

Appendix 7C. Sources and methods for arms transfers data

THE SIPRI ARMS TRANSFERS PROJECT

The SIPRI Arms Transfers Project reports on international flows of conventional weapons. Since publicly available information is inadequate for the tracking of all weapons and other military equipment, SIPRI covers only what it terms major conventional weapons. Data are collected from open sources for the SIPRI Arms Transfers Database and presented in a register that identifies the suppliers, recipients and the weapons delivered,¹ and in tables that provide a measure of the trends in the total flow of major weapons and its geographical pattern. SIPRI has developed a unique trend-indicator value (TIV) system. This value is not comparable to financial data such as gross domestic product, public expenditure, or export or import figures.

The database covers the period from 1950. Data collection and analysis are continuous processes. As new data become available the database is updated for all years covered.²

I. Revision of methods in 2007

New published technical information on individual weapons may necessitate a recalculation of their TIV. From time to time, however, more significant and generic modifications are introduced to reflect the changing reality of arms transfers or to make use of new sources of information. For example, in 2006 turrets for armoured vehicles and ships were added to the database, and the calculation of the SIPRI TIV for production under licence was reviewed and modified. Such changes are made retroactively for the entire database in order to preserve a meaningful time series.

In 2007 the coverage of the database was expanded to include guided but unpowered bombs and shells. These weapons have become widespread in recent years and are as important as other, guided short-range missiles in terms of technology, price and influence on military doctrine.

II. Selection criteria and coverage

Selection criteria

SIPRI uses the term ‘arms transfer’ rather than ‘arms trade’ or ‘arms sale’. SIPRI covers not only sales of weapons, including manufacturing licences, but also other forms of weapon supply, such as aid and gifts.

¹ The register of transfers of major conventional weapons, which appeared in previous editions of the SIPRI Yearbook, is now available on the SIPRI website in 2 formats: a register with the data used for the analysis presented in this chapter, and a more flexible searchable database with the most recent data. SIPRI’s online database is continually updated. See <<http://armstrade.sipri.org/>>.

² Thus, data from different editions of the SIPRI Yearbook or other SIPRI publications cannot be combined or compared. Full, up-to-date data are available in the SIPRI Arms Transfers Database (note 1).

The weapons transferred must be destined for the armed forces, paramilitary forces or intelligence agencies of another country. Weapons supplied to or from armed non-state actor in an armed conflict are included as deliveries to or from the individual armed non-state actor, identified under separate ‘recipient’ or ‘supplier’ headings. Supplies to or from international organizations are also included and categorized in the same fashion. In cases where deliveries are identified but it is impossible to identify either the supplier or the recipient with an acceptable degree of certainty, transfers are registered as coming from ‘unknown’ suppliers or going to ‘unknown’ recipients. Suppliers are termed ‘multiple’ only if there is a transfer agreement for weapons produced by two or more cooperating countries and if it is not clear which country will make the delivery.

Weapons must be transferred voluntarily by the supplier. This includes weapons delivered illegally—without proper authorization by the government of the supplier or the recipient country—but excludes captured weapons and weapons obtained from defectors. Finally, the weapons must have a military purpose. Systems such as aircraft used mainly for other branches of government but registered with and operated by the armed forces are excluded. Weapons supplied for technical or arms procurement evaluation purposes only are not included.

Major conventional weapons: the coverage

SIPRI covers only what it terms major conventional weapons, defined as follows.

1. *Aircraft*: all fixed-wing aircraft and helicopters, including unmanned reconnaissance/surveillance aircraft, with the exception of microlight aircraft, powered and unpowered gliders and target drones.

2. *Armoured vehicles*: all vehicles with integral armour protection, including all types of tank, tank destroyer, armoured car, armoured personnel carrier, armoured support vehicle and infantry fighting vehicle. Only vehicles with very light armour protection (such as trucks with an integral but lightly armoured cabin) are excluded.

3. *Artillery*: naval, fixed, self-propelled and towed guns, howitzers, multiple rocket launchers and mortars, with a calibre equal to or above 100 millimetres.

4. *Sensors*: (a) all land-, aircraft- and ship-based active (radar) and passive (e.g. electro-optical) surveillance systems with a range of at least 25 kilometres, with the exception of navigation and weather radars, (b) all fire-control radars, with the exception of range-only radars, and (c) anti-submarine warfare and anti-ship sonar systems for ships and helicopters. In cases where the system is fitted on a platform (vehicle, aircraft or ship), the register only notes those systems that come from a different supplier from that of the platform.

5. *Air defence systems*: (a) all land-based surface-to-air missile (SAM) systems, and (b) all anti-aircraft guns with a calibre of more than 40 mm. This includes self-propelled systems on armoured or unarmoured chassis.

6. *Missiles*: (a) all powered, guided missiles and torpedoes with conventional warheads, and (b) all unpowered but guided bombs and shells. Unguided rockets, free-fall aerial munitions, anti-submarine rockets and target drones are excluded.

7. *Ships*: (a) all ships with a standard tonnage of 100 tonnes or more, and (b) all ships armed with artillery of 100-mm calibre or more, torpedoes or guided missiles, with the exception of most survey ships, tugs and some transport ships.

8. *Engines*: (a) engines for military aircraft, for example, combat-capable aircraft, larger military transport and support aircraft, including helicopters; (b) engines for combat ships, such as fast attack craft, corvettes, frigates, destroyers, cruisers, aircraft carriers and submarines; (c) engines for most armoured vehicles—generally engines of more than 200 horsepower output. In cases where the system is fitted on a platform (vehicle, aircraft or ship), the register only notes those systems that come from a different supplier from the supplier of the platform.

