
SEMI AUTOMATIC
SEMI OUTOMATIESE

A Sick or Dying Industry?
Products and Producers

1

Introduction

In May 2001 Smith & Wesson, an icon of the American firearms industry, was sold by its British owner, Tomkins, to an American company Saf-T-Hammer. In 1987, anticipating a gun boom, Tomkins had bought the gun-maker for USD 112 million. Now facing a less promising market, it unloaded the firm for just USD 15 million (*Los Angeles Times*, 15 May 2001). At the time industry observers declared that the firearm business, with production levels at a 30-year low, was 'a dying industry' (*Associated Press*, 14 August 2001). However, a few months later, largely as a result of the 11 September 2001 terrorist attacks in the United States, government and industry figures began to show significant increases in gun sales in the US and elsewhere (*Washington Post*, 22 October 2001). Do these events give any insights into the current state of the global small arms industry and its future trends? Is small arms production a declining business, or have the events of 11 September 2001 transformed its fortunes, at least in the short term?

This chapter examines the current state of the global small arms industry. It provides an annual update of, and new information on, trends and patterns in the global small arms industry, including geographic distribution (number of companies and countries that produce small arms) and the value and volume of global production. The chapter includes a regional survey, which examines small arms production in the Middle East. It also focuses on the most important small arms-producing firms worldwide in order to provide a more detailed picture of the global industry. Licensed production is a key feature of global small arms production, particularly in developing countries, and the chapter provides an analysis of two of the world's most significant licensors of small arms—FN Herstal (Belgium) and Heckler and Koch (Germany/UK)—whose weapons are produced in more than 35 countries worldwide.

The following questions are addressed in this chapter:

- **What are the current trends in the global small arms industry?**
- **Which are the major small arms-producing companies and where are they located?**
- **Who are the major licensors of small arms and in which countries are their products produced under licence?**

All the material presented in this chapter is based on information obtained from open public sources, including official information, annual and specialized defence publications, corporate and non-governmental information services, defence exhibitions, company promotional material, and primary field research in selected countries and regions.

The following are among the key findings of the chapter:

- More than 1,000 companies worldwide are involved in some aspect of small arms production.
- At least 98 countries produce, or have the capacity to produce, small arms and/or ammunition.
- Global production of military-style small arms has declined in recent years.
- Nearly seven million commercial firearms were produced worldwide during 2000.
- Global production of military-calibre small arms ammunition has remained relatively constant in recent years.

A weapons show, South Africa. (© Gérard Klijn)

- The total value of global small arms production, including ammunition, in 2000 was at least USD 7.4 billion.
- At least 11 countries in the Middle East legally produce small arms and/or ammunition.
- 13 countries dominate the global market for small arms.
- Current domestic production of firearms in the US is still way below the peak of 1993–94.
- Licensed production is an easy way to gain market share, evade strict export controls, or facilitate exports to prohibited destinations.

A lack of detailed information about global production, particularly time series data, as well as the significant differences between the various sectors and sub-sectors of the global small arms market makes it difficult to determine the long-term trends in the global small arms industry. Unlike the global small arms industry, other sectors of the global defence industry seem to be enjoying increased sales after nearly a decade of painful downsizing, restructuring, and consolidation. A recent report suggests that in 2000 arms transfer agreements with developing countries totalled USD 36.9 billion, the highest level since 1993, and an increase of nearly nine per cent over 1999 (Grimmett, 2001, p. 3). According to the Stockholm International Peace Research Institute (SIPRI, 2001, p. 302), 'the global defence industry, more generally, and particularly the Western defence industry, after half a decade of rapid concentration in the context of shrinking markets, has entered a new phase of reorganisation in which a smaller number of large companies face a constant if not growing level of demand for new military equipment'. Levels of global defence spending have been increasing in recent years (SIPRI, 2001; BICC, 2001) and many of the world's major defence contractors, particularly in the US, are likely to benefit from increased defence spending as the US and other governments respond to the terrorist attacks in the US on 11 September 2001 (*Defence News*, 24–30 September 2001).

However, the small arms industry is unlikely to benefit significantly from recent increases in demand for defence equipment, because it differs from other sectors of the defence industry in at least two important ways. First, its main customers, as reflected in the distribution of global stockpiles (STOCKPILES), are individuals rather than states or governments. Second, public opinion is increasingly demanding action against the many harmful effects flowing from the availability and misuse of small arms, thus prompting governments (and the international community) to consider stricter regulation of the production of these types of weapons.

BOX. 1.1 Definition of small arms and light weapons

In the *Small Arms Survey*, 'small arms and light weapons' covers both military-style weapons and commercial firearms (handguns and long guns), following the definition set out in the *Report of the Panel of Governmental Experts on Small Arms* (UNGA, 1997).

- *Small arms:* revolvers and self-loading pistols, rifles and carbines, assault rifles, sub-machine guns, and light machine guns.
- *Light weapons:* heavy machine guns, hand-held under-barrel and mounted grenade launchers, portable anti-tank and anti-aircraft guns, recoilless rifles, portable launchers of anti-tank and anti-aircraft missile systems, and mortars of less than 100mm calibre.

The *Survey* uses the terms 'small arms', 'firearms', and 'weapons' interchangeably. Unless the context dictates otherwise, no distinction is intended between commercial firearms (e.g. hunting rifles), and small arms and light weapons designed for military use (e.g. assault rifles).

The global small arms industry: Annual update

This section provides an update on the survey of the global small arms industry that was provided in the *Small Arms Survey 2001*. It focuses on the distribution of production (i.e. the number of countries and companies that produce small arms), general trends and patterns, and the size and scope of the industry (i.e. the value and volume of production).

Salesman and customers at a gun shop in Moscow.

Distribution: Bigger and smaller?

How many countries worldwide have the capacity to produce small arms? Is the number of producer countries growing? The *Small Arms Survey 2001* estimated that 95 countries have the capacity to produce small arms. However new information and research suggests that at least 98 countries worldwide have the capacity to produce small arms (see Appendix).[1] Table 1.1 shows that the largest geographic concentration of producer countries—over 40 per cent—is in Europe and the Commonwealth of Independent States (CIS). This estimate of the global distribution of small arms producing countries should be treated with caution, however. In some countries (e.g. Bangladesh, Dominican Republic, and Guinea), the lack of reliable information, both official and unofficial, makes it difficult to ascertain whether any small arms are currently being produced, and if so whether regularly or only on an *ad hoc* basis. Some countries are involved in the production only of components rather than final products; while in others, small arms production involves relatively marginal activities such as loading or filling ammunition cartridges.

At least 98 countries worldwide have the capacity to produce small arms.

TABLE 1.1 Global distribution of small arms producing countries, 2000–01

Region	Number (2000)	Percentage	Number (2001)	Percentage
Europe/CIS	39	41	41	42
North/Central America	6	6	5	5
South America	10	11	11	11
Asia-Pacific	19	20	20	21
Middle East	11	11	11	11
Sub-Saharan Africa	10	11	10	10
Total	**95**	**100**	**98**	**100**

Source: Appendix

The difficulty in distinguishing between end producers and intermediate producers makes it hard to determine the total number of companies producing small arms. In addition companies go out of business or change their names. Small arms are often produced in different divisions, subsidiary companies, or plants that are parts of larger companies. Thus, the total number of end producers is likely to be much lower than the total number of producers, including intermediate producers (Omega Foundation, 2001b).

More than 1,000 companies worldwide are involved in some aspect of small arms production.

The *Small Arms Survey 2001* estimated that small arms are produced by at least 600 companies worldwide, of which at least half are located in the US. However, new information and research suggests that more than 1,000 companies worldwide are involved in some aspect of small arms production, whether as intermediate and/or end producers.[2] Nearly half of these companies (47 per cent) are located in Europe and the CIS. The rest are concentrated

in North/Central America (mainly the US), with smaller numbers in South America, sub-Saharan Africa, the Middle East, and the Asia-Pacific region. The types of companies are extremely diverse, ranging from small family-owned businesses to subsidiaries or business units of large, multinational, defence-industrial conglomerates. The size of the companies ranges from establishments with fewer than 20 to over 1,000 employees.

TABLE 1.2 Global distribution of small arms companies, 2001

Region	Number (2001)	Percentage
Europe/CIS	485	47
North/Central America	351	34
South America	37	4
Asia-Pacific	92	8
Middle East	46	4
Sub-Saharan Africa	31	3
Total	**1,042**	**100**

Source: Omega Foundation (2001b)

The apparent increase in the number of companies, and countries, involved in some aspect of small arms production does not necessarily indicate an increase in the absolute size, or production capacity, of the global small arms industry. What is clear is that the industry is more widely distributed than was previously known. However, the global small arms industry is smaller today than it was during the 1980s and 1990s in terms of the volume of production, and has less production capacity. Furthermore, even though more than half of the world's countries are currently engaged in the production of small arms, the international market for small arms is still dominated by only 13 countries (Small Arms Survey, 2001, p.15).

TABLE 1.3. Acquisitions of small arms producers (selected)

Target company	Purchaser	Date
Saco Defense (US)	General Dynamics (US)	2001
Santa Barbara (Spain)	General Dynamics (US)	2001
Primex Technologies (US)	General Dynamics (US)	2001
Smith & Wesson (US)	Saf-T-Hammer Corp (US)	2001
Heckler & Koch (Germany)	BAE Systems/Royal Ordnance (UK)	1991
Sako Ltd (Finland)	Beretta (Italy)	1999
Vursan (51%) (Turkey)	Beretta (Italy)	1999
Luigi Franchi (Italy)	Beretta (Italy)	1995
Mauser Werke (Germany)	Rheinmetall DeTec (Germany)	1996
Buck Werke (Germany)	Rheinmetall DeTec (Germany)	1998
Eurometaal (66%) (Netherlands)	Rheinmetall DeTec (Germany)	1999
Oerlikon Contraves (Switzerland)	Rheinmetall DeTec (Germany)	2000
Australia Defence Industries (Australia)	Thomson-CSF (France)	1999
Suhler Jagd-und Sportwaffen (Germany)	Steyr-Mannlicher (Austria)	1994
SK Jagd-und Sportmunitions (Germany)	Nammo Lapua Oy (Finland)	1992
Carl Walther (Germany)	Umarex Sportwaffen (Germany)	1993

Source: Company reports

Like the defence industry more generally, the small arms industry has become more concentrated in recent years through mergers and acquisitions (SIPRI, 2001) in response to factors like cuts in defence spending and the decline

in demand as a result of defence downsizing, particularly in NATO countries and in the countries of the former Soviet Union. This concentration has taken place mainly at the company level. For example, some of the world's well-known small arms producers have been acquired either by larger defence companies (e.g. Saco Defense acquired by General Dynamics) or by other major small arms producers (e.g. Sako Limited acquired by Beretta).

The diversity of countries and companies producing small arms makes it difficult to generalize about the global small arms industry. The regional survey in the third section provides a more detailed picture of small arms production in the Middle East. The fourth section provides detailed case studies of selected countries and companies to help provide a more accurate picture of the state of the global small arms industry.

Estimating the value and volume of global production: Some first steps

The *Small Arms Survey 2001* provided some initial estimates for the value and volume of global production of small arms and ammunition in 1980–99 and in 2000. Most of these estimates were preliminary, based on incomplete information. For example, they excluded figures for the production of commercial firearms such as handguns, hunting and sporting rifles, and associated ammunition. However, new research and information enables us to refine and update our estimates of the value and volume of global small arms production for 2000, the latest year for which relatively comprehensive information is available.[3]

In attempting to estimate more precisely the global value and volume of small arms production, this chapter makes a distinction between military-style small arms and commercial firearms, and associated ammunition. In the last few years more detailed data on small arms production, particularly production of commercial firearms, has become available, and it is now possible to provide more reliable estimates of the value and volume of global production.

Volume of production

Military-style small arms: The *Small Arms Survey 2001* estimated that more than **815,000** military-style small arms (pistols, rifles, sub-machine guns, and machine guns) were produced worldwide during 2000 (Small Arms Survey, 2001, pp. 12–13). This figure, it was noted, was less than half the annual average production of 2.1 million during the period 1980–99. It appears that the volume of global production of military weapons has continued to decline in recent years, and it is estimated that approximately **720,000** weapons were produced worldwide during 2001 (Forecast International, 2002); but these estimates of global production have to be treated with great caution.[4] The acquisition of small arms for the US armed forces amounted to nearly 40,000 in 2000, representing five per cent of the global volume of production (STOCKPILES). No significant increase in domestic production for the US armed forces is expected during 2001.[5]

Commercial firearms: New information and research suggests that the global volume of production of commercial firearms (handguns and long guns) in 2000 was approximately **seven million**. According to new estimates compiled by the World Forum on the Future of Sport Shooting Activities (WFSA), approximately **6.9 million** commercial firearms were produced worldwide during 2000 (WFSA, 2001).[6] Nearly three-quarters of this total (74 per cent) were produced in the United States (four million) and in the European Union (1.1 million). The rest (1.7 million) were produced in countries such as Brazil, China, Canada, Japan, and the Russian Federation (WFSA, 2001). While figures for US production can be confirmed by annual production figures from the Bureau of Alcohol,

Nearly seven million commercial firearms were produced worldwide during 2000.

Tobacco and Firearms (BATF), there is no way of confirming the figures for other countries. According to the BATF, more than **one million** firearms are imported into the US every year (United States, BATF, 1999). Furthermore, the WFSA figures do not give any indication of long-term trends in the global production of commercial firearms. It is worth noting that the ratio of the volume of global production of commercial firearms to military-style small arms is approximately 9:1. In the US the ratio is 100:1.

Ammunition: The *Small Arms Survey 2001* estimated that at least **15 billion** units of military-calibre small arms ammunition, of all types and calibres, were produced worldwide during 2000 (Small Arms Survey, 2001, p. 14). This figure, it was noted, was significantly lower than the average annual production of 21 billion units during the period 1980–99. The volume of global small arms ammunition production has remained relatively constant in recent years, and it is estimated that approximately **16 billion** units were produced during 2001 (Forecast International, 2002). These estimates of global production likewise have to be treated with great caution.[7] The acquisition of small arms ammunition for the US armed forces amounted to approximately one billion units in 2000, representing six per cent of the global volume of production. No significant increase in domestic production for the US armed forces is expected during 2001. No information on the volume of production of ammunition for commercial firearms is available.

These estimates for the volume of global small arms production in 2000 are preliminary, and are not comparable with other figures. Based on the information presented above, it seems that the volume of global small arms production, particularly military-style small arms, is declining, largely because of lower demand. The trends in the volume of global production of commercial firearms are, however, more difficult to determine. The volume of the production of ammunition, particularly military-calibre ammunition, seems to be relatively constant. Overall these trends in the volume of production seem to suggest that the current production capacity of the global small arms industry is smaller than during the Cold War era.

Value of production

Military-style small arms: If we assume that at least 815,000 military-style small arms were produced in all countries during 2000, and using the average price of USD 410 paid for an M16 rifle by the US armed forces during 2000 as a rough proxy, the value of global production of military-style small arms in 2000 can be estimated at **USD 335 million**.[8]

Commercial firearms: The total value of shipments (production) of commercial firearms in the US in 1997 was USD 1.2 billion, and the total number of firearms produced in that year was 3.5 million (United States, Census Bureau, 1997a). This means that the average price of each firearm was USD 335. Using this figure, adjusted to 2000 prices (USD 358) as a rough proxy, the value of global firearms production in 2000, based on the estimate of worldwide production of seven million commercial firearms, can be estimated to be at least **USD 2.5 billion**.

Ammunition: Information on the value of global small arms ammunition production is even more difficult to obtain. It is estimated that 1.06 billion units of military-calibre small arms ammunition, of all types, were procured by the US armed forces during 2000. The total value of the US armed forces' contracts for small arms ammunition during the same year was USD 215 million (Forecast International, 2002). This means that the average price for each unit of ammunition produced in the US in 2000 was 20 US cents. Given that at least 15 billion units of military-calibre ammunition were produced in 2000, and using the figure of 20 cents as a rough proxy, the value of global production of military-calibre small arms ammunition in 2000 can be estimated to be at least **USD 3 billion**.

There are no reliable estimates for the volume of production of ammunition for commercial firearms, which makes it difficult to estimate the value of production. In 1997 domestic shipments (production) of ammunition for commercial firearms in the US were valued at USD 859 million (United States, Census Bureau, 1997b). Adjusted to 2000 prices this is equivalent to **USD 917 million**. Given that the US accounts for at least 58 per cent of the global production of commercial firearms (WFSA, 2001), it can be assumed that the value of US ammunition production for commercial firearms *vis-à-vis* the rest of the world is of a similar magnitude. Therefore it can be assumed that the value of global production of commercial firearms ammunition in 2000 was approximately **USD 1.6 billion**.[9]

Global estimates

The value of global small arms production is difficult to estimate, given the lack of detailed information about prices and the costs of production in many countries, particularly some of the major producers such as China. Therefore, it is possible to provide only very rough estimates of the value of global small arms production, based on multipliers derived from the volume of production.

The value of global production of military-style small arms, including ammunition, was estimated to be at least USD 3.3 billion in 2000. In contrast, the value of global production of commercial firearms, including ammunition, was estimated to be at least USD 4.1 billion during the same year. Thus, the commercial firearms industry appears to be the larger sector, by value, of the global small arms industry.

Based on the estimates presented above, it is clear that the total value of global small arms production, including both commercial firearms and military-style small arms, in 2000 was at least **USD 2.8 billion**. The value of the production of commercial firearms is probably more than seven times the value of the production of military-style small arms. The total value of global small arms ammunition production, for both commercial firearms and military-style small arms, in 2000 was at least **USD 4.6 billion**. Thus, the total value of global small arms production, including ammunition, in 2000 was estimated to be at least **USD 7.4 billion**.[10]

It is worth noting that the estimates for the value of global ammunition production are at least 1.5 times greater than the estimates for the value of global small arms production. This ratio of 2:3 for the value of small arms production to ammunition production is similar to the ratio presented in the *Small Arms Survey 2001*. However, the ratios for the value of production of ammunition for military-style small arms and commercial firearms are quite different.

