

COMPARATIVE ANALYSIS ON DATA SOURCES OF ARMS TRADE

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Abstract: *There are two reliable sources for acquiring arms trade data, one is from us government intelligence agencies which regularly release the up-to-date data through official research reports; another is from Stockholm International Peace Research Institute, which periodically updates its online arms trade database or publishes SIPRI yearbook each year. We deliberate on the two main resources for arms trade data and find there exist many differences which respectively are, main information sources, definition coverage, pricing method, and contents published. Through contrastive analysis toward different sources, we summarize their merits and demerits respectively and conclude that answering different questions about the arms transfer needs to choose pertinent types of data.*

Keywords: *Arms trade; Data sources; Comparative analysis*

1. INTRODUCTION

Arms trade is one of the most intensely discussed issues in the public at large, as well as in the social sciences. Scholars have looked at various aspects of arms transfers and drawn conclusions from existing data, but seldom have the questions of validity and accuracy of the data.

It is common knowledge that data on arms transfers are especially unreliable and open to manipulation.

Still, one finds scores of empirical studies and policy papers based on the existing data.

In this paper, we first make a list of all sources for data of arms trade, and find out the most reliable and authoritative ones.

Next, we compare data from different sources and sum up their respective merits and demerits. Based on the analysis, we draw this paper's conclusion.

There are basically four institutions that put out arms trade data of some kind, which is as following: One comes from researching reports provided by US official institutions.

The most common cited reports fall into two categories.

One kind of report is prepared annually to provide Congress by Congressional Research Service, (CRS) whose name is 'Conventional Arms Transfers to Developing Countries'(CATDN);

Another kind of report is annually published previously but now irregularly issued by the Bureau of Verification and Compliance,(BVC), whose name is 'Word Military Expenditures and Arms Transfers'(WMEAT).

Stockholm International Peace Research Institute which is a semi-official research institution also a reliable source for arms trade data, SIPRI periodically updates its online arms trade database or publishes SIPRI yearbook each year.

The database and Yearbooks provide materials about conventional weapons transfers to countries, international organization, and non-state military groups since 1950.

International Institute for Strategic Studies (IISS) in London annually publishes a yearbook named 'the Military Balances' that contains data of conventional weapons transfer too, while the data is not collected by IISS itself but cited from CRS reports.

Besides, over 140 countries report to United Nations the import and export of 'weapons and armaments' of their own countries and we can query data through UN Commodity Trade Statistics Database (Comtrade data).

But it is of the limited use; first, not all countries submit to the United Nations, some major weapons exporting countries do not submit their data.

Second, the statistic of arms deals is not complete, for example, warship, combat aircraft, and electronic equipment for military use do not include in it.

Compared with IISS and Comtrade data, WMEAT, CATDN and SIPRI are more authoritative and reliable sources for researchers.

2. COMPARISON OF TWO DIFFERENT DATA SETS

It is found that the arms trade data provided by different institutions makes a big difference which is embodied in the following aspects:

2.1 The difference of definition. The definition of arms transfer in WMEAT is that: "[1]Arms Transfer represents the international transfer of military equipment and related service, including weapons of war, parts thereof, ammunition, support equipment, and other commodities designed for military use, as well as related services.

Among the items included are tactical guided missiles and rockets, military aircraft, naval vessels, armored and non-armored military vehicles, communications and electronic equipment, artillery, infantry weapons, small arms, ammunition, other ordnance, parachutes, and uniforms.

Dual use equipment, which can have application in both military and civilian sectors, is included when its primary mission is identified as military.

The building of defense production facilities and licensing fees paid as royalties for the production of military equipment, as well as equipment delivery, maintenance, operating and training services, are included when they are contained in military transfer agreements.

Military services such as training, supply, operations, equipment maintenance or repair, technical assistance, and construction are included where data are available. Excluded are foodstuffs, medical equipment, petroleum products and other supplies."

CATDN is prepared annually to provide Congress with official, unclassified, quantitative data on conventional arms transfers to developing nations by the United States and foreign countries for the preceding eight calendar years for use in its policy oversight functions.

The values of arms transfer agreements or deliveries in the report refer to [2]"the total values of conventional arms orders or deliveries as the case may be, which include all categories of weapons and ammunition, military spare parts, military construction, military assistance and training programs, and all associated services."

SIPRI is the source which only provides the data of conventional weapons transfer.