9. *Other*: (a) all turrets for armoured vehicles fitted with a gun of at least 20-mm calibre or with guided anti-tank missiles, (b) all turrets for ships fitted with a gun of at least 57-mm calibre, and (c) all turrets for ships fitted with multiple guns with a combined calibre of at least 57 mm. In cases where the system is fitted on a platform (vehicle or ship), the register only notes those systems that come from a different supplier from the supplier of the platform.

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

III. The SIPRI trend indicator

The SIPRI system for the valuation of arms transfers is designed as a trend-measuring device. It allows the measurement of changes in the total flow of major weapons and its geographical pattern. The trends presented in the tables of SIPRI trend-indicator values are based only on actual deliveries during the year or years covered in the relevant tables and figures, not on orders signed in a year.

The TIV system, in which similar weapons have similar values, shows both the quantity and quality of the weapons transferred—in other words, it describes the transfer of military resources. It does not reflect the financial value of (or payments for) weapons transferred. This is impossible for three reasons. First, in many cases no reliable data on the value of a transfer are available. Second, even if the value of a transfer is known, in almost every case it is the total value of a deal, which may include not only the weapons themselves but also other items related to these weapons (e.g. spare parts, armament or ammunition) as well as support systems (e.g. specialized vehicles) and items related to the integration of the weapon in the armed forces (e.g. training, or software changes to existing systems). Third, even if the value of a transfer is known, important details about the financial arrangements of the transfer (e.g. credit or loan conditions and discounts) are often unavailable.³

Measuring the military implications of transfers would require a concentration on the value of the weapons as a military resource. Again, this could be done from the actual money values of the weapons transferred, assuming that these values generally reflect the military capability of the weapon. However, the problems listed above would still apply. For example, a very expensive weapon may be transferred as aid at a 'zero' price; although it will therefore not show up in financial statistics, it will still

³ It is possible to present a very rough idea of the economic factors from the financial statistics now available from most arms-exporting countries. However, most of these statistics lack sufficient detail. Such data are available from the SIPRI Arms Transfers Project via <http://www.sipri.org/contents/arms_trad/>.

be a significant transfer of military resources. The SIPRI solution is a system in which military resources are measured by including an evaluation of the technical parameters of weapons. The purpose and performance of a weapon are evaluated, and it is assigned a value in an index that reflects its value as a military resource in relation to other weapons. This can be done under the condition that a number of benchmarks or reference points are established by assigning some weapons a fixed place in the index, thus forming its core. All other weapons are compared to these core weapons.

In short, the process of calculating the SIPRI TIV for individual weapons is as follows. For a number of weapon types it is possible to find the average unit acquisition price in open sources. It is assumed that such real prices roughly reflect the military resource value of a system. For example, a combat aircraft bought for \$10 million may be assumed to be a resource twice as great as one bought for \$5 million, and a submarine bought for \$100 million may be assumed to be 10 times the resource that a \$10 million combat aircraft would represent. Weapons with a real price are used as the core weapons of the valuation. Weapons for which a price is not known are compared with core weapons in the following steps.

1. The description of a weapon is compared with the description of the core weapon. In cases where no core weapon exactly matches the description of the weapon for which a price is to be found, the closest match is sought.

2. Standard characteristics of size and performance (weight, speed, range and payload) are compared with those of a core weapon of a similar description. For example, a 15 000-kilogram combat aircraft would be compared with a combat aircraft of similar size.

3. Other characteristics, such as the type of electronics, loading or unloading arrangements, engine, tracks or wheels, armament and materials, are compared.

4. Weapons are compared with a core weapon from the same period.

Weapons in a 'used' condition are given a value 40 per cent of that of a new weapon. Used weapons that have been significantly refurbished or modified by the supplier before delivery (and have thereby become a greater military resource) are given a value of 66 per cent of the value when new. In reality there may be huge differences in the military resource value of a used weapon depending on its condition and the modifications during the years of use.

The SIPRI trend indicator does not take into account the conditions under which a weapon is operated (e.g. an F-16 combat aircraft operated by well-balanced, well-trained and well-integrated armed forces has a much greater military value than the same aircraft operated by a developing country; the resource is the same but the effect is very different). The trend indicator also accepts the prices of the core weapons as genuine rather than reflecting costs that, even if officially part of the programme, are not exclusively related to the weapon itself. For example, funds that appear to be allocated to a particular weapon programme could be related to optional add-ons and armament or to the development of basic technology that will be included (free of cost) in other programmes. Such funds could also act, in effect, as government subsidies to keep industry in business by paying more than the weapon is worth.

In cases where subsystems, such as sensors and engines, are produced and delivered by suppliers other than the supplier of the platform on which the subsystems are fitted, the TIV calculation of the platform would be reduced by the value

of components. The TIV of the components would be listed as coming from a supplier different than the supplier of the platform.

IV. Sources

The Arms Transfers Project uses a variety of sources to collect data: newspapers; periodicals and journals; books, monographs and annual reference works; and official national and international documents. The common criterion for all these sources is that they are open, that is, published and available to the public.

Such open information cannot, however, provide a comprehensive picture of world arms transfers. Published reports often provide only partial information, and substantial disagreement between them is common. Order and delivery dates and exact numbers (or even types) of weapons ordered and delivered, or the identity of suppliers or recipients, may not always be clear. Exercising judgement and making informed estimates are therefore important elements in compiling the SIPRI Arms Transfers Database. Estimates are conservative and may be underestimates.

All sources of data as well as calculations of estimates are documented in the SIPRI Arms Transfers Database.