These estimates for the total value of global small arms production in 2000 are very tentative, and not comparable with other years. It is also difficult to ascertain the trends in the value of global production, given the absence of information from some of the world's major producers. Future editions of the *Small Arms Survey* will attempt to provide more robust and updated estimates of the global value and volume of small arms production.

TABLE 1.4 Estimates of the global value and volume of small arms production, 2000

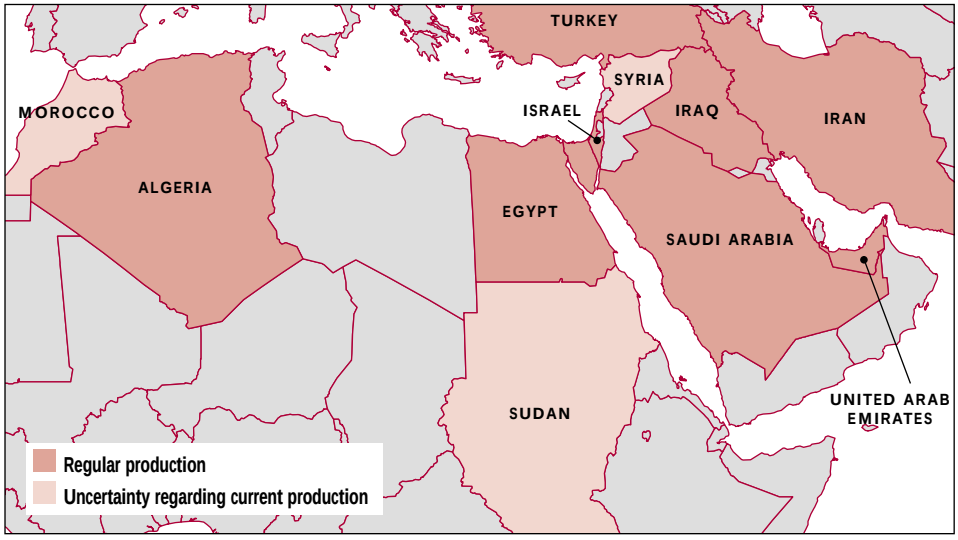
	Volume of production, 2000 (estimate)	Multiplier (USD)	Value of production, 2000 (USD, estimate)
Military small arms	815,000	410	335 million
Commercial firearms	7,000,000	358	2.5 billion
Military-calibre ammunition	15 billion units	0.20	3 billion
Commercial ammunition			1.6 billion
Total			**7.4 billion**

Sources: Company Reports; Forecast International (2002); United States, BATF (1998; 1999; 2000); United States, Census Bureau (1997a; 1997b); WFSA (2001)

Regional survey: Small arms production in the Middle East

The *Small Arms Survey 2001* provided a regional survey of small arms producers, given the fact that the global small arms industry is not homogeneous and that the production of small arms and ammunition varies considerably between countries. In this chapter, we focus specifically on one region, the Middle East[11] which is characterized by high levels of conflict (and therefore a high demand for weapons, including small arms and light weapons) and a large and growing number of domestic small arms producers.[12] Future editions of the *Small Arms Survey* will focus on small arms production, in terms of both countries and companies, in different regions.

MAP 1.1 Small arms production in the Middle East



The Middle East as a region remains one of the world's largest recipients, by value, of major conventional arms. During the period 1993–2000, five of the world's top ten recipients of conventional arms—Saudi Arabia, United Arab Emirates, Egypt, Israel, and Kuwait—were in the Middle East (Grimmett, 2001). Despite the fact that the region is a major recipient of conventional arms, at least 11 countries in the Middle East produce, or have the capacity to produce, small arms and/or ammunition.[13] There is some uncertainty regarding current production in Morocco, Sudan, and Syria. None of the other countries in the region, including the Palestinian territories and Western Sahara, is known to produce, or have any capacity to produce, small arms on a regular basis (Feldman and Shapir, 2001).[14] The production of small arms and ammunition in the Middle East is summarized in Table 1.5.

States in the region have established domestic small arms production capabilities, and defence industries more generally, for a wide variety of reasons. These include: military and law-enforcement needs (e.g. strategic independence), political utility, national prestige, economic and diplomatic leverage, and/or employment creation (Miller, 2001). While anecdotal evidence suggests that many countries in the region (e.g. Iran, Saudi Arabia, Turkey) are attempting to expand their small arms production capabilities, official and unofficial information about the actual value and volume of production is difficult to obtain. There is a noticeable lack of public information about small arms production in the Middle East, and, with the exception of Israel and Turkey, it is almost impossible to assess the current state of the small arms industry in the region, particularly in terms of the value and volume of production.

Craft production

Many countries in the Middle East have a long history and culture of craft production of small arms. This type of production typically occurs in small private workshops or homes without any legal (i.e. governmental or company) authorization. It results in weapons of generally poor quality, and includes repair capabilities for damaged weapons

in small workshops. Most craft production involves the manufacture of simple single-shot weapons or illicit copies of existing types of small arms. In many countries in the region it is the only form of production that occurs; in others it exists alongside an established domestic production capability for small arms.

Palestinians have long been suspected of developing and maintaining a craft production capability for various types of weapons (STOCKPILES). During 2001, Israeli security forces discovered an extensive network of workshops and factories for manufacturing various types of small arms and light weapons (e.g. mortar rounds, hand grenades and anti-tank rockets) in the Gaza Strip (*Jerusalem Post*, 23 May 2001). The discovery was made after the arrest of Sa'adi Ashi, the owner of a metal production facility. The facilities in Gaza have subsequently been destroyed, but it is unlikely that all craft production in the areas administered by the Palestinian Authority has ceased.

Regular production

The majority of small arms production in the region occurs in state-owned factories or companies, and generally involves the production of foreign weapons under licence. At least seven states in the region are involved in the regular production of small arms. Egypt, Iran, Israel, and Turkey have the most well-developed production facilities in the region, and these countries are also all engaged in the legal export of small arms. At least 11 states in the region are known to produce, or have the capacity to produce, small arms and/or ammunition on a regular basis.

Israel is the only innovative producer of small arms in the region. Countries such as Egypt, Iran, and Turkey, which are important regional producers, tend to concentrate on licensed production of foreign products. In some limited cases, minor modifications on the licensed weapons are made, and occasionally innovation is evident. In general, these countries simply manufacture the foreign products according to original specifications, usually designated with a different (local) name.

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Algeria produces various types of small arms under licence in state-owned arsenals (Feldman and Shapir, 2001, p. 88). It is not clear whether the country has a capability to produce small arms ammunition. No further information concerning current production is available.

Egypt is one of the oldest and largest of the region's small arms producers, and manufactures a wide range of small arms and ammunition (Feldman and Shapir, 2001, p.112), yet there is a lack of public information there, both official and unofficial, about current small arms production. Almost all the weapons produced in Egypt are based on Soviet-era designs, despite the deployment in recent years of NATO-style weapons for military use, acquired through import, generally from the US. Egypt continues to produce the AK series assault rifle, often with modest modifications for the export market, and maintains a highly active production base, all under state control (Gander and Cutshaw, 2001b).

The production of small arms in Egypt is under the control of the Ministry of Defence and Military Production (MDMP), which controls all the country's small arms and ammunition manufacturing plants; the best-known of these is Factory 54, the Maadi Company for Engineering Industries. It was founded in 1949 to produce rifles and machine guns under licence. It currently produces the Misr 7.62mm assault rifle (a copy of the Kalashnikov AKM) and a variety of pistols, rifles, sub-machine guns, and machine guns (Gander and Cutshaw, 2001b). A number of other factories produce various small arms and ammunition of various calibres, mostly under licence from the former Soviet Union. The most important factories for ammunition production include Aboukir Engineering Industries (Factory 10) and Shoubra Company for Engineering Industries (Factory 45) (Gander and Cutshaw, 2001a).

Iran has a well-developed domestic defence industrial base, and all defence production falls under the umbrella of the Defence Industries Organisation (DIO). The DIO produces a wide range of small arms including G3 rifles and MP5 sub-machine guns under a (lapsed) licence agreement with Heckler and Koch (Germany) (Abel, 2000). The Islamic Revolutionary Guard Corps has its own production facilities for the manufacture of various types of small arms and light weapons (*Jane's Sentinel Security Assessment*, 10 August 2000). Ammunition Industries, which is part of the DIO, is the main domestic producer of small arms ammunition.

Iraq has a wide range of domestic defence production capabilities, including the capacity to manufacture small arms (Feldman and Shapir, 2001, p. 151). However, many of these production capabilities were severely damaged or destroyed during the Second Gulf War. While the full extent of the damage is unknown, it is likely that many of these capabilities have been revitalized in recent years. In early 2002 it was reported that at least three types of small arms, including the Tabuk (a modified version of the AKM rifle), were in production (Forecast International, 2002).

Israel is the region's only innovative producer of small arms, thanks largely to its links with US defence producers. The country has a well-developed indigenous capacity to design various types of small arms and light weapons. Israel is also one of the world's major arms producers and exporters and it was recently ranked as the eighth largest supplier of arms to developing nations during 1997–2000 (Grimmett, 2001). The country's production of small arms has declined in recent years mainly because of a drop in foreign orders following the collapse of the Soviet Union and the end of contracts with many traditional foreign customers, along with a growing shift on the part of the Israeli Defence Force (IDF) towards US suppliers to meet its defence equipment requirements, thanks to continuing US military aid (Sadeh, 2001). The main domestic producer of small arms is the state-owned company Israel Military Industries (IMI), which was ranked as the 59th largest arms producing company in the Organisation for Economic Co-operation and Development (OECD) and developing countries by SIPRI in 1999 (SIPRI, 2001, p. 309). The company currently employs 4,100 people and in 2000 had total sales of USD 417 million, of which less than ten per cent is accounted for by sales of small arms. KSN Industries, a private company, produces various types of pistols. The main domestic producers of small arms ammunition, in addition to IMI, include Kalia Israel Cartridge Co, Reshef Technologies, and Soltam Ltd (Gander and Cutshaw, 2001b).

Morocco has a state-owned factory that manufactures small arms ammunition mainly for domestic consumption (Feldman and Shapir, 2001, p. 227). No further information concerning current production is available.

Saudi Arabia established its own domestic defence industry in the late 1970s. Production of small arms and ammunition is centred at the Al-Kharj Arsenal, part of the Prince Sultan Military City south-west of Riyadh. The country manufactures the G3 and ammunition under licence from Heckler & Koch (Germany), M1 rifles and M16 assault rifles under licence from Colt (USA), and ammunition for the M60 machine gun. It also manufactures hand grenades under licence from Plasticas Oramil (Spain) (*Jane's Defence Weekly*, 18 August 1999). During 2001, Saudi Arabia and Pakistan announced a joint venture to manufacture several types of small arms, mainly products under licence from Heckler & Koch, at the Al-Kharj Arsenal (Forecast International, 2002).

Sudan produces small arms ammunition in a state-owned company, the Military Industry Corporation, which has received support from a variety of countries in eastern Europe and the Middle East (*Jane's Sentinel Security Assessment*, 22 February 2000). There are also unconfirmed reports that Pakistan Ordnance Factories (POF) helped recommission Sudan's small arms factories a few years ago (Omega Foundation, 2001c). The Military Industry

Corporation is designed to meet the country's domestic needs but the country remains a net importer of ammunition. There are unconfirmed reports that the country manufactures small arms (*Africa News Service*, 13 August, 2001). No further information concerning current production is available.

Syria established a domestic small arms ammunition production capability in the 1980s with assistance from the former Soviet Union (Feldman and Shapir, 2001, p. 291). However, the country is currently not self-sufficient in ammunition production, and still imports from countries in eastern Europe, Egypt, and the Russian Federation (Forecast International, 2002). No further information concerning current production is available.

Turkey is one of region's largest and most export-oriented producers of small arms. Together with Israel it is also the region's most transparent arms producer, providing a fairly high degree of public information about domestic defence production. The production of small arms is carried out by the state-owned company Makina ve Kimya Endustrisi Kurumu (MKEK). The company currently employs more than 8,000 people and was ranked by SIPRI as the 60th largest arms-producing company in the OECD and developing countries in 1999 (SIPRI, 2001, p. 309). Total arms sales in 1999 were USD 480 million, up from USD 440 million in 1998. MKEK is a holding company and has

Turkey and Israel are the most transparent small arms producers in the Middle East.

TABLE 1.5 Current production of small arms and ammunition in the Middle East*

Country/Territory	Small arms production			Ammunition production	Small arms and ammunition production
	Craft**	Regular	Innovative		
Algeria		X		#	X
Bahrain	X				
Egypt		X		X	X
Iran		X		X	X
Iraq		X		X	X
Israel		X	X	X	X
Jordan	X				
Kuwait	X				
Lebanon	X				
Libya	X	#			
Morocco		#		X	X
Oman	X	#			
Palestinian territories	X				
Qatar	X				
Saudi Arabia		X		X	X
Sudan		#		X	X
Syria		#		X	X
Tunisia	X				
Turkey		X		X	X
UAE				X	X
Western Sahara	X				
Yemen	X				
Total	**11**	**7 (5)**	**1**	**10 (1)**	**11**

Notes: * Assessment of current production capabilities based on both primary and secondary sources.
** Craft production. This column is for countries that have craft production as their highest level of production. Countries with regular or innovative production sometimes also have craft production, but this is not registered here.
X Known production.
Unknown production (number of unknown producers).

Sources: Feldman and Shapir (2001); Forecast International (2002); Gander and Cutshaw (2001b); Omega Foundation (2001b); Reed (2001).

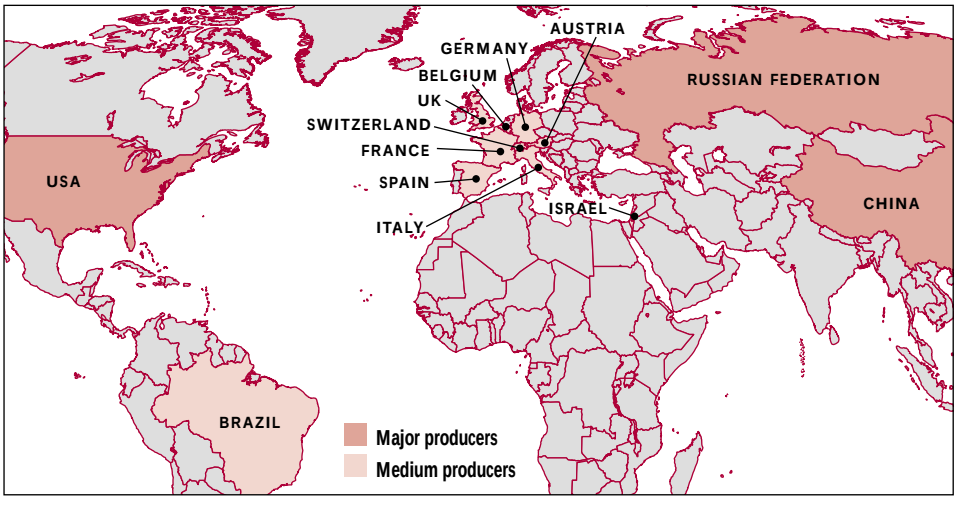
12 affiliated companies in different parts of Turkey (Reed, 2001). The company produces a wide range of small arms and light weapons including pistols, Heckler & Koch MP5 sub-machine guns, mortars, grenades (with launchers), and artillery systems. MKEK produced the G3 assault rifle under licence from Heckler & Koch for a number of years; slight changes in manufacture led to the appellation G3A7. Production of the G3A7 has now ceased. The main MKEK plant for the production of small arms is Silahsan AS (in Kirikkale). Ammunition production in Turkey takes place in a number of MKEK factories including Kapsulsan AS (in Ankara), Barutsan (Elmadag), Cansas AS (Cankiri), Celiksan AS (Kirikkale), Elroksan AS (Elmadag), Fiseksan AS (Ankara), and Muhimmatsan AS (Kirikkale) (Reed, 2001, p. 64).

The United Arab Emirates has a company in Abu Dhabi, the Adcom Company, which produces a range of small arms ammunition mainly for domestic use (Forecast International, 2002). No further information concerning current production is available.

The world's most important producers of small arms: Company and country profiles

The *Small Arms Survey 2001* provided a preliminary ranking of the world's small arms producing countries. It identified at least three countries—China, the Russian Federation, and the US—as major producers, and at least 23 countries, mainly in Europe, as medium producers. The only medium small arms producing countries outside Europe were Brazil and Israel.[15] Despite the fact that more than half the world's countries produce, or have the capacity to produce, small arms, and the emergence of 'new' producers such as India, Pakistan, Singapore, South Africa, and Taiwan, the global small arms market is still dominated by 13 countries: Austria, Belgium, Brazil, China, France, Germany, Israel, Italy, the Russian Federation, Spain, Switzerland, the UK, and the US. Of these, all except Belgium and Switzerland are also the world's most important producers of conventional weapons (Grimmett, 2001).[16] This section provides detailed case studies of the most important small arms companies in the 13 countries that dominate the global small arms market.

MAP 1.2 **The world's most important small arms producers**



In some countries, such as Austria, Germany, Italy, and the US, the major producers of small arms are private companies, while in others, like Belgium, China, France, Israel, and Switzerland, they are state-owned. In some countries, such as Brazil, there is a mixture of private and state ownership. Among European firms there are some cases of cross-national ownership, such as FN-Herstal (France/Belgium); Heckler & Koch (UK/Germany); SIG Sauer (Germany/Switzerland/USA), and Beretta (France/Italy). In addition, many European companies, like FN Herstal, Beretta, and SIG have well-established US and/or other foreign subsidiaries.