The arms trade database mainly records transfers of weapons which fall into the nine categories.

That is, aircraft, armored vehicles, artillery, sensors, air defense systems, missiles, ships, engines and other [3].

The statistics presented refer to these nine categories only. Transfers of other military equipment, such as small arms and light weapons, trucks, artillery under 100 mm caliber, ammunition, support equipment and components, as well as services or technology transfers are not included.

2.2 The difference of statistical caliber. Based on the definitions above mentioned, we find that the caliber of SIPRI is the most narrow, which only record the transfers of conventional arms. Whereas US official statistical caliber is much larger, it not only includes conventional weapons but also contain the small and light arms, dual-use commodity, technical support and services.

It should be pointed out that the statistical figures in WMEAT and CATDN exist in differences though they are all the U.S. official publications.

The U.S. Arms exports in WMEAT accounts include private enterprise to enterprise or enterprise-to-government exports under the Direct Commercial Sales program administered by the Directorate of Defense Trade Controls (DDTC) in the Bureau of Political-Military Affairs of the U.S. Department of State, as well as government-to-government transfers under programs administered by the Department of Defense.

We find that CATDN only contains the data from DOD, that is, government-to-government arms deals. So, for US arms trade, the data of WMEAT is larger than CATDN.

2.3 The difference of collection channels.

The data of SIPRI's arms transfer project are from variable sources: ^[4] newspapers, periodicals, books, monographs and annual references, nationally and internationally official documents, industrial information, blogs and other publications from internet.

The common adoption criterion of all those sources is publicly published and available. SPIRI is prudent with single-source data, and only the data from at least five different sources can be regarded as reliable.

WMEAT and CATDN are different from SIPRI in collecting data; they do not rely on the independent data of arms trade, but excerpt from official sources of American governmental organizations. Specifically, Defense Intelligence agency (DIA) and other intelligence services of USA are in charge of collecting the arms trade data of the USA and other countries.

For the confidentiality, the intelligence collected by DIA is not announced externally, and those published reports only quoted some total volumes of the data that are consistent with the data of CIA and DIA.

2.4 The difference of pricing method. The arms trade data of SIPRI is not the trade volume of arms transfers, or the currency amount of the actual payment, but a quantity index, which is called Trend-indicator values (TIV)^[5].

SIPRI used the TIV to indicate every weapon or subsystem in the database, and then figure out quantities of roll-in, roll-out and mutual transfers among different entities on the basis of the TIV and the amounts of delivered arms systems or subsystems of the designated years. Consequently, TIV doesn't indicate the actual amount of arms transfers, but an indicated value of transfer volume.

Therefore, it's pointed out in the annual report of SIPRI that "TIV should not be applied directly, and it's better regard it as a sort of original data, and use it to measure and calculate the trend of international arms transfers, the percentage of supplier countries and recipient countries, or the ratio of designated countries' external transfer volume and received volumes from other countries. American government's official data is the actual agreement value of arms transfers' contracts or arms transfers' actual delivered values of the year, to facilitate totaling or longitudinal comparison, American government often provide current US dollar and constant US dollar as two different measurement units.

If SIPRI provides one kind of TIV but not the actual value of arms trade, does that mean the agreement value or the delivered value of WMEAT and CATDN are true and accurate?

In fact there is indication that WMEAT and CATDN often use price index to calculate the turnover, especially when other countries' arms trade amount of export and import involved.

The price index here is mainly calculated by estimating military hardware's production cost or military use-value.

2.5 The difference of contents. The data published by CATDN are the contract agreement value or actual delivered value of conventional weapons, which have been transferred from USA and other major arms supplier countries to developing countries during the last 8 years, the statistics cycle was calendar year, and there were updates of data every year.

At the meanwhile, CATDN provided developed countries' data of roll-out arms total volume around the world, but the research focus was arms transfers to developing countries.

The report also announced a large amount of proportional data, such as static and dynamic market shares of each major supplier country, and the ratio of amounts of money of military hardware transferred to developed countries and developing countries. Moreover, CATDN provided the quantity of major arms systems transferred from major arms supplier countries to developing countries during the last 8 years, and divided by regions to count the quantities of all kinds of conventional weapons rolling in each continent and each region.

WMEAT recorded the arms transfers' agreement value and delivered value of every country in the world from 1963 to 2005, the statistics cycle was fiscal year, and there were three different kinds of data: the first one was divided by geographical areas and about every-year quantities of arms flow of designated areas; the second one was grouping countries by revenue and about every-year quantities of arms flow of countries with designated revenue; the third one indicated every single country's arms import and export volumes.

