnikov assault rifle has become a symbol of armed conflict. Renowned for the simplicity of its design and ease of operation and repair, the Kalashnikov is the weapon of choice for militaries and armed groups throughout the world. Of the 500 million firearms in circulation, as many as one in five is a Kalashnikov (Small Arms Survey 2004). Tracking black market Kalashnikov prices therefore has the potential to provide a useful step towards better understanding the illicit small arms market. By documenting prices of a representative class of weapon across countries and time it is possible to investigate which factors are significant in determining weapon price variation.

The Black Market Kalashnikov prices dataset was initially set up by Phillip Killicoat in cooperation with the NISAT team at PRIO and it contains over 300 price observations from 117 countries (Killicoat 2006a). A major source for the price observations is the NISAT Black Market Archive, a collection of over 9,000 news articles on black market small arms transactions. In addition, the dataset contains price information from existing literature, interviews with experts from the arms industry (Killicoat 2006a). Each price observation is coded according to the following criteria:

- a. Country where the weapon price was observed
- b. Date of observation
- c. USD price (converted from local currency where appropriate and controlled for inflation).
- d. Weapon Type (exact assault rifle type observed. E.g., AK-47, AK-74, AK-101, craft replica).
- e. Quality of the weapon (new, used or in need of repair)
- f. Location where price was observed (according to one of four indicators (1) city, (2) province, (3) border, or (4) foreign transaction)
- g. Source of the price observation

4.1. Limitations to the data and recommendations

⁴This section is drawn from Killicoat, Phillip. 2007. 'Kalashnikov Price Data Collection Methodology'. Memorandum written January 2007

Philip Killicoat's research on Kalashnikov prices identified a number of limitations to the reliability and scope of the data, and provided recommendations for improvement (Killicoat 2007). Firstly, detailed price reports for the same weapon type, in the same condition and transacted between similar individuals are rare. Secondly, weapons types descriptions are often simplistic (frequently reported as AK-47s rather than a later Kalashnikov variant). More accurate recording of weapon types would be valuable when discriminating between changing market tastes. Thirdly, the initial dataset did not include information on who was buying and selling the weapons. In subsequent collections, it will be beneficial to construct coding rules to identify certain classes of sellers and buyers. Last, in addition to collecting journalistic reports, more rigorous use could be made of small arms field workers. For example, field workers and other interested parties could be advised of NISAT's price collection effort and encourage to feed back prices as they are observed.

5. Licensed trade prices

The final dataset being developed by the NISAT project at PRIO is a dataset of prices for the licensed trade in firearms.⁵ This dataset is much more of a work in progress than the preceding two datasets. As noted above, the vast majority of the records in the NISAT database just concern the weapon type and the total value of the transaction. However, an important minority contain data on both the number of units transferred and the total price of the transaction. Using this information, it is possible to estimate the average price per firearm.

This information is useful for several reasons. First, a researcher can take the above described data (see section 3) on the total value of firearms transactions between states and use the average price data to estimate the number of firearms being traded. Second, the average price data will allow a researcher to examine the structure of the small arms industry. For example, it can highlight long term changes in the average price of firearms exported by a particular country. Similarly, the countries that export high priced weapons can be compared with those that offer discount firearms. Last, it is also interesting to note instances in which a country exports high priced firearms and imports low priced guns.

The average prices are calculated using a four stage process:

1. Convert all currencies into current USD
2. Eliminate outliers.
3. Calculate a 'generic' mean value of a firearm category (see 3.2) for a particular year.
4. Calculate the mean value of a firearm for all countries in a specific year (where sufficient data is available).

The average price dataset uses both Comtrade data and data provided by Eurostat. This is a departure from the methodology used by the (above mentioned) Comtrade

⁵ This section is based upon Marsh (2006).

dataset. The data from Eurostat uses a modified version of the Harmonised System (CN8) so the two data sources are easily comparable. Moreover, concerning the total value of the trades the two data sources provide duplicate information (this is unsurprising as both are based upon data provided by national customs authorities). However, many countries that do not report the number of units transferred to Comtrade do so to Eurostat. Therefore, combining the two data sources provides an increased number of price and unit observations to work with.

After converting all the prices into current USD (Eurostat prices are reported as Euros) the next task is to remove outliers. In some cases there are a small number of transactions with a very high price per unit. For example, concerning pistols, there is one transaction with an average price of 400 000 USD and another with 150 000 USD. These are very likely to be errors – either in the total price or the number of weapons exported. These outliers are removed manually.

The final two phases are to calculate the generic mean value of a particular weapons type for a particular year, and then to calculate the individual figures for each country. As with the Comtrade dataset, this process uses both base and mirror data. In this case the use of mirror data significantly increases the number of countries for which there is price and unit data. For example, the USA reports on both the number of units imported, and the total value of the imports. The USA is also the world's largest small arms importer. It is therefore possible to obtain average price observations from all of the countries that export to the USA.