Most of these companies manufacture a range of small arms products, including ammunition, for both military and civilian markets, although some companies are more dominant in one or the other market. Some companies (e.g. Giat Industries) also manufacture other categories of weapons like tanks and military aircraft, and in some cases small arms production makes an insignificant contribution to total sales. FN Herstal and Heckler & Koch are the world's most important licensors of small arms, and their products are manufactured, collectively, under licence in more than 35 countries worldwide. The AK series assault rifle, originally produced by Izhmash in Russia, and subsequently produced in at least 19 other countries, is the world's most widely distributed military-style small arm (Small Arms Survey, 2001, p. 20).

Most of the companies are smaller than companies in other sectors of the defence industry. With the exception of CNGN in China, and Izhmash in the Russian Federation, most companies (e.g. Heckler & Koch, Glock, Beretta) have less than

TABLE 1.6 The world's most important small arms producers, selected financial indicators, 2000

Country	Company	Total sales* (2000)**	Total employment*** (2000)
Austria	Glock	ATS 200 million (USD 14m)	380
	Steyr-Mannlicher	EUR 16 million (USD 15m)	135
	Hirtenberger	ATS 402 million (USD 28m)	260
Belgium	FN Herstal	BEF 3,7 billion (USD 86m)	929
Brazil	Forjas Taurus	USD 47.5 million	1,656
	Amadeo Rossi	USD 5.4 million	1,354
	CBC	USD 46.5 million	900
	Imbel		2,220
China	CNGN (Norinco)	CNY 13,1 billion (USD 1,5b)	456,000
France	Giat Industries	FRF 3,6 billion (USD 517m)	7,500
Germany	Rheinmetall DeTec	EUR 1,6 billion (USD 1.5b)	9,000
	Mauser-Werke	EUR 44 million (USD 42m)	235
	Heckler & Koch (UK)	DEM 159 million (USD 77m)	570
	JP Sauer & Sohn	DEM 50 million (USD 24m)	320
	Umarex	DEM 66 million (USD 32m)	190
Israel	Israel Military Industries	USD 417 million	4,100
Italy	Beretta SpA	EUR 130.3 million (USD 123m)	908
Russian Federation	JSC Izhmash	USD 170.7 million	25,400
	JV Degtyarev Plant	USD 59.7 million	15,368
	Izhevsky	USD 46.6 million	14,954
Spain	Santa Barbara	ESP 14 billion (USD 80m)	2,020
Switzerland	Swiss Ammunition Enterprise (RUAG Suisse)	CHF 270 million (USD 168m)	1,092
UK	Royal Ordnance Plc	GBP 153 million (USD 232m)	1,974
US	Alliant Techsystems	USD 1 billion	6,500
	Primex Technologies	USD 530 million	2,850
	Sturm, Ruger & Co	USD 202 million	1,778
	Smith & Wesson	USD 133 million	670
	OF Mossberg	USD 75 million	585
	Colt's Manufacturing	USD 72 million	600
	Remington Arms		2,200

Notes: * *Includes sales of small arms.*
** *Exchange rates with the USD as of 1 January 2001.*
*** *Includes those employed directly in small arms production.*

Sources: Company reports

a thousand employees, and in many cases only a few hundred.[17] State-owned companies (e.g. IMI in Israel, Santa Barbara in Spain) tend to have larger numbers of employees than the private companies (e.g. Beretta in Italy, Glock in Austria).

Many small arms companies have experienced declining sales and profitability in recent years.

Many companies have experienced declining sales and profitability in recent years, as reflected in dramatic declines in employment. In some countries (e.g. Belgium, France, Israel) this declining performance has prompted direct government financial support. In other countries (e.g. US) government support has involved the awarding of multi-year, or follow-on, contracts. The US market for both military-style and civilian small arms is critical to the survival and profitability of almost all of Europe's small arms producers. Both FN Herstal (Belgium) and Beretta (Italy), through their US subsidiaries, rely heavily on contracts from the US armed forces. Glock (US) is one of the most important suppliers of handguns to law-enforcement agencies in the US. Private companies, particularly those still owned by family interests (e.g. Glock, Beretta, Sturm, Ruger & Co) have tended to perform better than state-owned ones (e.g. FN Herstal, IMI) or those controlled by shareholder interests (e.g. Heckler & Koch).

The financial performance and employment levels of companies has an impact on productivity, and many state-owned companies have exhibited lower levels of labour productivity than their private counterparts.

Table 1.6 provides selected financial indicators for some of these companies. Much of the information on total sales and employment is not comparable. In some companies (e.g. Giat Industries, CNGN, Santa Barbara, IMI, Rheinmetall) sales of small arms account for an insignificant proportion of total sales, while in other companies (e.g. Glock, Sturm, Ruger & Co) they account for a (sometimes 100 per cent) dominant proportion of total sales.

Major producers

This subsection provides detailed case studies of the world's three major small arms producers: China, the Russian Federation, and the US. Each country study provides information on the major small arms producing companies, including selected financial information, where available.

China[18]

China is regarded as one of the world's major small arms producers and exporters, but there is almost a complete lack of official and unofficial information about the size and scope of domestic small arms production (Frankenstein, 1999, p. 191). Recent figures suggest that China was the fifth largest supplier of conventional arms to developing countries during the period 1993–2000, with sales of USD 7.2 billion: an average of USD 970 million a year (Grimmett, 2001). Between 1987 and 1994 China was a major supplier of rifles to the US market, accounting for more than 40 per cent of total US rifle imports, including military-style weapons (Diaz, 1999, p. 73). China is also a major supplier of small arms to Africa, and was the largest supplier, by volume, of civilian firearms to the South African domestic market between 1997 and 1999 (Chetty, 2000).

Defence production, including small arms production, in China is entirely controlled by the state. It occurs either in large state-owned defence-industrial companies or in companies and factories owned and controlled by the People's Liberation Army (PLA).[19] The state-owned defence industry is guided by the civilian State Council and supervised by the Commission of Science, Technology and Industry for National Defence (COSTIND). COSTIND is also the clearing house for arms production and co-ordinates military needs directly with the PLA's General Armament Department. China's defence industry today comprises large state-owned industrial corporations who also produce civilian goods. Most of these corporations used to be secret 'machine-building' industrial ministries headed by military

officers. Now they are civilian-run and profit-seeking and have increasingly sought to diversify their activities beyond their core military business (Brömmelhörster & Frankenstein, 1997; Frankenstein, 1999).

The major small arms producing company in China is the state-owned **China North Industries Group Corporation** (also known as Norinco). Norinco was established in 1980 as the official arms trading company under the Fifth Ministry of Machine Building (Gill and Medeiros, 2000). In 1988 the company was formed under the Ministry of Machinery and Electronics, incorporating 160 enterprises and more than 700,000 employees. Between 1980 and 1990 Norinco earned a total of USD 12 billion from arms sales, peaking at USD 2.5 billion a year in 1986 and 1987. In the 1990s its combined sales of military and civilian products averaged about USD 2 billion annually. However, weapons account for only 20–30 per cent of overall production (*Jane's Sentinel Security Assessment*, 20 September 2000).

Under a reorganization of state-owned companies, in July 1999 Norinco was divided into China South Industries Group Corporation (CSG) and China North Industries Group Corporation (CNGN). CSG (with its 260,000 employees and 64 companies) will refocus almost entirely on civil production. CNGN will be the new weapons producer, and will produce most of China's small arms, apart from some small PLA factories.

Despite restructuring, CNGN is still large and difficult to manage. It consists of 131 companies, including 83 industrial enterprises, and 456,000 employees (Brömmelhörster, 2001). It accounts for nearly all state-controlled small arms production (besides ammunition and spare parts). State secrecy makes it impossible to provide exact figures for its small arms production. The bigger factories, however, are in Xian, Beijing, Wuhan, Dalian, Shijiazhuang, and Shenyang.

Small arms production accounts for probably less than five per cent of CNGN's overall turnover, which includes the production of tanks, armoured vehicles, artillery guns, missiles, bombs, and explosives (Reed, 2001). Prior to restructuring in 1999, most of the enterprises within Norinco made losses; although in recent years there have been significant attempts to get rid of unprofitable activities (Frankenstein, 1999).

Russian Federation[20]

The Russian Federation is one of the world's major defence producers, and it is consistently ranked as one of the most important arms exporters in the world. In the period 1993–2000, the country achieved sales of USD 30.5 billion—an average of USD 3.8 billion a year—in conventional arms to developing countries, second only to the US (Grimmett, 2001). According to unofficial figures, total revenues from arms exports amounted to USD 3.5 billion in 2000 (*Moscow Profil*, 7 May 2001). The defence industry of the Russian Federation, including the small arms sector, has been drastically downsized and restructured since the end of the Cold War and the collapse of the former Soviet Union in 1991. However, in recent years the output of the Russian arms industry has been rising (Cooper, 2001, p. 317). In addition, exports of military products now account for 34 per cent of the total output of the Russian arms industry (Cooper, 2001, p. 319).

In Russia more than 85 per cent of all small arms are produced in Izhevsk.

Russia's military industrial complex comprises about 1,700 enterprises: about 30 per cent state enterprises (GUPs), 30 per cent joint-stock companies (JSCs) with state participation, and the rest private (*Moscow Profil*, 7 May, 2001). According to the Centre for Analysis of Strategies and Technologies (CAST, 2001b) a number of trends have become evident in recent years. The main centres for the production of both military-style and civilian small arms in the Russian Federation are Izhevsk (Udmurtia), Tula (central Russia), and Kovrov (Vladimir region). More than 85 per cent of all domestically produced small arms are manufactured in Izhevsk. JSC Izhmash is regarded as the leading domestic producer and exporter of small arms. The production facilities in Tula, apart from the Instrument Design

Bureau, have lagged behind the facilities in Izhevsk, in terms of both design and manufacture for domestic and export markets. As in the past, some firms (e.g. TsKIB SOO) still concentrate on design, while others focus on production (e.g. Izhmash). Often it is unclear whether specific firms are engaged in the design or the production of small arms.

The Russian small arms industry is currently experiencing a process of product diversification. The Kalashnikov era is likely to end in the next few years, leading to a transition from the key types of small arms produced during the Soviet era. Currently, even the latest models of the Kalashnikov assault rifle are merely upgraded versions of the basic AK-47, usually with a different calibre or higher fire rates (e.g. Izhmash Nikonov assault rifle AN-94). However, many companies are developing numerous new weapons, particularly for special and law-enforcement task forces. In addition, the Russian Defence Ministry has invited tenders for new small arms for the Russian armed forces. The final choice will be made in 2002–3 and supplies of new types of small arms to Russia's armed forces will begin simultaneously.

Since the ending of centralized government orders for weapons, plants often develop and produce firearms in small batches to meet orders from security forces and paramilitary divisions of the Interior Ministry. Such a flexible approach gives plants at least some chance to win orders for military-purpose goods, but it leads to de-standardization in small arms. Besides, the commercial viability and usefulness of producing so many varieties of firearms with similar technical specifications is not always evident.

A final trend is the production of hunting and sporting guns as a way of raising total production volumes. Most of these civilian weapons have been derived from military-style small arms.

The main small-arms producers in the Russian Federation are located in Izhevsk, Tula, and Kovrov.

MAP 1.3 Small arms production centres in the Russian Federation

JSC Izhmash (Izhevsk): Izhmash is Russia's biggest manufacturer of small arms. It was founded in 1807 as the Izhevsk Arms Plant, and became the main producer of small arms in the Soviet Union era. In 1948 it launched the production of AK-47 Kalashnikov assault rifles. Today Izhmash is a major engineering facility that, in addition to small arms, makes sporting and hunting guns and various civilian products. Its large and successful civilian division moderates its dependency on arms contracts. It also uses part of the profits from its civilian production to fund its small arms Research and Development (R&D).

At the end of 2000, following an additional share issue and the restructuring of some USD 86 million in debt to the federal government, Udmurtia's stake in Izhmash shrank from 34.35 per cent to 19.8 per cent, while the share of the Ministry for Property Relations grew from 25.5 per cent to 57 per cent, giving the federal government full control over Izhmash operations. With its powerful research and design division, Izhmash currently manufactures the

latest models of Russian small arms. Mikhail Kalashnikov, the world-famous designer of the AK series assault rifle, still works at the plant. In 1997 Izhmash was made the federal scientific and production centre for small arms, with Kalashnikov as its head. This status has given the company a virtual monopoly over the design and manufacture of new models of small arms in the Russian Federation.

Mikhail Kalashnikov with a copy of the world-famous AK-47 rifle.

Even though Izhmash began the production of combat weapons with AK-47 assault rifles, it currently manufactures only the latest models of the Kalashnikov assault rifle family: AK-101–108 and is the Russian Federation's only producer of them. Some models (AK-101 and AK-102) are produced solely for export because they have the standard NATO calibre of 5.56mm. The plant still has the potential to manufacture the AK-74 assault rifle adopted by the Soviet Army in 1974 and its upgraded version AK-74M, though there is no information about current production.

The plant also produces some new-generation small arms such as the Nikonov assault rifle (AN-94), which has been supplied to Russia's airborne troops. Since 1964 Izhmash has been making the Dragunov sniping rifle (SVD) and its more advanced modification, the SVDS. It also manufactures the Bizon-2 sub-machine gun in small batches of several hundred pieces for special-tasks forces and the Interior Ministry. Izhmash is also Russia's biggest producer of hunting guns derived from the Kalashnikov assault rifle (CAST, 2001b).

Izhmash currently employs 25,400 people, up from 22,900 in 1999. In 1999 total sales amounted to USD 90 million; in 2000 they soared to USD 170.7 million.[21] The Izhmash Board of Directors aims to almost double total sales in 2001 to USD 290 million.[22] The company was ranked (by total sales) as the sixth largest defence company in Russia in 2000, up from eighth in 1999 (CAST, 2001a).

Izhevsky Mekhanichesky Zavod (Izhevsk): The plant was founded in 1942 to manufacture small arms for the army. It is still state-owned. Nowadays it is a multi-faceted industrial facility producing various civilian goods in addition to pistols, hunting, sporting, and air guns. Since the Second World War it has been specializing in the production of the Makarov pistol, the main handgun used by the Soviet army. It also makes a special version for law-enforcement purposes. In the past few years the plant has intensified its R&D on new types of combat pistols expected to be adopted by the Russian army, navy, and law-enforcement agencies. So far the new models have been made in test batches of several hundred pieces on order from defence and law-enforcement agencies for troop trials. Designers making the latest models have considered manufacturing them according to Western standards in order to encourage exports. In 2000 the company had total sales of USD 46.6 million (USD 40.9 million in 1999) and employed nearly 15,000 people. Exports, mainly of sporting and hunting weapons, accounted for 35 per cent of total sales (CAST, 2001a).

JSC Tulsky Oruzheiny Zavod (Tula): The plant was founded in 1712 and for a long time was the main producer of small arms in the Russian empire and later in the Soviet Union. In 1961 it launched the production of the Kalashnikov assault rifle. During the Soviet era it produced anti-tank guided missiles and under-barrel grenade

launchers. In 1991–92 the share of government orders in overall output slumped from 100 per cent to between seven per cent and ten per cent, and the production of small arms was suspended. In 1993 Tula Arms Plant became a joint stock company and changed its strategy. It expanded the production of hunting and sporting guns while in the defence sector it concentrated on the manufacture of small batches of high-precision pistols and sub-machine guns for Special Forces. In recent years the plant has seen an increase in production and profits, mainly as a result of export orders, which currently account for 82 per cent of its output. The main export articles are hunting and sporting guns that are sold to over 20 countries (CAST, 2001b).

KBP-Instrument Design Bureau (Tula): The KBP-Instrument Design Bureau, which was founded in 1927, manufactures a wide spectrum of armaments, including small arms. It is the main Russian designer and manufacturer of portable anti-tank guided missiles. During the past few years the company has lived mainly on exports. A subsidiary of the KBP design bureau, the Central Research and Design Bureau of Sporting and Hunting Guns (TsKIB SOO), specializes in the design of pistols, revolvers, machine pistols, sniping rifles, and small sub-machine guns. The firearms are designed and produced in small batches on order from the Russian Interior Ministry for special law-enforcement units. The facility also produces hunting and sporting guns (CAST, 2001b).

JSC Kovrov Mechanical Plant (Kovrov): The Kovrov Mechanical Plant (KMP) was founded in 1950 for the production of small arms and light weapons. Since the 1950s it has been making various modifications of the Kalashnikov machine gun. In 1993 the plant was transformed into a joint stock company. In the late 1990s KMP tried to offer a range of new models of small arms on the market. It designed and prepared for serial production the 9A-91 assault rifle for police task forces, the AEK-971 assault rifle, and the AEK-919K Kashtan sub-machine gun. In 2000 its design office produced the first test samples of the AEK-973 assault rifle (CAST, 2001b).

Despite KMP's aggressive marketing policy to develop new models of small arms for both domestic and foreign markets, so far there is no information available about any export contracts or domestic deliveries to the Russian armed forces or domestic law-enforcement agencies. The Kashtan sub-machine gun, however, is a candidate in a tender of the Russian Defence Ministry, law-enforcement and security forces, and the final choice will be made in 2002–3 (CAST, 2001b).

JSC V.A. Degtyarev Plant (Kovrov): The plant was founded in 1917 for the production of machine guns. In the late 1950s it began to produce air defence guns, anti-tank guided missiles, and portable air-defence missile systems. Now it is a joint stock company, controlled by the MDM Group. In recent years the company has designed and produced the Kord heavy machine gun and various types of revolvers. In 2000 the company had total sales of USD 59.7 million (USD 51.9 million in 1999), and employed over 15,000 people (CAST, 2001a).

BOX 1.2 Russian small arms ammunition production

The Russian ammunition industry in general is currently in a critical condition. Annual production volumes have plummeted from five billion units in Soviet times to 50 million today.[23] Government contracts are virtually non-existent because the Russian Defence Ministry, unable to afford new cartridges, is using up its old arsenals. This situation is forcing most companies to switch to the production of cartridges for hunting and sporting guns that have a greater export potential. Current manufacturers of small arms ammunition include: Vympel State Production Association (Khabarovsk territory); Novosibirsk Low Voltage Equipment Plant (Moscow); Ulyanovsk Machinery Plant (Samara region); Pribor Federal Scientific and Production Centre (Moscow); and Bazalt State Research and Production Enterprise (Moscow).