At the same time, WMEAT provided the data of total volume of global merchandise trade, and calculated the proportion of arms trade volume in the total volume of merchandise trade. With those data, we can compare the competitiveness of each country's arms export expediently.

SIPRI provided the actual delivered data of military hardware's import and export of one country in one year, the time span was from 1950 to 2012.

All those data were counted per country and per calendar year, and updated every year.

The latest update was finished March 18, 2013. Besides, SIPRI provided detailed army transaction lists.

The contents of lists included the category of conventional weapons imported or exported by one country during certain period, the amount of imports and exports, the name and model of the arms, brief descriptions of conventional weapons, the years of signing agreements, the delivery years of army, and some information about transaction cost and transaction mode.

3. THE ADVANTAGES AND DISADVANTAGES OF DIFFERENT SOURCED DATA

From Table 1 of analysis of differences for different sourced data, we can see that they have their own advantages and disadvantages.

The advantage of WMEAT is that it provided arms transfers' agreement value and actual delivered value, and the data not only include quantity information but price information of military hardware.

Moreover, WMEAT's definition for arms has the most extensive coverage, and the data in the reports have most categories and most types that can fulfill many kinds of research needs.

The disadvantage is that the reports updated only to 2009 and stopped publishing, so there is a lack of latest data that WMEAT can't meet the needs of army trade trend analysis and empirical study for recent period.

CATDN emphasizes on providing the data of major arms supplier countries' conventional army transfers, specifically, those countries are the USA, the UK, France, Germany, Italy, Russia and PRC.

WMEAT and SIPRI don't have a focus, and counted the data of all the countries' arms imports and exports all over the world.

Besides, the biggest disadvantage of CATDN is that its reports update every 8 years, i.e. it doesn't update all the historical data, at the moment we can only get the latest data from 2004 to 2011, but not other years' latest data.

Table 1. Comparison of army transfers' data

	Time span	Categories of weapons	Transaction type	Statistics cycle	Measurement unit	Category of data
WMEAT	1963-2009	Major arms systems; accessory equipment; technical support and training services; dual-use commodities; Small and light weapons	Intergovernmental trade; trade between government and enterprise; trade between enterprise and enterprise	Fiscal year	Current US dollar; Constant US dollar	Single country; grouped countries and areas
CATDN	1974-2011	Major arms systems; accessory equipment; technical support and training services	Intergovernmental trade	Calendar year	Current US dollar; Constant US dollar	Single country; grouped countries and areas
SIPRI	1950-2012	Major arms systems	Transaction among countries, international organizations and nongovernmental armed organizations	Calendar year	TIV; constant US dollar of 1990	Single country

And every time when CATDN updated its reports, there was a big difference between the old data and new data that lowers former-years reports' value of reference.

The advantage of SIPRI is that it is the only one who provided the data of worldwide all major conventional weapons transfers since 1950, and has the longest time span, what's more, all the data counted with the constant US dollar of 1990 that get rid of the influences of inflation and exchange rate fluctuation, and make the time series data have consistency and comparability.

The disadvantage of SIPRI is that its reports only counted the data of conventional weapons, but not including other weapon categories and related services and technical supports.

The data of WMEAT are comparatively more authentic than the one of SIPRI in indicating the amount of arms flow, because it covers all types of arms transfers.

Besides, the TIV of SIPRI indicated the amount of conventional weapons transfers, but not including price information, the information volume of the data is relatively small.

Thirdly, SIPRI doesn't provide grouped data, like grouping countries by region or revenue. However, CATDN and WMEAT reported not only single country's data but grouped data by regions.

To be objective, there are some obvious disadvantages of above-mentioned different sourced data in accuracy, clarity and availability, and for strictly scientific significance, those data should be used conservatively or be used with special notes and explanations.

We think that to use the data accurately, on the one hand, it is necessary to choose the data according to the objectives of the research; on the other hand, we should solve the existing problems of the data to better fulfill the requirements of research.

But in the short term, creating a new data collection organization, or expanding SIPRI's capability, or making intelligence agencies of the USA announce the confidential data are impossible.

Therefore we have to be prudent with different sourced data and use them reasonably, in order to ensure furthest the objectivity and accuracy of our research conclusions.

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