The generic average is calculated by summing all the price and unit data, and then by dividing by the number of observations. An example is the category pistols and revolvers (HS Category 930200). Over the period 1992-2005 there were 53 098 observations (after outliers were removed). Over that period the mean price per gun was 198.4463 USD. This figure is of course less useful as the figures are based upon current USD. (It would be interesting to convert them to constant USD but that has not been done yet). In 2004 the mean value of a pistol was USD 238.4957 (based upon 2199 observations). This can be further disaggregated into a mean of USD 263.2739 for exports (1331 observations) and USD 221.8642 for imports (952 observations).

A similar process is used to calculate the values of sporting guns, a combination of HS930330 (sporting rifles) and HS930320 (sporting shotguns). After removing outliers, the total number of observations for 2004 was 10 480, the mean value of exports is USD 300.5312, and of imports is USD 310.6146.

We also used this process to examine the trade in military firearms (HS 930190). However, the results were much less satisfactory. In 2004 there were just 151 observations (after outliers were removed). Moreover, over half of these (81) were reported by the USA. In addition, the observations are spread out and don't cluster round the mean. Therefore, the average figures – generic USD 407.7405, exports USD 660.63739; and imports USD 130.0346 – are much less representative than for the other weapon types.

6. Data users and conclusion

The datasets on small arms described above have formed the basis of research on the global arms dynamic, both licensed and illicit. Since 2003, the NISAT project at PRIO has provided the data used in the Small Arms Survey's estimates of the size of the global trade in small arms and the main importers and exporters.

The most recent output by NISAT staff is a paper presented at the 2007 International Studies Association conference in Chicago on how factors related to globalisation are linked to the growing problem of weapons proliferation. Globalisation is a controversial topic and sceptics argue that as economies become more open to the global capitalist system, the demand and supply of tools of violence will increase. The dataset was used to show that, contrary to this assertion, greater trade dependence and foreign direct investment predicted lower SALW imports (de Soysa, Jackson and Ormhaug 2007).

Another author (Holm 2006) used the dataset to produce an analysis of the development of EU controls over the arms trade which was published in *European Security*. For certain partners, NISAT has been involved in producing datasets on given countries, regions and blocs, for example for the EU Joint Research Centre and United Nations Institute for Disarmament Research (UNIDIR).

The NISAT database is also used as a key resource by campaigning groups such as Amnesty International and the campaign for an Arms Trade Treaty (ATT). Knowledge of to whom weapons are being sold is clearly of key importance to organisations attempting to bring about greater control over the international trade in small arms and light weapons. This information has been used by the ATT campaign to highlight examples of transfers of arms to parties that used them to commit violations of international human rights law. In addition, our work on cataloguing the information supplied by governments is highly relevant to the ATT's sections on transparency.

The dataset of Kalashnikov prices will be used as the basis for a chapter on AK-47 prices in the forthcoming *Small Arms Survey 2007* to be written by Phillip Killicoat. A recent scholarly publication derived from the database of Kalashnikov prices has already been used to demonstrate a relationship between weapons prices and the likelihood of civil war (Killicoat 2006a)

References

- De Sousa, Jackson and Ormhaug. 2007. 'Globalization and the Proliferation of Small Arms, 1992–2003.' Paper presented at the International Studies Association 2007, Chicago. February.
- Holm, Kyrre. 2006. "Europeanising Export Controls: The Impact of the European Union Code of Conduct on Arms Exports in Belgium, Germany and Italy." *European Security*. Vol. 15. No. 2.
- Killicoat, Phillip. 2006a. "Cheap Guns, More War? The Economics of Small Arms." MPhil in Economics Dissertation. Oxford: Oxford University.
<http://pkillicoat.googlepages.com/Thesis060320.pdf>
- Killicoat, Phillip. 2006b. "Weaponomics: The Economics of Small Arms", *CSAE Working Paper* WPS/2006-13, Oxford
www.csae.ox.ac.uk/workingpapers/pdfs/2006-13text.pdf
- Killicoat, Philip. 2007. 'Kalashnikov Price Data Collection Methodology'. Unpublished background paper. January.
- Marsh, Nicholas. 2005. 'Accounting guns: The methodology used in creating data tables for the Small Arms Survey.' Memorandum prepared for the *Small Arms Survey*. 15 November.
- NISAT. 2006. Norwegian Initiative on Small Arms Transfers. "Blackmarket Archive on Small Arms." <http://www.nisat.org>.
- Small Arms Survey. 2005. *Small Arms Survey 2005: Weapons at war*. Oxford. Oxford University Press.
- Small Arms Survey. 2006. *Small Arms Survey 2006: Unfinished business*. Oxford. Oxford University Press.
- United Nations. 1997. Report of the Panel of Governmental Experts on Small Arms'. www.un.org/sc/committees/sanctions/a52298.pdf
- Wagstaff, Julian. 2002. 'User documentation for NISAT database manager software, NISAT query engine software (Remote versions)'. Memorandum prepared for PRIO. December.
- Wagstaff, Julian. 2004. 'System, User and Code Documentation For NISAT Data Import ("Add_Records") And Agglomerator Applications'. Unpublished memorandum prepared for PRIO. October.
- World Bank. 2006. *World Development Indicators* (WDI). ESDS International. Last accessed December 2006.