Source: CAST (2001b)

TABLE 1.7 Russia's most important small arms producers, selected financial indicators, 1999–2000

Rank*		Company	Total sales (USD m)		Number of employees		Ownership
1999	2000		1999	2000	1999	2000	
8	6	JSC Izhmash	90	170.7	22,900	25,400	State
13	12	VA Degtyarev Plant	51.9	59.7	n/a	15,368	MDM Group
15	16	Izhevsky Mekhanichesky Zavod	40.9	46.6	n/a	14,954	State

*Note: * Based on ranking (by total sales) of top 20 Russian defence companies*
n/a not available
Source: CAST (2001a)

United States[24]

The US is recognized as one of the world's major small arms producers and exporters. During the period 1993–2000 the US was ranked as the world's major supplier of conventional arms to developing countries with sales of USD 61.5 billion, an average of USD 7.6 billion a year (Grimmett, 2001). More than 300 local companies produce small arms and/or ammunition, and the country is estimated to have one of the world's largest domestic markets for small arms (United States, Census Bureau, 1997a; 1997b). Without exception, there is more official and unofficial information about the production of small arms in the US than for any other country.

© Associated Press/El Flynn

Small arms for sale, California.

The small arms industry is not a significant sector of the US economy. Total employment amounted to 16,770 people in 1997, the latest year for which official figures are available. Recent unofficial information suggests that the number of people employed in small arms production has remained constant or declined since 1997. The total value of production (shipments) was USD 2.059 billion (USD 1.2 billion for small arms, and USD 859 million for ammunition) in 1997 the latest year for which official figures are available (United States Census Bureau, 1997a; 1997b). Unlike some of the other major small arms producing countries, the small arms industry in the US is dominated by privately-owned companies, and a handful of companies (including two foreign-owned ones) dominate the domestic market for both military and commercial small arms, including ammunition.

TABLE 1.8 US domestic production of firearms, 1998–1999

Type	Production 1998	Production 1999	% change
Pistols	960,365	995,446	3.7
Revolvers	324,390	335,784	3.5
Rifles	1,345,899	1,569,685	16.6
Shotguns	1,036,520	1,106,995	6.8
Machine guns	32,866	22,490	–31.6
Other/misc.	25,151	55,114	119.1
Total	**3,725,191**	**4,085,514**	**9.7**

Sources: United States, BATF (1998; 1999)

The small arms industry is not a significant sector of the US economy.

Since 1997, there have been small increases in total domestic production of small arms, and just over four million units were produced in 1999, the latest year for which official figures are available (United States, BATF, 1999). The increase between 1998 and 1999 was nearly ten per cent, with the largest increases coming from rifles (17 per cent) and other/miscellaneous firearms (119 per cent). Domestic production in 1999 (4.08 million) was slightly lower than annual average production for the period 1980–99 (4.1 million) (United States, BATF, 1998; 1999).

Despite the small increase in 1999, total domestic production of firearms is still way down from the peak in 1993–94, when total production was over five million units a year. More recent unofficial information suggests that the firearm industry, particularly the handgun business, may be a 'dying industry' (Cameron Hopkins, quoted in *Virginian Pilot*, 14 August 2001) and that production levels are at a 30-year low (*Associated Press*, 16 April 2001). Imports of handguns into the US are also lower than in recent years. The industry's decline is variously attributed to: market saturation, stiffer rules for buyers (the Handgun Violence Prevention Act of 1993), a massive decline in the number of licensed gun dealers (104,000 today, down from 284,000 in 1992), lower levels of crime, and declining public acceptance of owning handguns (*Associated Press*, 16 April 2001). The number of handguns produced for the US military has also declined dramatically in recent years, and purchases between 1993 and 2000 were 80 per cent lower than in the previous eight-year period. The drop in purchases by the US military is attributed to 'smaller armed forces and the greatly diminished threat in the post-Cold War era' (Greg Fetter, quoted in *Associated Press*, 16 April 2001).

TABLE 1.9 Top US small arms companies, selected financial indicators, 1998–2000

Company	Total sales* 1998 (USD m)	Total sales* 2000 (USD m)	Employment** 2000
Sturm, Ruger & Co	211.6	202.7	1,778
Smith & Wesson	140	133	670
OF Mossberg	20	75	585
Colt's Manufacturing	70	72	600
Saco Defense	65	31	240
Marlin Firearms	50	52.4	440
FN Manufacturing	47 (est.)	45.9 (est.)	390
Crossman Corp	45	29	310
Savage Arms	26	25	200
Beretta USA	n/a	30	200
Remington Arms	n/a	n/a	2,200
Total	**674.6**	**696**	**7,613**

Notes: * *Includes sales of small arms and other products.*
** *Includes employment of those directly involved in small arms production*
n/a not available

Sources: Ezell (2001); Gale Research Inc (2001); Reed (2001); Standard & Poor's Corporation (2001).

Against this background of a declining US handgun market, Smith & Wesson, one of the most famous small arms producers for nearly 150 years, was sold for USD 15 million to Saf-T-Hammer, having been bought by British company Tomkins for USD 112 million in 1987 (*Los Angeles Times*, 15 May 2001). Total production at Smith & Wesson in 1999 was 334,491, down from 680,717 in 1995 (*Associated Press*, 16 April 2001). The company, together with other manufacturers, has since 1998 been faced with lawsuits from a range of cities and other government bodies concerning negligence. The lawsuits sought reimbursement from gun makers for the high costs of policing violence and

of treating gunshot victims. Rather than fight in court, Smith & Wesson negotiated a government settlement, agreeing to include locks on all its guns and to introduce a range of other safety features and changes in its marketing practices. Other gun makers did not follow Smith & Wesson's lead, and blamed the company for selling out (*Associated Press*, 16 April 2001). As a result of its decision, the company's sales have suffered in recent years because of boycotts from distributors, dealers, and customers (Ezell, 2001).

TABLE 1.10 Top US producers of firearms, ranked* by weapons type

Type	Company	Production 1998	Production 1999	% change	Exports/total production (%) 1999
Pistols	Sturm, Ruger & Co	161,058	213,876	32.8	3,519 (1.6%)
Revolvers	Smith & Wesson	139,583	152,724	9.4	37,857 (24.7%)
Rifles	Sturm, Ruger & Co	332,538	426,226	28.2	453 (0.1%)
Shotguns	Remington Arms Co	336,527	364,354	8.3	11,121 (3%)
Total**		**3,725,191**	**4,085,514**	**9.7**	**245,528 (6%)**

Notes: * Ranked according to 1999 production.*
*** Total production of all types of firearms, by all US producers.*

Sources: United States, BATF (1998; 1999)

Sales by individual companies have mostly either remained unchanged or declined over the last few years. Production and total sales by the top companies declined between 1997 and 2000 (Ezell, 2001). Only one major American company—O.S. Mossberg, which manufactures mainly shotguns and rifles for both civilian and law-enforcement markets—has significantly increased its sales, from USD 20 million in 1998 to USD 75 million in 2000, largely as a result of good business planning and increasing demand for long guns, particularly shotguns (Ezell, 2001).

Sturm, Ruger & Co is the most important firearms producer in America, in terms of the value of sales, employment, and total production. It dominates domestic production of pistols and rifles for the commercial market, and is the only US-based producer that offers products in all four categories: pistols, revolvers, rifles, and shotguns. Rifles account for nearly 40 per cent of the company's total sales. It is also an important supplier of military-style small arms.

The most important US contractors (producers) of military-style small arms are **Colt's Manufacturing** (M4 carbine, M16 rifle), **FN Manufacturing** (a subsidiary of FN Herstal of Belgium: M16 rifle, M249 squad automatic weapons and M240B medium machine gun), **Saco Defense** (a subsidiary of General Dynamics: M2HB machine gun and MK19-3 grenade machine gun), and **Beretta USA**, a subsidiary of Beretta of Italy. Both FN Manufacturing and Saco Defense are completely dependent on government sales, while Colt's Manufacturing is less so because of its civilian business (Ezell, 2001).

Two companies dominate the production of military calibre ammunition for the US military: Alliant Techsystems and Primex Technologies. Alliant Techsystems had total sales of over USD 1 billion in 2000, and employed 6,500 people. Its conventional munitions group, which manufactures ammunition from small arms to tank ammunition, had sales of USD 421 million in 2000, accounting for nearly 40 per cent of the company's total sales. All the company's small arms ammunition is manufactured at the Alliant Lake City Small Calibre Ammunition Company (Hoover's Inc., 2001: 2 August).[25] In 2000 Alliant was awarded a ten-year contract, worth USD 100 million annually, to supply small arms ammunition for the US Army (Forecast International, 2002). Primex Technologies, which was acquired by General Dynamics in early 2001, had total sales of USD 530 million in 2000, and employed 2,850 people (Extel Financial Limited, 2001: 1 February).[26] Small arms account for less than ten per cent of the total sales of Primex.

Medium producers

This subsection provides detailed case studies of the world's most important medium-sized small arms producers: Austria, Belgium, Brazil, France, Germany, Israel, Italy, Spain, Switzerland, and the United Kingdom. Each country study provides information on its most important small arms producing companies, including selected financial information. Together with the world's three major producers—China, the Russian Federation, and the US—these countries dominate the global small arms market.

Austria[27]

Austria has a relatively small domestic defence industry, but the country is a major producer of small arms.

Austria has a relatively small domestic defence industry, and local defence companies, unlike in neighbouring Switzerland, have been largely excluded from the European-wide defence industry consolidation of recent years. The total turnover of the Austrian defence industry in 2000 was EUR 174 million (USD 164 million) (Austrian Defence Industry Association, 2001). However, the country is a major producer of small arms for both military and civilian markets, and a number of local companies are involved in some aspect of small arms production (Omega Foundation, 2001b). Two companies—Glock and Steyr-Mannlicher—are the most important domestic producers, for both military and civilian markets, and are also major exporters. Other local companies include Hirtenberger (ammunition), Dynamit Nobel Graz (ammunition), Andres & Dwonsky Karlstein (sporting pistols), and Voere Kufsteiner Gerätebau Handelsges (hunting and sporting weapons) (Lock, 2001).

Glock: A metal producer founded in 1963, Glock entered the small arms market only in 1981. Since 1981 the company has supplied more than 2.5 million pistols to armies and law enforcement agencies in more than 50 countries, as well as to civilians in more than 100 countries. The company produces a range of nearly 40 pistol models in different sizes and calibres for the military, law-enforcement, and civilian markets. It is estimated that more than 90 per cent of the company's production is exported. At least 5,000 police departments and agencies in the US at State, federal, and local levels are equipped with Glock pistols, and an estimated 500,000 of the company's pistols are carried daily in the US as service handguns (Gander and Cutshaw, 2001b).

In addition to its production facilities in Deutsch-Wagram (Austria), the company has production facilities in the US, France, and subsidiaries (or trading companies) in Hong Kong, Uruguay, and Madeira (Hoover's Company Profile Database, 2001). Financial details about the company, which is still privately owned by the Glock family, are difficult to obtain. However, recent reports suggest that total sales for the company amounted to ATS 220 million (USD 14 million) in 2000, and that total employment was 380 people (Lock, 2001).[28]

Steyr-Mannlicher AG: Established in 1864, Steyr-Mannlicher AG operates as an independent subsidiary of Steyr-Daimler-Puch AG and produces a wide range of products for military, law-enforcement, and civilian markets. The company's products for the military market include pistols, rifles, sub-machine guns, and a light support weapon (Gander and Cutshaw, 2001b). The company produced the 7.62mm FN FAL rifle under licence (renamed the StG-58) during 1958–70, and approximately 130,000 units were produced.[29] The Steyr 5.56mm AUG rifle, which is in service in at least 24 countries, is produced under licence in Australia and Malaysia; the Steyr 7.62mm SSG 69 sniper rifle is produced under licence in Greece. The company is also a major producer of various types of small arms ammunition.

The company owns 51 per cent of the shares in a German company, Suhler Jagd-und Sportwaffen GmbH, which produces various sporting and hunting rifles, thus complementing its existing product range of commercial firearms. In June 2001, an Austrian company, Cura Investholding GmbH, acquired 100 per cent of the shares of Steyr-Mannlicher,

including its shares in Suhler Jagd-und Sportwaffen GmbH. According to company reports, Steyr-Mannlicher had total sales of EUR 16 million (USD 15 million) in 2000, and employed 135 persons.[30]

Belgium[31]

While Belgium is not a significant producer of major conventional arms, it is still one of the world's most important small arms producers. At least 15 companies in Belgium are involved in some aspect of small arms production (Omega Foundation, 2001b). However, domestic production of small arms and ammunition is dominated by one company, FN Herstal, which is part of the Groupe Herstal (Mampaey, 1998; 2000).

FN Herstal was established in 1889 (named Fabrique Nationale d'Armes de Guerre) when several small arms manufacturers from Liège joined forces to fulfil a government order of 150,000 Mauser rifles. In later years the company ventured into the civilian market with hunting rifles and bicycles (much later also trucks and cars). FN Herstal had hoped that diversification would act as a safety-net for the company when military orders were low, but it mismanaged its diversification policy (Mampaey, 2000, p. 21).

In the late 1970s FN was drastically reorganized into four divisions (Mampaey, 1997). At the same time it began to expand worldwide with the acquisition of Browning (1977) and the creation of subsidiaries in Portugal (FN Viana, 1973), Brazil (FN do Brasil, 1977), and the US (FN Manufacturing, 1981). In 1980 it had a major success when NATO adopted the FN SS-109 ammunition (5.56mm) as its standard. But not all was well with the company. In the early 1980s the demand for small arms from traditional clients fell, and the workforce in the arms production division was regularly underemployed (Mampaey, 1997, p. 5). FN was restructured again during the mid-1980s in the hope that decentralizing the industrial (i.e. non-military) activities would lower costs. In 1987 the Browning division was turned into a subsidiary of FN Herstal, and was quickly followed by FN Moteurs and FN Industry. FN Moteurs was finally sold in 1989 to the French company SNECMA (*Jane's Defence Weekly*, 24 June 1989).

At the end of 1990 FN's major shareholder, the *Société Générale de Belgique*, sold 92 per cent of its equity to the French state-owned defence group Giat Industries. The remaining eight per cent was bought by the Région Wallonne, the Walloon regional government. The FN Group was renamed Groupe Herstal, while FN Herstal became known as *Fabrique Nationale Nouvelle Herstal* (FNNH).[32] By this time employment was down to 1,200 from over 10,000 in the early 1980s (Mampaey, 2000, p. 26). But all was not well either with Giat Industries (see below). As a result of mounting losses, Giat Industries sold FN do Brasil (Brazil) and its shares in Beretta SpA (Italy) and began to search for a buyer for Groupe Herstal. One interested company was Colt's Manufacturing, FN's American rival. The sale of Groupe Herstal to Colt was vetoed by the Région Wallonne, and at the end of 1997 Giat Industries sold all its remaining equity (92 per cent) in Groupe Herstal to the Région Wallonne. Currently, the small arms activities of the Groupe Herstal are structured into two groups: (1) military products, which includes two subsidiaries: FN Herstal (Belgium) and FN Manufacturing (US); and (2) commercial products, which includes five subsidiaries: Browning International (Belgium), Browning S.A. (Belgium), Browning Inc (US), Browning Viana (Portugal), and US Repeating Arms Co Inc (US).

In recent years the Région Wallonne has been providing Groupe Herstal with substantial sums of money to keep the company afloat (Danssaert, 2001). In 2000, FN Herstal's turnover was BEF 3.7 billion (USD 86 million), with exports amounting to 98 per cent of total sales. Weapons sales accounted for 73 per cent of total sales, while ammunition accounted for 15 per cent (Danssaert, 2001). In the same year total employment was 929, down from 1,206 in 1997, when the company was sold by Giat Industries (Mampaey, 2000).

Brazil[33]

Brazil was the largest supplier of handguns to the US during 1991–95.

Brazil is one of the developing world's major defence producers and a major producer of small arms, particularly for the US market (*Jane's Defence Weekly*, 21 June 2000). At least 18 companies are involved in some aspect of small arms production (Omega Foundation, 2001b). The major domestic producers of small arms include the state-owned Industria de Material Belico do Brasil (Imbel) and a number of private companies. Imbel, which was established in 1974, is a non-quoted public company, and in 2000 employed 2,220 people (Graham & Whiteside Ltd, 2001). The company produces a wide range of small arms and ammunition, mainly for the military market. Its products include pistols, rifles, and sub-machine guns (Gander and Cutshaw, 2001b). The company started producing the 7.62 FN FAL rifle under licence in 1964 (250,000 have been produced to date), and currently produces the 5.56mm version (Danssaert, 2001). More than 90 per cent of the 2,000 .45 calibre pistols that the company exports each month are bound for the US market. Springfield Armory is the distributor of Imbel products in the US. Currently, between 40 per cent and 50 per cent of the company's total production is exported (Gazeta Mercantil, 26 October 2001).

The most important private companies in Brazil include Forjas Taurus (handguns and sub-machine guns), Amadeo Rossi (handguns), and Industria Nacional de Armas (INA) (sub-machine guns). Both Forjas Taurus and Amadeo Rossi are major suppliers of handguns to the US civilian market, and in 1996 Brazil was the second largest supplier of handguns to the US, having been the largest supplier throughout the period 1991–95 (Diaz, 1999).

Forjas Tauras is Brazil's leading producer and exporter of handguns. In 2000 it had total sales of USD 47.5 million and employed 1,656 people. Over 60 per cent of the company's sales in 2000 consisted of exports to nearly 60 countries. **Amadeo Rossi** had total sales of USD 5.4 million in 2000, and employed 1,354 people.

Brazil is also a major producer of small arms ammunition. The most important producers include Fabrica National de Cartuchos e Municoes in Sao Paulo, **Companhia Brasiliera de Cartuchos** (CBC) in Sao Paulo, and Fabrica Realengo in Rio de Janeiro. CBC, which is owned by Imbel, is the largest and oldest ammunition producer in Brazil and one of the largest ammunition producers in the developing world. In 2000 the company had total sales of USD 46.5 million and employed 900 people.

The financial performance of CBC, Taurus, and Rossi has declined in real terms in recent years, and this is reflected in the trends in Brazil's small arms exports (TRANSFERS). Taken together, the three companies had total sales of almost USD 100 million in 2000, and collectively employed nearly 4,000 people. In July 2000, the Brazilian Ministry of Defence effectively 'closed' the local small arms market to foreign competitors in an attempt to protect the local small arms industry (*São Paulo Valor*, 12 July 2000).

France[34]

While France is a significant producer and exporter of major conventional armaments, it pales by comparison with other European countries such as Austria, Belgium, Germany, and Italy in terms of small arms production. The country was ranked as the third largest supplier of conventional arms to developing countries in the period 1993–2000 with sales of USD 24.7 billion, or USD 3 billion a year (Grimmett, 2001). More than 30 companies in France are involved in some aspect of small arms production, although most production is for domestic consumption (Omega Foundation, 2001b). The state-owned company, Giat Industries, is the most important domestic producer of small arms and ammunition. The other major domestic producer is a private company PGM Precision (sniper rifles).

Giat Industries has a history dating back to the eighteenth century. The French small arms industry was established with the creation of Manufacture d'Armes de St Etienne in 1764. A number of armaments factories were subsequently established at Tulle (1777), Toulouse (1792), Rennes (1793), Roanne (1918), Le Mans (1927), Sal Bris (1933), and Issy-les-Moulineaux (1936). In 1945, all of these factories were grouped together under Direction des Études et Fabrications d'Armements (DEFA). In 1965, DEFA became Direction Technique des Armements Terrestres (DTAT) and was included in the Direction Ministérielle des Armements (DMA). These arsenals were regrouped in 1971 with the creation of Groupement Industrial des Armements Terrestres (GIAT). On 1 July 1990, GIAT became Giat Industries, SA. In the same year Giat Industries acquired Matra Manhurin, a well-known producer of small arms and light weapons.

Giat Industries is one of the world's leading producers of land systems, although its products are also sold to air forces, navies, gendarmeries, and police forces. The company is in the process of diversifying its activities into other sectors in co-operation with other industries. Luchaire, which produces ammunition and other light weapons, and Manurhin, which produces ammunition, are both wholly-owned subsidiaries of Giat Industries.

Giat Industries manufactures a wide range of small arms for the military market, including the FAMAS 5.56mm assault rifle, Apilas anti-tank weapon, FR-F2 sniper rifles, and a general-purpose machine gun. The company is also one of Europe's most important ammunition producers, manufacturing a range of small arms ammunition and grenades. Between 400,000 and 500,000 of the FAMAS F1 rifle have been produced, but it has not sold well in comparison with other assault rifles such as the AK series, G3, or FN-FAL. It is currently in service in six countries, including France (Small Arms Survey, 2001, p. 20).

Despite improving financial figures, the company is still losing money and relies heavily on government bail-outs to keep production lines moving. The company is still recovering from huge financial losses incurred in the mid-1990s as a result of currency speculations. Since 1991, the French government has poured an estimated FRF 22 billion (USD 3.1 billion) into Giat Industries (*Jane's Defence Weekly*, 9 May 2001).

Since 1991 the French government has poured an estimated USD 3.1 billion into Giat Industries.

In 2000, the company had a turnover of FRF 3.6 billion (USD 517 million), down from FRF 5.7 billion (USD 819 million) in 1999 (*Jane's Defence Weekly*, 9 May 2001), although its order book in 2000 was worth FRF 18.2 billion (USD 2.6 billion). At least 70 per cent of total sales were for the domestic market, with 30 per cent for exports. Only 20 per cent of total sales were accounted for by sales of weapons and ammunition systems, including small arms and light weapons. It is likely that sales of small arms account for less than five per cent (roughly USD 25 million) of the company's total sales. In 2000 Giat employed 7,500 people down from over 10,000 in 1998 (*Jane's Defence Weekly*, 10 May 2000). Giat Industries was ranked as the 36th largest arms producing company in the OECD and developing countries by SIPRI in 1999 (SIPRI, 2001, p. 308).

Despite its financial difficulties, the French government refuses to let Giat Industries fail, and it will therefore continue to have a strong presence in the global defence market. The downsizing of the French Army is reducing domestic requirements, forcing the company to continue to search for export markets (Reed, 2001, p. 306). There is also speculation that Giat Industries may be partly or wholly privatized in the near future.

Germany[35]

Germany is one of the world's major producers of conventional arms, ranking as the sixth largest supplier of major conventional arms to developing countries in the period 1993–2000 with sales of USD 5.8 billion, an annual average of USD 725 million (Grimmett, 2001). The country has a long history of small arms manufacturing, and is one

Germany is one of Europe's major producers of small arms for both the military and the civilian markets.

of Europe's major producers of small arms for both the military and the civilian markets. Currently more than 30 companies in Germany are involved in some aspect of small arms production (Lock, 2001; Omega Foundation, 2001b; 2001c). The most important domestic manufacturers of small arms and ammunition for military and police markets include Heckler & Koch (owned by BAE Systems of the UK), JP Sauer & Sohn, Carl Walther (owned by Umarex Sportwaffen), Rheinmetall DeTec, Diehl, and Dynamit Nobel.

Rheinmetall DeTec is the largest arms producer in Germany and was ranked by SIPRI as the 22nd largest arms producing company in the OECD and developing countries in 1999 (SIPRI, 2001, p. 308). In recent years the company has acquired a number of other small arms manufacturers including Mauser Werke, Buck Werke, Eurometall (the Netherlands), and Oerlikon-Contraves (Switzerland). In 2000 the company had total sales of EUR 1.6 billion (USD 1.5 billion) and employed 9,000 people. In the same year Mauser-Werke, which produces a range of sniper rifles, had sales of EUR 44 million (USD 42 million) and employed 235 people (Graham & Whiteside Ltd, 2001). Rheinmetall DeTec has very little interest in the small arms sector, and recently sold the trademark of Mauser pistols to JP Sauer & Sohn (Lock, 2001).

Germany's most important domestic manufacturers of pistols for the military and police markets are **JP Sauer & Sohn**, Carl Walther, and Heckler & Koch. JP Sauer was founded in the eighteenth century and started production of arms in 1871. In late 2000, the company acquired the small arms business of SIG Arms of Switzerland (see below). In 2000 the company had total sales of DEM 50 million (USD 24 million), and employed 320 people. The company's US subsidiary SIG Arms Inc had turnover of DEM 45 million (USD 22 million) in the same year, and employed 70 people. The company produces about 80,000 pistols annually, almost half for export to the US market.

Carl Walther was purchased in 1993 by two non-defence companies, and has since been streamlined and merged into Umarex Sportwaffen. The present management of Umarex has announced its intention to exit government (i.e. military) markets and concentrate on civilian markets (Lock, 2001). In 2000 Umarex had total sales of DEM 66 million (USD 32 million) and employed 190 people. Domestic production of rifles, sub-machine guns, and other crew-served small arms and light weapons (e.g. heavy machine guns) is dominated by Heckler & Koch. Mauser Werke, which is owned by Rheinmetall DeTec, produces a 7.62mm sniper rifle. Dynamit Nobel is the most important local producer of ammunition for the military market.

Heckler & Koch, which was established in 1948 and acquired by BAE Systems (UK) in 1991, dominates the production of small arms in Germany. The company produces a wide range of products for the military, police, hunting and sporting markets. In addition to production facilities in Germany, the UK, and the US, the company's products have been produced under licence in nearly 20 countries. In 2000 Heckler & Koch had total sales of DEM 159 million (USD 77 million), and employed more than 500 people. The company, together with Alliant TechSystems and Brashear LP, is involved in the development of the Objective Individual Combat Weapon (OICW) for the US armed forces.

The company **Fritz Werner**, which until 1990 was state-owned and is now a subsidiary of Ferrostaal AG (part of the MAN group), has played a key role in establishing domestic production facilities for small arms and ammunition in a wide range of countries, usually in co-operation with German small arms producers including Heckler & Koch, Dynamit Nobel, and Rheinmetall.

A large number of German companies are involved in the manufacture of high precision, and expensive, weapons for the hunting and sporting market, as well as personal weapons, mainly for the US market. Some companies also specialize in producing high-quality barrels for top of the range customized sporting and hunting weapons. In 1999

these firms supplying the hunting and sporting market had a combined turnover of DEM 325 million (USD 157 million) (Lock, 2001). The main companies supplying the civilian market include JP Sauer & Sohn, JG Anschütz, Blaser Jagdwaffen, SK Jagd-und Sportmunitions (owned by Nammo Lapua Oy of Finland), Intertex, Suhler Jagd-und Sportwaffen (51 per cent owned by Steyr-Mannlicher of Austria), and Umarex Sportwaffen (including Carl Walther). Intertex produces a range of pistols for the high end of the civilian market.

Israel[37]

Israel is one of the world's most important arms producers and exporters. The country was ranked as the seventh largest supplier of conventional weapons to developing countries in the period 1993–2000 with sales of USD 2.6 billion, an average of USD 325 million a year (Grimmett, 2001). At least ten companies are involved in some aspect of small arms production (Omega Foundation, 2001b). The state-owned company Israel Military Industries (IMI) is the most important domestic producer of small arms and ammunition. In addition to IMI, smaller private-sector firms, such as KSN Industries (pistols), Soltam (mortars), and the Kalia Israel Cartridge Company (ammunition) also manufacture small arms for domestic use and export (Gander and Cutshaw, 2001b).

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Israeli children with an Uzi sub-machine gun.

In the past decade the Israeli government has injected USD 1.23 billion into IMI.

Israel Military Industries (IMI), known as Taas in Hebrew, was created during the 1920s, when members of the Jewish self-defence forces built a number of factories for manufacturing explosives, small arms, and ammunition. On 15 May 1948, when Israel declared its independence, IMI was officially founded under the auspices and direction of the Ministry of Defence.

IMI produces a range of small arms and light weapons including the Uzi sub-machine gun, the Galil rifle, the Negev-Light Machine Gun (LMG), the Jericho Semi-Automatic Pistol, the Tavor Assault Rifle, the SR-99 Semi Automatic Sniper Rifle, as well as ammunition for these weapons. In 1998, weapons sales of the Negev machine gun, Jericho pistol, Desert Eagle pistol, Uzi SMG, and the Galil rifle accounted for 88 per cent of IMI's total sales of small arms, while the provision of spare parts accounted for 12 per cent of total sales.[38]

Revenues from sales of the Uzi, both to the Israeli government and abroad, have played an important role in the growth of IMI. Over the years, the profits from these sales have provided the basis for the expansion of IMI. As IMI and other defence companies expanded, they also became important factors in national industrial and economic development (Steinberg, 1983). Over 60 per cent of IMI products are exported to foreign armed forces, defence manufacturers, and law-enforcement and security agencies.[39]

In 1990, IMI employed 11,000 workers and was one of Israel's largest firms (*Jane's Defence Weekly*, 25 October 2000). In 1990, IMI became a government-owned corporation and now consists of nine individual profit centres and 12 plants. However, following years of consecutive growth, a severe downturn in sales took place during the 1990s.

The loss of sales was caused by a drop in foreign orders following the end of the Cold War and the expiry of contracts with foreign customers. In addition, the growing shift of the IDF towards American suppliers (linked to the terms of US military aid) reduced IMI's sales to the IDF (Sadeh, 2001).

Currently, IMI employs approximately 4,100 workers (*Jane's Defence Weekly*, 25 October 2000). After significant losses, the firm made profits in the late 1990s, but in 1999 total sales were USD 485 million, down from over USD 500 million the previous year. In 2000, IMI's total sales were USD 417 million. However, the company posted a USD 49 million loss, bringing its losses in the last two years to approximately USD 107 million (Steinberg *et al.*, 2001). The company stated that 2000 was a difficult year due to problems in its small arms factories. However, as part of IMI's reorganization plan, the manufacture of small arms was moved from IMI's Ramat Hasharon facility to the plant in Kiryat Shmona (Steinberg *et al.*, 2001).

As IMI expanded, small arms production played a relatively smaller role and was shifted to the periphery as part of a broad government policy to promote population movement away from the concentration in Israel's coastal plain near Tel Aviv (Steinberg, 1983, p. 292). The Small Arms Factory group (SAF) includes the Keshet factory in Kiryat Shmona. Sales from the SAF in 1999 amounted to about six per cent of IMI's total sales. The SAF currently employs 70 people, down from over 300 in 1999. The division caused IMI a USD 28 million loss in 2000, but was expected to almost break even in 2001 (*Business Arena*, 13 November 2001). About 80 per cent of the SAF's products are exported, while the remaining 20 per cent are slated for domestic use.[40] SAF's profits are primarily generated by sales of pistols, sub-machine guns, machine guns, rifles, and spare parts.

IMI was ranked as the 59th largest arms producing company in the OECD and developing countries by SIPRI in 1999 (SIPRI, 2001, p. 309). In the past decade the Israeli government has injected USD 1.23 billion into IMI (*Business Arena*, 24 October 2001). In response to the crisis and the increase in government subsidies, successive governments sought to restructure the defence industrial sector, including IMI, but this has been resisted by the trade unions (Sadeh, 2001). Recently, there has also been speculation about merging IMI with the Israel Armament Development Authority (Rafael). As a result, the future of IMI remains in doubt.

Italy

Italy was ranked as the eighth largest supplier of conventional arms to developing countries in the period 1993–2000, with sales of USD 2.5 billion, an average of USD 312 million a year (Grimmett, 2001). Nearly 40 companies in Italy are involved in some aspect of small arms production (Omega Foundation, 2001b). Beretta SpA is the country's most important domestic small arms producer, and produces a wide range of products for both military and civilian markets. Other important domestic producers of small arms for the military market include Bernardelli (rifles), Franchi (rifles), Tanfoglio (pistols) and Benelli (pistols). Both Franchi and Benelli are owned by Beretta (Cattaneo, 2001).

Beretta SpA has been selling small arms since 1526, and by the 1950s it was regarded as one of Italy's most important weapons factories.[36] The company's main factory in Brescia produces around 1,500 firearms a day, and an estimated 75 per cent of the company's total production is for the civilian market (hunting and sporting). Beretta also provides firearms to the armed forces of several countries. The company's products have been produced under licence in Indonesia (sub-machine guns), Brazil (sub-machine guns), Morocco (rifles), Egypt (pistols), US (pistols), and Austria (machine guns) (Gander and Cutshaw, 2001b).

The largest foreign market for the company's products is the US, where the company has a subsidiary, Beretta USA Corporation. In 1985 Beretta USA was awarded its first contract to supply 92F pistols (renamed M9) to the US Army, Air Force, Navy, Marines Corps, and Coast Guard. Some law-enforcement agencies have adopted the 92F as well, particularly the US Border Patrol and Immigration and Naturalization Service agents. Throughout the 1990s Beretta was awarded various contracts to supply pistols to the US armed forces. In late 2001, following the terrorist attacks on the US, the Pentagon asked Beretta to speed up delivery of its 20,000 Benelli M4 shotguns, for use by the Marines and Special Forces (*Corriere della Sera*, 4 November 2001).

Beretta owns or controls a number of other small arms companies in Italy and other countries.

Today the company is wholly owned by the Beretta family. In 1997 the family re-acquired the 36 per cent equity that had been owned by the French company, Giat Industries, for the previous 20 years. During financial year 2000, Beretta had total sales of EUR 130.3 million (USD 123 million), a 21 per cent increase over 1999. Of total sales, domestic sales accounted for 38 per cent, and exports 62 per cent. All aspects of the company's business have witnessed increases in recent years. The increase in exports in the last few years has been helped by a more favourable lira-USD exchange rate. This has lead to increased deliveries to Beretta USA and to the opening of a new distribution network through Beretta Australia. In 2000 the company sold 200,000 weapons, up from about 170,000 in 1999; of these, more than 50 per cent were sport shooting firearms, about 18,000 were AR70/90 assault rifles for the Italian Army, and the remaining items were pistols for police and civilian customers, whose sales increased by 13 per cent. The company employed 908 people in 2000, slightly down from 926 in 1999.

The Beretta Group, which includes Beretta SpA, owns or controls a number of other small arms companies in Italy and other countries. The acquisition of Sako Ltd (Finland) in 1999 allowed the group access to the Northern European/Scandinavian market. Also, the share of Sako exports to the US (about 50 per cent of its production) allowed Beretta to further consolidate its presence in the North American market. Beretta has a worldwide network of distributors, including 21 in Italy and 71 in more than 60 other countries (Cattaneo, 2001).

During fiscal year 2000 the Beretta Group's total sales were USD 291.7 million, up from USD 233 million in 1999. Since 1995, with the exception of 1996, both sales and net profit of the company have increased. Exports have increased as a share of total sales, from 64 per cent in 1995 to 80 per cent in 1999. Foreign sales currently account for about 80 per cent of total sales, and of these more than half go to the North American market.

Spain[41]

During 1996–2000 Spain was the 11th biggest exporter of arms in the world and the sixth biggest exporter in Europe, according to SIPRI (2001, p. 357). More than 20 local companies are involved in some aspect of small arms production (Omega Foundation, 2001b). During the 1990s its accumulated debts pushed the small arms industry in Spain into a serious crisis. The country's major small arms producer, the state-owned company Santa Barbara, was finally bought by the US-based company General Dynamics in March 2001, after a protracted takeover battle with Germany's Rheinmetall and Krauss-Maffei. Of the three largest private companies (Astra, Llama Gabilondo, and Star) only Llama Gabilondo has survived and is currently being transformed to a shareholder company, Fabrinor. The company had total sales of ESP 750 million (USD 4.2 million) in 2000 and manufactures about 20,000 small arms a year, mainly pistols. More than 80 per cent of the company's production is

destined for the US market; the remaining 15 per cent is distributed to various countries, including a small portion of sales to the Spanish army (*El Pais*, 25 February 2001). Both Astra and Star were previously the major domestic producers of pistols for the military market.

Santa Barbara was established in 1960 when factories of the Spanish Army grouped together to develop, manufacture, and market defence material. Formally known as Empresa Nacional Santa Barbara de Industrias Militares, the state-owned company was bought by General Dynamics on 30 March 2001 for USD 4.4 million, after the company suffered huge financial losses throughout the last decade. The company is currently being privatized as a result of its acquisition by General Dynamics.

In 2000 the Spanish government admitted that Santa Barbara was 'technically bankrupt', with accumulated losses of more than USD 800 million.

Santa Barbara is the main supplier of small arms and ammunition for the Spanish armed forces. Its small arms products include the Cetme assault rifle, the C-75 Special Forces rifle, and the Ameli 5.56mm light machine gun (Gander and Cutshaw, 2001b, p. 855). In 1998 Heckler & Koch reached agreement with the Spanish armed forces to supply 115,000 new G-36 assault rifles. The initial 15,000 rifles were supplied from the HK production facilities in Germany, but the remaining 100,000 were manufactured in Spain by Santa Barbara under a licensed production agreement. Santa Barbara built a new production facility, known as FACOR, at La Coruna in north-west Spain, to produce the rifles (*Jane's Defence Weekly*, 22 July 1998).

Santa Barbara has been operating at a loss for several years. In 2000 the Spanish government acknowledged that the firm was 'technically bankrupt' and it is estimated that in the last decade the company accumulated losses of more than USD 800 million. In 2000, Santa Barbara's losses were reported at USD 22 million (*Jane's Defence Weekly*, 18 October 2000). In the same year the company's defence turnover was ESP 14 billion (USD 80 million), and the company employed 2,020 people (1,731 in 1999). Santa Barbara exports 7.1 per cent of its total production; the rest of its production is for domestic consumption. The company's products are in use in more than 47 countries worldwide.[42]

While Santa Barbara has suffered from considerable financial difficulty throughout the decade, analysts have said that the company will benefit from its recent acquisition by General Dynamics.[43] However, there have been concerns within the European Union about the takeover because it gives the US a major foothold in the European defence market. General Dynamics is planning to invest approximately EUR 60 million (USD 57 million) in capital improvements over the next five years to make Santa Barbara competitive in the world market and maintain a strong military and industrial capability for Spain (*Defence Systems Daily*, 26 July 2001). With the privatization of Santa Barbara, the company can be expected to expand its global market as well as remain the principal supplier for the Spanish armed forces.

Switzerland[44]

Until recently, Switzerland had a well-developed domestic arms industry, including a number of companies producing small arms. However, two of its most important producers of small arms, SIGARMS and Oerlikon-Contraves, are now foreign-owned (by German companies), reflecting the absence of a national industrial policy to maintain domestic defence capacities under all circumstances. But the companies are continuing the tradition of German-Swiss co-operation in small arms production, while at the same time reflecting the European-wide consolidation of defence production (Lock, 2001).

The major domestic producer of small arms for the military market is the **SIGARMS Group** (formerly SIG Arms), which was purchased from the Schweizerische Industrie Gesellschaft (Swiss Industrial Company) by German investors in late 2000 (*Agence France Press*, 4 October 2000). The 'new' SIGARMS Group, which is currently in a transition

process, has subsidiary companies and production facilities in Switzerland (SAN Swiss Arms AG, Hämmerli AG), Germany (JP Sauer & Sohn GmbH and Blaser Jagdwaffen GmbH), and the US (SIG Arms Inc). The company's production facilities in Switzerland will probably be closed down and production activities rationalized in Germany (at JP Sauer & Sohn in Eckernförde) and the US (at SIG Arms Inc in Exeter, New Hampshire). The new company has about 400 employees worldwide, and produces a wide range of small arms for the military market, including pistols and rifles. It owns the trademarks for Mauser, Blaser, Hämmerli, and JP Sauer & Sohn, and will continue to use the SIG name on the P210 pistol. The SIG name will also be used in conjunction with Sauer on all SIG-Sauer handguns (e.g. P220 pistol).[45]

The SIG-Sauer 9mm P226 Pistol, of which more than 400,000 have been produced, is used by many armed forces, including the US Coast Guard, UK armed forces, and the US Federal Bureau of Investigation. The SIG 540 series rifle, which is in service in more than 20 countries (including ten in Africa), has been produced under licence in Chile, France, and Portugal (Gander and Cutshaw, 2001b). The ammunition sections of SIG Arms are now controlled by the German company Rheinmetall DeTec, reflecting the European-wide consolidation of small arms ammunition production (Lock, 2001). SIGARMS also produces a wide range of weapons for the civilian market, mainly through its subsidiaries Hämmerli AG and Blaser Jagdwaffen. The company Brügger and Thomet is mainly involved in the production of accessories (e.g. sights) for small arms for the military and police markets. It also acts as an agent for a number of foreign producers (e.g. Heckler & Koch). In 2000 it had total sales of CHF 15 million (USD 9.3 million). Other Swiss producers of small arms, mainly for the hunting and sporting market, include Grünig & Elmiger and Martin Tuma Engineering (Lock, 2001).

The state-owned **RUAG Suisse Group**, which was founded in 1863, includes both the Swiss Ammunition Enterprise (SM) and the Swiss Ordnance Enterprise (SW). It was ranked as the 50th largest arms producing company in the OECD and developing countries by SIPRI in 1999 (SIPRI, 2001, p. 309). According to company information, in 2000 RUAG had total sales of CHF 941 million (USD 584 million) and 3,843 employees. SM, which has plants in Altdorf and Thun, is the major domestic producer of small arms ammunition for both military and civilian markets, and in 2000 had total sales of CHF 270 million (USD 168 million) and 1,092 employees (Graham & Whiteside Ltd, 2001).

The UK is no longer considered a major small arms producer.

United Kingdom[46]

The UK is one of Europe's largest defence producers, and the country was ranked as the world's fourth largest supplier of conventional weapons to developing countries during the period 1993–2000 with sales of USD 8.9 billion: an average of USD 1.1 billion a year (Grimmett, 2001). Although many companies are involved in various aspects of small arms production, the UK is not in the same league as other European producers such as Belgium, Germany, or Italy in terms of the value and volume of its domestic small arms production (Omega Foundation, 2001a; 2001b)

For centuries, small arms production in the UK was concentrated at the small arms arsenal at Enfield. The arsenal was privatized in the late 1980s and transferred to a new green-field site in Nottingham in the early 1990s (Lock, 2001). The UK no longer produces pistols for the military market, and its armed forces are equipped with pistols manufactured in Belgium (FN Herstal) and Switzerland/Germany (SIG Arms).

The major domestic producer of small arms and ammunition for the military market is **Royal Ordnance** (RO), which is the small arms division of **BAE Systems Plc**. RO also owns Sterling Armaments Company (since 1988) and Heckler & Koch GmbH (since 1991). The acquisition of Heckler & Koch in 1991 gave RO access to 74 per cent of the European small arms market and a significant share of the world market (Forecast International, 2002).

BAE Systems is one of the world's largest defence firms, and was ranked as the third largest arms producing company in the OECD and developing countries by SIPRI in 1999 (SIPRI, 2001, p. 307). In 2000 the company's total sales were USD 14.3 billion, and it employed 84,900 people worldwide. Royal Ordnance, which is part of BAE Systems' RO Defence division, produces small arms and ammunition. It had total sales of GBP 153 million (USD 232 million) in 2000, and employed 1,974 people. The production of small arms is concentrated in Heckler & Koch, which includes facilities in the UK (Nottingham), Germany (Oberndorf), and the US.[47] Heckler & Koch GmbH (Germany), which is part of RO, had total sales of DEM 159 million (USD 77 million) in 2000, and employed 570 people. The production facility in Nottingham will close during 2002 because a contract to modify 200,000 faulty SA-80 rifles was awarded to the Heckler & Koch plant in Germany in 2000 (*Daily Mail*, 5 October 2000).

Other important domestic producers include Accuracy International (sniper rifles), Armalon (sniper rifles), BMS Trading (rifles), Conjay Arms (small arms ammunition), Manroy Engineering (machine guns), FR Ordnance (submachine gun), and Parker Hale (sniper rifles) (Omega Foundation, 2001a; 2001b; Forecast International, 2002).[48] Most of these firms have fewer than 100 employees and concentrate on a few niche products. Accuracy International, which manufactures precision rifles, opened a US manufacturing plant in 1997 to assist with sales to the US military. Manroy Engineering manufactures the M2HB machine gun, under licence, from FN Herstal. Since the closing of the Enfield small arms factory, the company also has the manufacturing rights for the L7 General Purpose Machine Gun, which is a modified version of the MAG (FN Herstal).

Licensed production

Licensed production is an easy way to evade strict export controls.

Licensed production, an important feature of the global small arms industry, has been operating since the late nineteenth century.[49] Licensed production can have a number of political, strategic, and economic benefits for the licensor. Allowing weapons to be produced under licence increases political influence or strengthens political and military co-operation, and can help to standardize military equipment among allies. In economic terms, licensed production may allow companies to achieve returns on their R&D costs and increase their global market share. This is particularly important for countries that are competing with established defence producers. Licensed production can also be an easy way to evade strict export legislation and controls or to facilitate exports to prohibited destinations. Many developing countries, for a range of strategic, political, and economic reasons, want to be self-sufficient in the production of small arms and associated ammunition. Licensed production agreements are a cost-effective and less risky way for licensee countries to obtain tried and tested foreign defence technology. Thus, in most developing countries, legal production of small arms almost inevitably includes licensed production of foreign weapons.

The globalization of small arms production, and the increase in the number of countries with the capacity to produce small arms, has been primarily facilitated by licensed production agreements, and a number of studies have documented the increase in licensed production of weapons in developing countries.[50] A 1995 report estimated that licensed production was taking place in at least 21 developing countries, 16 of which were also exporting the small arms they manufactured (Klare, 1995). Since the 1960s at least 14 countries—Austria, Belgium, the Czech Republic, France, Germany, Israel, Italy, Portugal, Singapore, South Africa, Sweden, Switzerland, the United Kingdom, and the US—have established small arms licensed production agreements with some 46 countries (Abel, 2000, p. 88).

This section defines licensed production, and examines some of the conceptual aspects of licensed production and joint ventures. It provides case studies of two of the world's most significant licensors of small arms—FN Herstal (Belgium) and Heckler & Koch (Germany/UK)—and focuses on some of the countries in which their products are produced under licence. Neither Belgium nor Germany in the early Cold War period was a major defence producer, and both used licensed production to compete with some of the major producers such as France, the UK, the US, and the former Soviet Union.

FN Herstal small arms products.

These two case studies are used to highlight some of the key features of licensed production of small arms. However, details of licensed production agreements are almost impossible to obtain because of commercial confidentiality, thus making it difficult to compare the two cases presented in this chapter. What is clear is that licensed production of small arms normally involves (1) a licensed production agreement, which includes provisions for some kind of royalty payment; (2) a technology transfer transaction (including plant and infrastructure and some technical assistance); and (3) some provision for ongoing technical assistance. Interestingly, licensed production has not saved either FN Herstal or Heckler & Koch from the financial difficulties that they are currently experiencing.

FN Herstal and Heckler & Koch are two of the world's most important licensors of small arms.

It is worth noting that the German company Fritz Werner, previously state-owned and since 1990 a subsidiary of Ferrostaal AG (part of the MAN Group), has played a key role in helping establish arms production facilities in a number of developing countries, including Ethiopia, India, Indonesia, Iran, Iraq, Malaysia, Myanmar, Nigeria, Saudi Arabia, Sudan, and Thailand. A number of these facilities have been established for the licensed manufacture of FN Herstal or Heckler & Koch weapons (Lock, 2001; Omega Foundation, 2001c). In most cases, the production facilities (and technical know-how) were set up as part of a turnkey project, and were regarded by the recipient countries as more important than the licences themselves.

Definitions: Licensed production

When defence companies want to enter a foreign market, they have several methods at their disposal, such as:

- direct export;
- licence agreements;
- joint ventures;
- direct foreign investment (establishing a wholly owned domestic subsidiary); and
- buying into an existing foreign corporation.

Several basic concepts are essential to understanding licence agreements. The World Intellectual Property Organization (WIPO) defines a **licence** as a right conferred by a patent, or by a protected utility model, industrial design, new plant variety, or trademark ('industrial property'); a licence is given by the owner of that right ('licensor') to another person ('licensee'), to perform certain acts which are covered by that right in exchange for a payment ('royalty') (WIPO, 1977).

Licensed production can be defined thus: 'A company in country A contracts with a company in country B to undertake the legal production of its products. In terms of a licensed production agreement, the licensing company in country A usually provides technical data or copies of the products to be produced in country B, and sometimes provides machine tools or assists in the setting up of production facilities' (Small Arms Survey, 2001, p. 9). The latter may include technical consultation and training or other relevant know-how as part of the licence agreement, depending on the technological sophistication of the acquirer. But normally the licensing of relevant know-how is part of a separate know-how agreement. Licensed production agreements are also commonly referred to as licensed manufacturing agreements, co-production agreements, technology-transfer agreements, and are sometimes classified within the general term of 'offsets'.[51]

Sometimes a joint venture is more desirable for the licensor and licensee. A joint venture involves the co-operation of two or more otherwise independent companies, which are linked, through the venture, in the pursuit of a common commercial, financial, or technical activity (Muchlinski, 1995). In more practical terms the activity may entail the production of a product, the supply of services, or R&D (Blakeney, 1989).

According to Muchlinski (1995) the exact form of the joint venture depends on the wishes of the parties to the joint venture and on national law, and may include either one of the following types:

- a contractual joint venture: A contract defines the respective obligations of the parties. Usually established for a limited duration. Example: the international consortium;
- an equity joint venture: the parties establish a legal entity, which is responsible for the daily management of the joint enterprise. Usually established for an indefinite duration. Examples: the partnership or limited liability company.

Licensed production can include co-production, technology transfer agreements, and offsets.

Hart and Bereskin (1996, p. 2) identify three types of licences:

- non-exclusive licence: the licensor retains the right to use the licensed property and the right to grant additional licences to third parties;
- sole licence: the licensor agrees not to grant licences to third parties, but the licensor retains the right to use the licensed property;
- exclusive licence: the licensor cannot grant licences to third parties, nor can he use the licensed property.

When a licence is granted the **scope of the licence** must be defined. The licensor can place restrictions on the licensee's right to use the licensed property.

Subject matter: the owner of intellectual property has several exclusionary rights, including 'the right to make, have made, use and sell the patented invention' (Hart and Bereskin, 1996, p. 3). The licensor may grant the licensee all or only some of these rights. The licensor may, for instance, place restrictions on production quantity, but may also concern itself with production quality. The scope of the rights granted determines the size of the royalty.

Territory: the licensor may wish to grant an exclusive licence to different foreign licensees in each country. A problem arises when the licensor wants to limit the right to export. Can the licence agreement limit the licensees' right to export? According to Muchlinski (1995), reasonable territorial restrictions have been accepted under the competition laws of developed countries. Developing countries, on the other hand, are less happy with export restrictions, arguing that such restrictions simply inhibit their ability to earn foreign exchange through exports.

Improvements: since improvements can be developed by the licensor and the licensee, licence agreements: (a) include terms in the agreement providing for prompt disclosure of such improvements to the other party; (b) provide for the ownership of any rights in the improvement of technology; (c) provide obligations with respect to seeking patent protection; and (d) provide obligations with respect to granting further licences or granting back licences (Hart and Bereskin, 1996, p. 4). A big obstacle is defining the scope of new developments and the inclusion of grant-back provisions. These provisions 'oblige a licensee to transfer to the licensor any improvements in the technology represented by the licensed industrial property rights' (Blakeney, 1989, p. 35). Such provisions are met with hostility when these obligations are not reciprocal. Know-how is in most countries excluded from these grant-back obligations (Blakeney, 1989, p. 36).

In most cases the licensee pays the licensor royalties in exchange for the use of the intellectual property. The size of the royalty varies with the scope of the rights granted.

Payment of royalties can include one or more of the following:

- lump sum payment (used primarily for the transfer of know-how);
- annual fixed sum payments;
- fixed sum per unit produced;
- a percentage of the selling price of the product.

The licensee is obliged to pay these royalties for the duration of the licence agreement. However, a problem can occur when the intellectual property rights expire. Sometimes the termination date of the licence agreement extends well beyond the expiry date of the intellectual property rights. Most countries accept that when the intellectual property rights expire all royalty payments can be terminated (Blakeney, 1989).

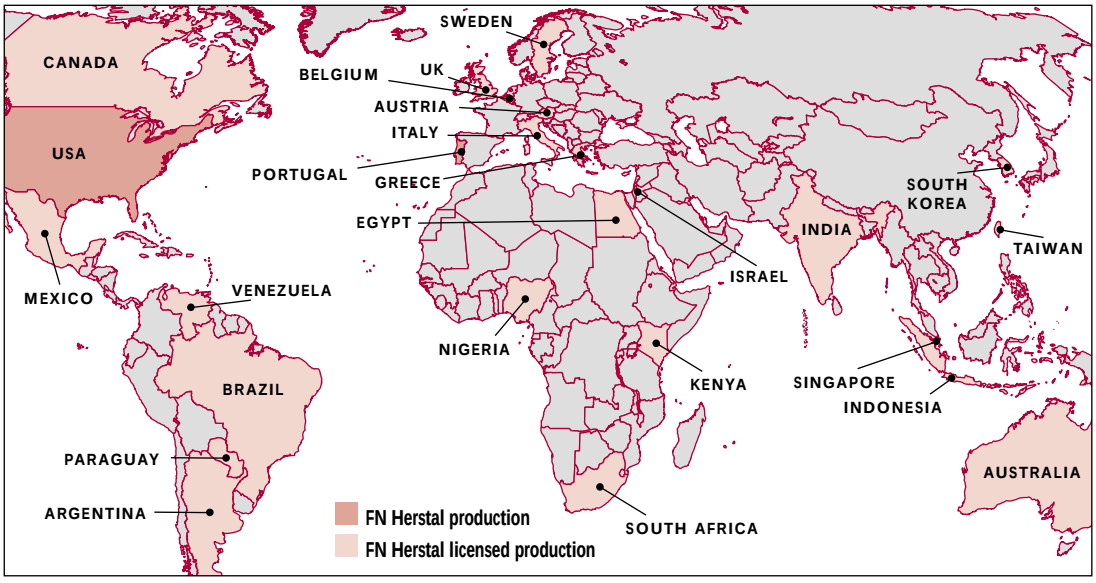
Case study 1: FN Herstal[52] and licensed production in Sub-Saharan Africa

FN Herstal is one of the world's oldest and most important producers of small arms and the most important domestic producer of small arms and ammunition in Belgium. FN Herstal's various small arms products, including the FN-FAL assault rifle and the FN MAG machine gun, are in service in more than 90 countries worldwide (Small Arms Survey, 2001, p. 20). It is estimated that five million to seven million FN-FAL rifles and 150,000–200,000 FN MAG have been produced worldwide (Small Arms Survey, 2001, p. 20).

In addition to the manufacture of small arms (both military-style and civilian) in its own production facilities in Belgium, Portugal, and the US, FN Herstal's small arms products and/or ammunition have been manufactured under licence in more than 20 countries worldwide (see Table 1.11). In addition to licensing its products, the company, through its engineering division, has often provided technical assistance to licensees with respect to the production infrastructure needed to manufacture small arms and ammunition.[53]

The following case studies of Kenya, Nigeria, and South Africa provide examples of how FN Herstal, through licensed production agreements and technology transfer transactions, has played a key role in helping various countries in sub-Saharan Africa to establish their own domestic small arms production capabilities. In Kenya and Nigeria, the company provided technical assistance through a technology transfer to help establish the necessary infrastructure to produce weapons, in addition to licensing the manufacture of its products. The licensed production of FN Herstal's products also provided the foundation for the development of South Africa's domestic small arms industry, including the indigenous design and export of various types of small arms products.

MAP 1.4 FN Herstal licensed production



1. Kenya: Kenya Ordnance Factories Corporation, Eldoret[54]

The decision to establish a domestic arms production capability in Kenya (code-named Ngano Project) was mooted in the mid-1970s, when the then President Amin of Uganda made a number of territorial claims against Kenya. The Ngano Project remained on paper for many years, until in 1989 the government allocated KSH 300 million (approximately USD 6 million) to the construction of an ammunition factory at Eldoret.[55] Construction continued sporadically during the next few years, and was finally finished in mid-1996. The first batch of ammunition was produced in November 1996.

KOFC has a production capacity of 20 million rounds of ammunition per year.

The factory was initially a project of the Department of Defence, but was later converted into a State Corporation, the Kenya Ordnance Factories Corporation (KOFC). The company, which is wholly owned by the Kenyan government, has a board of directors including top military officials, and is subject to the provisions of the Corporations Act. President Daniel arap Moi and other senior politicians reportedly have interests in the company (*Jane's Intelligence Review*, 1 February 1998).

FN Herstal played a key role in the establishment of KOFC. The company was chosen, according to normal tender procedures, to supply the production infrastructure (equipment and machinery) for the factory, but because of cash flow problems was also called upon to construct the buildings, though in a reorganized funding arrangement. The deal between FN Herstal and the Kenya government, which was signed in 1988, was reportedly worth USD 80 million and also made provision for FN Herstal to buy any surplus production (*Jane's Intelligence Review*, 1 November 1996). At least three Belgian companies were involved in the construction of the plant: FN Herstal, M.A.D., and New Baron & Levoque International. The latter two companies worked as subcontractors for FN Herstal and/or the Kenyan Department of Defence, and built most of the infrastructure (Danssaert, 2001).

The factory has two production lines with a capacity of 40,000–60,000 rounds of ammunition a day, depending on the combinations to be manufactured (approximately 20 million a year). The factory makes three calibre types of ammunition in seven varieties:

TABLE 1.11 FN Herstal: Worldwide licensed production

Country	Company/ factory	9mm HP Browning	7.62mm FN FAL	7.62mm FN FALO	5.56mm FNC	7.62mm FN MAG	5.56mm Minimi	5.56mm FAL	Ammo
Argentina	DGFM	X	X			X		X	X
Australia	ADI		X	X			X		
Austria	Steyr-Mannlicher		X						
Brazil	Imbel/Fabrica de Itajuba		X					X	
Canada	Canadian Arsenals		X	X					
	John Inglis	X							
	Diemaco						X		
Egypt	Maadi Company					X ?			
Greece	Hellenic Arms Industry						X		
India	Government Rifle								
	Factory, Ishapore		X			X			
Indonesia	PT PINDAD	X			X				
Israel	IMI		X						
	KSN Industries	X ?							
Italy	Beretta SpA						X		
Kenya	Kenya Ordnance								
	Factory Corporation								X
Korea (South)	Daewoo Precision								
	Industries				X?		X?		
Mexico	Fabrica de Armas		X ?						
Nigeria	DICON	X	X						X
Paraguay	DINDUSMIL								X
Singapore	Singapore								
	Technologies					X			
South Africa	Armscor/Denel		X						
Sweden	FFV Ordnance				X	X			
Taiwan	Combined Service Forces								
	Arsenals					X ?	X?		
UK	RSAF Enfield		X			X			
	RO Birmingham		X			X			
US	FN Manf. Inc					X	X		
	DS Arms		X						
Venezuela	CAVIM		X						X

Note: X? indicates uncertainty regarding licensed production

Source: Danssaert (2001)

FN Herstal's products have been produced under licence in more than 20 countries.

- 9mm ammunition for the FN35 Browning pistol, and the various sub-machine guns (e.g. Sterling, Uzi, or H&K MP5) used by the Kenya armed forces;
- 7.62mm x 51mm ammunition (in ball, blank, and tracer) for the FN-FAL and G3, which are the main rifles used by the Kenya armed forces; and
- 5.56mm ammunition (in ball, black, and tracer) for weapons used by the Kenya police.

The ammunition is stamped with a KOFC mark and a batch number that gives an indication of the year of manufacture. The factory has a quality control laboratory and three support workshops, including one for machining and repairing tools used in the main factory, and one for making wooden packing boxes. There are currently no facilities for the manufacture of small arms.

Current employment at KOFC is 230 people (60 per cent civilian, 40 per cent military), and the company is run by a retired Major-General. The main clients of the company are the Kenya armed forces, Kenya police, and Kenya Wildlife Services. Production far exceeds domestic demand and a recent newspaper article asked where the 20 million bullets which are ostensibly produced every year by KOFC go. It also noted that there are unconfirmed reports that the type of ammunition produced by the company has been supplied to armed groups in the region (*The Nation*, 13 August 2001). However, the most popular weapon in the region is the AK series assault rifle, which uses 7.62mm x 39mm (short) ammunition, which is not produced by KOFC. Thus the identity of the recipients of KOFC's excess production remains unclear.

2. Nigeria: Defence Industries Corporation of Nigeria (DICON)[56]

The Defence Industries Corporation of Nigeria (DICON) was established in 1964 under an act of parliament to produce small arms and small arms ammunition for the Nigerian armed forces. At the time, the Federal Government of Nigeria contracted the German company Fritz Werner GmbH, in a turnkey project, to provide the necessary production infrastructure and to train local staff.[57] On completion of the project, DICON was producing such items as the BM59 (rifle), shotguns for hunting, and M36 hand grenades.

Nigeria acquired licences for the production of small arms from a number of foreign sources.

Over the years, the Nigerian government has acquired technical assistance and licences for the production of small arms and ammunition from a number of foreign sources, including Beretta (Italy) and FN Herstal (Belgium). Nigeria reportedly acquired a licence to produce the FN-FAL assault rifle in 1977, and the rifle was designated NR1 (Nigerian Rifle 1). However, this is disputed by the Director-General of DICON, who claims that the licence to produce the FN-FAL assault rifle, the FN 9mm pistol, and 7.62mm ammunition was acquired in 1983 (Ebo, 2001). In addition, FN Herstal provided the technology and infrastructure required for the manufacture of these products, having replaced Fritz Werner as DICON's technical partner in the early 1980s. Despite this lack of clarity, it is known that between 1982 and 1984 FN technicians were present in the Kaduna factory providing technical assistance for the upgrade of existing equipment. Since 1970 the Ordnance Factory at Kaduna has been reportedly manufacturing 7.62mm NATO and 9mm NATO cartridges (Ezell, 1988). The annual capacity is 12 million rounds, with a possible maximum of 36 million rounds a year (Ebo, 2001).

Currently, DICON's capacity for production of small arms and ammunition is at the same level as during the 1980s. It produces the following products (current 2001 prices):

- NR1 Light Automatic Rifle (NGN175,250, USD 1,586).
- High-powered pistols (NGN85,000, USD 770).
- Single-barrel shotgun (N35,000, USD 317).
- General-purpose machine gun (no current price).

Most of these products, according to DICON, are based on the licences and production infrastructure acquired from FN Herstal in 1983. No new licences or production infrastructure have been acquired since then. DICON also has the capacity to repair and recondition the above weapons. In a bid to utilize its excess production capacities, the company has in recent years diversified into non-military markets, including the production of salt and of metal parts for vehicles and furniture.

During the 1990s, DICON's arms manufacturing was almost dormant due to a lack of purchases by the Nigerian government. Successive governments seem to have been more interested in importing weapons than in manufacturing

them. The late President Sani Abacha spent USD 17 million on imported rifles, despite the fact that DICON has large amounts of rifles in its inventory (BBC Worldwide Monitoring, 18 October 1999). Currently, most of DICON's revenue comes from its investment in 20 per cent of the shares of UNION-DICON Salt, the largest salt-making enterprise in Nigeria.[58] Even this diversification has not been sufficient to keep the company afloat—in June 2000 a financial crisis obliged the company to place its staff on indefinite leave without pay (*Africa News Service*, 3 June 2000). It has been estimated that USD 100 million is needed to revive the moribund company (Forecast International, 2002).

DICON's turnover in 2000 was NGN 17.4 million (USD 157,500), and the company declared no profit. DICON currently employs 651 people and has two main production facilities. The Ordnance Factory is located at Kakuri, Kaduna South, and produces small arms and associated ammunition. The other facility is located at Bauchi and has the capacity to produce armoured personnel carriers, propellants, and explosives (Ebo, 2001).

The Nigerian government is keen to revitalize DICON, and is currently planning to phase out production of 7.62mm ammunition in favour of 5.56mm ammunition (Forecast International, 2002). At the end of 2000, the Nigerian Ministry of Defence announced the inauguration of the Board of Directors of DICON (*Africa News Service*, 21 February 2001). The Ministry proclaimed that '[w]e are committed to the principle of self reliance in weapons production... The Board is mandated to devise by all means necessary, measures that would enhance our capability to produce small weapons for our military and other relevant government agencies. It is hoped that by encouraging the development of DICON, the nation would not only be self reliant but would save the colossal amount of foreign exchange that is devoted to the procurement of arms overseas' (quoted in *Africa News Service*, 21 February 2001).

In early 2001 Denel, the South African arms company, expressed interest in taking over daily management of DICON under a joint venture agreement. Both companies are hoping that, by revitalizing DICON, they would 'jointly gain the major share of any future West African re-equipment programmes' (*Jane's Defence Weekly*, 21 February 2001).

3. South Africa: Armscor/Denel

In the early 1960s, South Africa began to move away from procuring complete weapon systems from abroad and instead moved towards local assembly and licensed production of weapons. The Armaments Development and Production Corporation of South Africa (Armscor) was created in 1968 with the explicit mandate to develop South Africa's domestic defence industry and to supervise the manufacture of armaments. During the first decade of its existence Armscor expanded rapidly through the acquisition of private companies and the creation of new subsidiaries. With the reorganization of the South African arms industry in 1975–76, Armscor also became responsible for the procurement of armaments. The UN mandatory arms embargo of 1977 fuelled the expansion of the South African arms industry even further (Batchelor and Willett, 1998, pp. 30–2).

South Africa's Denel has expressed an interest in a joint venture with DICON.

In the early 1990s the domestic demand for arms declined, after the ending of apartheid and the restructuring and downsizing of the South African Defence Force (SADF). In 1992 a new state-owned commercial company, Denel, was formed, and it took over all of Armscor's manufacturing facilities. Armscor retained responsibility for arms procurement, the sale of surplus arms, and the promotion of the South African defence industry (Batchelor and Willett, 1998).

Armscor's small arms production was concentrated in two subsidiary companies: Lyttleton Engineering Works (LIW) and Musgrave. The production of small arms ammunition took place at Pretoria Metal Pressings (PMP). All three companies became part of Denel in 1992. In 1996, Musgrave was closed down and its assets were transferred

to the Vektor division of LIW (Batchelor and Dunne, 1998). In 1997 Vektor became a separate division of Denel. It manufactures small arms for both the military and the civilian markets. The production of small arms ammunition for both military and civilian markets still takes place at PMP.

The UN mandatory arms embargo of 1977 fuelled the expansion of the South African arms industry.

South Africa has manufactured a number of small arms products under licence from FN Herstal since the early 1960s. These products have provided an important base for the development of South Africa's domestic small arms production capabilities.

South Africa acquired the 7.62mm FN FAL (designated the R1) for the SADF in 1960. Licensed production began in 1963 at LIW and ran until 1978,[59] when it was replaced by the R4/R5 (Ezell, 1988). A lighter version of the R1, the R2, was also acquired for the SADF. According to Etienne Hennop of the Institute for Security Studies (ISS), this rifle never went into production, but it did lead to the development of the R4/R5 rifles.[60] On the other hand, the South African Department of Defence says that the R2 was imported. Stevens and van Rutten (1981) list another model of the FN FAL rifle, the R3, which was produced under licence in South Africa. The 7.62mm FN MAG was acquired for the SADF in 1960 (Ezell, 1988). Given the South African defence industry's abilities to re-engineer and upgrade existing products, it is possible that the FN MAG formed the basis for the Vektor 7.62mm SS77 general-purpose machine gun that is currently in production, and in service with the South African National Defence Force (SANDF) and in Kuwait.[61]

Case Study 2: Heckler & Koch[62] and licensed production in the Middle East

Heckler & Koch GmbH (HK) has been manufacturing small arms since 1948. The company started operations in Oberndorf/Neckar, Germany, as a manufacturer of sewing machine parts and gauges for the machine tool industry. It is now one of the world's largest and most successful producers of small arms, and its weapons are in use in more than 90 countries worldwide (Small Arms Survey, 2001, p. 20). In recent years, HK has launched at least five new weapon systems and is also playing a key role in developing the next generation of military small arms for the US armed forces, the Objective Individual Combat Weapon (OICW). The HK G3 assault rifle, which has been the German army's standard rifle since 1959, is in service in more than 60 countries (Small Arms Survey, 2001, p. 20). At least seven million G3 rifles have been produced worldwide, and in addition to being produced in Germany it has also been produced under licence in at least 15 countries. Most of these licensed production agreements were established during the 1960s and 1970s.[63] However, not all of these agreements are still operational.

HK and Royal Ordnance had a close relationship long before RO purchased HK in 1991. HK and Britain's Secretary of State for Defence signed a licence production agreement in April 1970, with amendments in 1972 and 1977. Under the terms of the agreement, the Royal Small Arms Factory (RSAF) at Enfield manufactured various HK weapons and sold these to Heckler & Koch (UK), which was established in March 1973 and existed mainly as a sales company. The licence transferred to RO when it was established in January 1985. The manufacturing of HK weapons was undertaken at first by RSAF Enfield and later, after the privatization, at the RO Nottingham factory.

By the late 1980s, HK was facing serious financial problems. One key factor of this was the German government's decision not to order the company's new 4.7mm G11 rifle, the so-called caseless cartridge weapon, after paying more than DEM 100 million in development costs. HK had anticipated some DEM 60 million (USD 39 million) from the first production batch for the German Bundeswehr in September 1990, with a total potential value of DEM 2.7 billion (*Jane's Defence Weekly*, 26 January 1991). With financial problems mounting, HK went looking

for a buyer. Despite public announcements by Giat Industries (France) in January 1991 that it had acquired HK, by March 1991 HK had become a wholly owned subsidiary of the UK defence giant British Aerospace (now BAE Systems Plc).

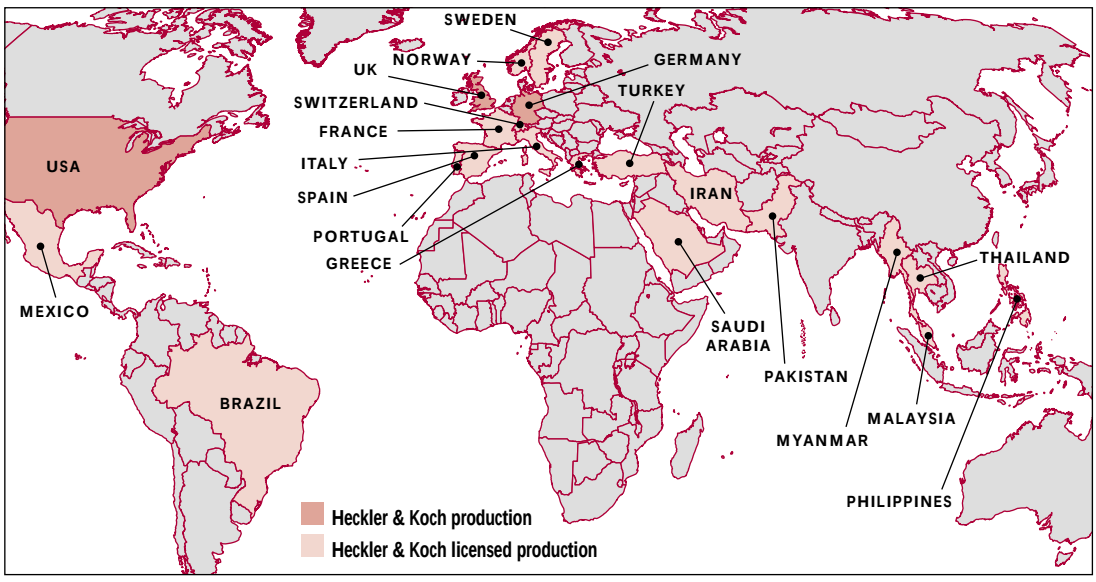
One of BAE's key objectives for the acquisition of HK in March 1991 was, according to the company, 'to regain a small arms R&D base' (*Jane's Defence Weekly*, 25 January 1992). RO had lost its UK small arms production facilities when its Enfield plant (RSAF) was closed in 1987. In addition, HK hoped to benefit from the greater worldwide marketing reach of BAE/RO. The acquisition of HK gave RO access to more than 70 per cent of the European small arms market and a significant share of the world market (*Jane's Defence Weekly*, 25 January 1992).

A technical co-operation agreement, signed in 1972 between RO and HK, had led to HK providing production equipment and barrels for the UK's 5.56mm SA80 rifles, while RO had assembled a wide range of HK weapons in the UK. The RO small arms plant at Nottingham was also manufacturing components for the HK plant at Oberndorf. Most of the production for Heckler & Koch (UK) was exported, as there was little domestic requirement for G3 rifles in the UK.

After 1991, when HK became a wholly owned subsidiary of Royal Ordnance Plc (itself part of the UK defence company, BAE Systems Plc), it became more difficult to obtain disaggregated information on the turnover, production, and export details of the German-based factory. Since 1998, Heckler & Koch Ltd (UK) has become a dormant company, and its operations are reported within the overall annual accounts for Royal Ordnance Plc and BAE Systems Plc. This makes it difficult to obtain disaggregated details of turnover and production.

In 2000 Heckler & Koch GmbH (in Germany) had total sales of DEM 159 (USD 77 million), and employed 570 people (Graham & Whiteside Ltd, 2001). During the same year, Royal Ordnance Plc (including Heckler & Koch GmbH) had total sales of GBP 153 million (USD 232 million), exports of GBP 38 million (USD 57 million), and total employment of 1,974 people (ICC Information Group, 2001).

MAP 1.5 Heckler & Koch licensed production



During 2000, BAE Systems tried unsuccessfully to sell HK to Colt's Manufacturing (US). No other potential buyers have been identified. In late 2000 a GBP 83 million contract to modify 200,000 faulty SA-80 rifles was awarded to HK's Oberndorf factory in Germany, in preference to the RO factory in Nottingham (*Daily Mail*, 5 October 2000). Many commentators agreed that the contract was awarded to the German factory to make HK more attractive to potential buyers. As a result, the RO facility in Nottingham will be closed during 2002.[64]

HK currently has manufacturing facilities in three countries: Oberndorf in Germany, Nottingham in the United Kingdom, and Sterling, Virginia, in the US. In addition, HK has liaison offices in four countries: Switzerland, Saudi Arabia, United Arab Emirates, and Thailand. Since 1957, HK weapons have been manufactured in at least 18 countries under licensed production agreements (see Table 1.12).[65] Currently, licensed production is taking place in at least ten countries including Iran, Greece, Mexico, Pakistan, Portugal, Saudi Arabia, Spain, Switzerland, Thailand, and Turkey. The G3 rifle has been produced under licence in 15 countries and currently ten countries—Iran, Germany, Greece, Mexico, Myanmar, Pakistan, Portugal, Saudi Arabia, Turkey and the UK—are producing the weapon. The MP5 sub-machine gun has been produced in eight countries and currently five—Germany, Greece, Mexico, Turkey, and the UK—are producing the weapon. Despite a statement by BAE Systems that the original licensed production agreement is no longer operational, Iran's Defence Industries Organisation continues to manufacture and export both the G3 rifle and a version of the MP5 (known as the Tondar).

Heckler & Koch weapons are produced in a large number of countries worldwide. This subsection provides case studies of three countries in the Middle East—Turkey, Iran, and Saudi Arabia—which produce HK weapons under licence. Like FN Herstal, HK, through its licensed production agreements and technology transfer transactions, has played a key role in helping various countries in the Middle East to establish their own domestic small arms production capabilities. It is also worth noting that Pakistan Ordnance Factories (POF), which manufactures a range of HK products under licence, has played a key role in helping various countries in the Middle East, including Iran, Oman, Saudi Arabia, and Sudan, to establish and develop their small arms production capabilities (Omega Foundation, 2001c).

1. Turkey: Makina ve Kimya Endustrisi Kurumu (MKEK)

MKEK, part of Turkey's state-owned Machine and Chemicals Industries Board, manufactures a wide range of small arms, ammunition, and other weapons systems under licensed production agreements, including a range of HK small arms. It has produced the G3 assault rifle since 1967 and the MP5 sub-machine gun since the 1980s.

In January 1998, MKEK signed a licensed production agreement with HK worth USD 18 million to produce 200,000 HK33 5.56mm assault rifles over a period of ten years *(Jane's Defence Weekly*, 14 January 1998). Some sources indicate that up to 500,000 HK33s will be produced (Omega Foundation, 2001c). The HK33 is intended to replace the 350,000 G3s which are in service with the Turkish Army, and which were produced under licence from HK. In 1998, while signing the contract for production of the HK33, it was reported that MKEK would continue to produce the G3 rifle for export (*Jane's Defence Weekly*, 14 January 1998).

MKEK has increased its exports in recent years, including many weapons made under licence. In 1995 the company reported that it had sold its products to some 38 countries. Its most popular export products include the HK MP5 machine gun (Omega Foundation, 2001c).

TABLE 1.12 Heckler & Koch: Worldwide licensed production

Products country (company)	G3	MP5	HK33	G36	Pistols	HK21	Notes/other
Brazil	X						
France (Manufacture Nationale d'armes de St Étienne)	X	X					No current production
Greece (Hellenic Arms Industry)	X	X	X		X	X	40mm grenade machine gun
Iran (Defence Industries Organisation)	X	X					
Italy (Luigi Franchi)							40mm grenade launcher
Malaysia (Munora Holdings)	X						
Mexico (Fabrica de Armas)	X	X			X	X	
Myanmar/Burma (State Arsenals)	X						
Norway (Norsk Forsvarsteknologi)	X						No current production
Pakistan (Pakistan Ordnance Factory)	X	X			X		
Philippines	X						
Portugal (INDEP)	X	X				X	
Saudi Arabia (Al Kharj Arsenal)	X						
Sweden (FFV)	X						No current production
Thailand (Army Weapons Production Centre)	X		X				
Turkey (MKEK)	X	X	X				
Spain (Santa Barbara)				X			
Switzerland (Brugger + Thomet)		X					

Source: Omega Foundation (2001c)

In 2000, the German government approved a licence for Fritz Werner to export and install an ammunition plant in Turkey.[66] The plant will produce 5.56mm calibre ammunition for use in the HK33 assault rifles. A Belgian company, New Lachausseé, part of the Georges Forrest International Group, will assist in constructing the ammunition plant.[67] The contract between MKEK and Fritz Werner is worth BEF 1.8 billion (USD 42 million), while the contract between MKEK and New Lachausseé is worth BEF 300 million (USD 7 million) (Herssens, 2001).[68]

2. Iran: Defence Industries Organization

Iran's defence industry dates back to the early 1970s. By the early 1990s the country's defence industry employed 45,000 people in 240 state-owned plants and an estimated 12,000 privately owned workshops (*International Defence Review*, 1 April 1994). The local defence industry has received technical assistance from a number of countries including the Russian Federation, North Korea, China, Pakistan, Argentina, Brazil, Taiwan, and Germany (*Jane's Defence Weekly*, 1 February 1992). In 1991 it was reported that Pakistan and Iran had jointly set up a small arms ammunition factory and that experts from POF had visited Iran for this purpose (*Inter Press Service*, 14 June 1991).

All defence production facilities in Iran fall under the umbrella of the Defence Industries Organisation (DIO). The Islamic Revolutionary Guard Corps has its own production facilities for the manufacture of various types of small arms including grenades, mortars, and ammunition (*Jane's Sentinel Security Assessment*, 10 August 2000).

In 1966, the Government of West Germany signed a deal with the Iranian government for the licensed production of the HK G3 assault rifle at the Mosalsalsasi weapons factory (Herssens, 2001). The actual management of the licensed production programme was supervised by the German company Fritz Werner (Herssens, 2001). It is through Fritz Werner that spare parts, production tooling, and raw materials are still believed to be provided to Iran and by the end of 1977 the Jangafzarsazi factories were reported to be producing a range of small arms and light weapons.[69]

The G3 production line was damaged during the early stages of the Islamic revolution of 1979, but it was rebuilt and continues to produce the G3 rifle. Before the revolution, the factory was reported to be producing about 145,000 G3s a year. Since then, the production rate has been estimated to be about 50,000 per year (Ezell, 1988). If these estimates are correct, then reports that Iran had supplied 50,000 G3 rifles to Sudan in 1991 would mean that a whole year's production had been exported in one deal (*Jane's Defence Weekly*, 9 May 1992). The DIO are also manufacturing and marketing a version of the MP5 which they designate the MPT 9mm (Tondar) (Omega Foundation, 2001c).

Pakistan and Saudi Arabia have recently established a joint venture in small arms production.

BAE Systems/Heckler & Koch has stated that the licensed production agreements for the G3 rifle and MP5 sub-machine guns with Iran are no longer valid. As the German government refuses to discuss the licensed production agreements on grounds of 'commercial confidentiality', it is not possible to ascertain the exact status of the original agreements.

The DIO continues to produce G3 rifles and variants of the MP5 sub-machine gun. At the Defence Services Asia arms exhibition in Malaysia, in April 2000, the company was marketing the MPT 9K 9mm automatic weapon, which bears a striking resemblance to the HK MP5K 9mm briefcase system.[70]

3. Saudi Arabia: Al-Kharj Arsenal

Saudi Arabia established a domestic defence industry in the late 1970s. Production of small arms and ammunition is centred at the Al-Kharj Arsenal, part of the Prince Sultan Military City south-west of Riyadh. The US, Germany, UK, and Belgium are reported to have assisted in establishing the country's domestic production capability. In 1979, the German company, Fritz Werner, was involved in setting up a plant to produce HK G3 assault rifles and ammunition under licence (*Jane's Defence Weekly*, 18 August 1999). By the mid-1980s, the Al-Kharj Arsenal was also manufacturing M1 rifles and M16 assault rifles under licence from Colt's Manufacturing (US) (*Jane's Defence Weekly*, 18 August 1999).

TABLE 1.13 Export destinations of HK licensed-produced weapons by licensees

Licensee company (country)	G3	MP5	Unspecified
Manufacture Nationale d'armes de St Étienne (France)	Lebanon Germany (Berlin) Djibouti Burkina Faso	Germany (Berlin)	
Hellenic Arms Industry SA (Greece)	Libya Burundi		
Defence Industries Organisation (Iran)	Sudan		
Munora Holdings (Malaysia)	Chile		
Pakistan Ordnance Factory (Pakistan)	Bangladesh	Kenya South Africa Philippines Burma	
INDEP (Portugal)	Zimbabwe		
Al Kharj Arsenal (Saudi Arabia)	Yemen		
MKEK (Turkey)	Cyprus Germany	Indonesia	Jordan Pakistan Norway Switzerland UK

Source: Omega Foundation (2001c)

In September 2001, it was reported that POF and Saudi Arabia had agreed their first joint venture in small arms production at the Al-Kharj Arsenal (*Jane's Defence Weekly*, 19 September 2001). It is likely that the joint venture will involve the manufacture of several types of small arms, including products manufactured under licence from Heckler & Koch.

Heckler & Koch weapons manufactured under licence have been allegedly exported, sometimes in violation of the original licensed production agreement.

Exports of licensed products

A key issue associated with licensed production is the export, by licensees, of weapons produced under licence to third countries in violation of the original licence agreement (Omega Foundation, 2001c). As mentioned earlier, the licensor may limit the right of the licensee to export to third countries through a general (or specific) territorial restriction in the licence agreement (Muchlinski, 1995).

The exports of HK weapons produced under licence by MKEK (Turkey) and by Iran's DIO would appear to be in direct contradiction of statements by HK officials that the right to re-export was excluded from the licensed production agreements signed with states such as Turkey and Iran.

In 1982, the German government placed further restrictions on the export of completed weapons. To obtain the approval of the German government, the weapons manufactured under licensed conditions are for the sole need of the country concerned and must not be re-exported. Exemptions from the re-export exclusion are possible only after prior consultation with the German government.[71] The German government still refuses to discuss whether it gave permission for MKEK to export MP5 sub-machine guns to Indonesia (Omega Foundation 2001c).

Table 1.13 provides details of transfers of HK weapons produced by licensee companies. The licensees claim export deals to many more countries but have not provided details of the weapons supplied. However, it is clear that HK weapons manufactured under licensed production agreements have allegedly been exported, sometimes in violation of the original agreements (Omega Foundation, 2001c).

Conclusion

This chapter has provided an assessment of the state of the global small arms industry. While it is clear that parts of the industry—certain companies in various countries—are 'sick', it is not possible to ascertain, with any real precision, whether the global industry is 'dying', that is, in long-term decline. The lack of both official and unofficial information about the value and volume of global small arms production makes it almost impossible to predict the industry's long-term trends. In the short term, certain factors that will determine the health of the industry can be identified, based on the information presented in this chapter. At the level of firms, factors such as market segmentation and concentration, and internal production and marketing decisions (e.g. finding niche opportunities) will have a significant impact on the health of firms. At a more general level, factors such as the economic and security environment in particular countries, negative public sentiment towards these types of weapons, and/or growing public pressure on governments to implement stricter national controls on the production of, trade in, and use of small arms are likely to have a significant impact on the health of firms and on the global industry more generally.

The information presented in this chapter demonstrates that global small arms production is more widely distributed than previously identified. Currently, more than 1,000 companies in at least 98 countries worldwide are involved in some aspect of the production of small arms and/or ammunition. The increase in the number of countries and companies that produce, or have the capacity to produce, small arms does not necessarily indicate an increase in the size or production capacities of the global small arms industry, but simply better information.

The chapter has also provided new and updated estimates on the value and volume of global small arms production, including commercial firearms. The *value* of global small arms production, including ammunition, for 2000 was estimated to be at least **USD 7.4 billion**. In terms of *volume*, it is estimated that nearly **eight million** small arms, including commercial firearms, were produced during 2000, of which more than 70 per cent were produced in the US and the European Union. The global volume of small arms production has declined in recent years, and is at much lower levels than during the Cold War era. There are also indications that the production of military-style small arms will continue to decline in the coming years. The long-term trends in the production of commercial firearms are currently unclear, but production volumes may start to increase as a result of the 2001 terrorist attacks in the US. Ammunition production for both military-style small arms and commercial firearms seems to be relatively constant at present.

Despite its global distribution, small arms production remains fairly marginal economically, both in terms of its contribution to national economic activity, and as a share of the value of global defence production. For example, in Austria the three most important small arms companies have combined total sales of USD 57 million, and collectively employ fewer than 800 people. The production of small arms is a mature industry with few barriers to entry, and is not a significant source of employment. In the US, only about 16,000 people are employed in the small arms industry.

The regional survey of small arms production in the Middle East provides new and more detailed information on the small arms production activities of countries and companies in the region. While at least 11 countries in the Middle

East have the capacity to produce small arms and/or ammunition on a regular basis, only a few countries can be regarded as significant producers. Most production takes place in state-owned companies, and involves local production under licence from foreign suppliers (e.g. Heckler & Koch). Israel, the region's largest and most innovative producer of small arms, is currently experiencing a crisis in its domestic defence industry, and it is unclear whether the country's small arms production capabilities, which are concentrated in the state-owned company Israel Military Industries, will survive the current crisis. At the same time, a number of other regional producers including Turkey, Iran, and Saudi Arabia are expanding their domestic production capabilities and aggressively targeting export markets. Recently, it has emerged that Pakistan Ordnance Factories has played a key role in supporting the development and expansion of small arms production capabilities in a number of countries in the Middle East including Iran, Oman, Saudi Arabia, and Sudan.

The chapter has also provided detailed information on the financial performance and production activities of the world's most important small arms companies in the 13 countries that dominate the global market for small arms. The overall picture is mixed: some firms are in deep crisis, while others appear to be prospering. This is largely a function of the fact that the small arms industry appears to be no longer governed by global military and/or economic trends. The industry is now so segmented that the success or failure of particular companies is often related to internal factors (e.g. marketing decisions) rather than external factors (e.g. the business cycle). Thus, the industry's long-term trends are increasingly obscure and unpredictable.

In the world's three major producers—China, Russia, and the US—the picture is difficult to assess because of a lack of detailed information, particularly with respect to China. China's most important small arms producer, the state-owned company CNGN (or Norinco), was radically restructured in 1999, but largely because of a lack of both official and unofficial information, it is not clear whether the company is still a major player in the global small arms market. In the Russian Federation, it is clear that a small number of companies, including JSC Izhmash, are re-emerging as significant players in the global small arms market, after nearly a decade of painful downsizing and restructuring in the Russian defence industry. The growing success of these Russian firms is linked to product diversification (e.g. commercial firearms) and increasing export sales. It is worth noting that more people are currently employed in JSC Izhmash (25,400) than in the entire firearms industry in the US.

The US small arms industry is at present in fairly bad shape, particularly handgun producers. However, the US still accounts for nearly 60 per cent of all commercial firearms produced worldwide. In recent years, well-known companies such as Smith & Wesson and Colt's have suffered either flat or declining sales. A few firms such as Sturm, Ruger & Co and OF Mossberg have, however, remained profitable and actually achieved increases in both domestic and export sales. While the US domestic market has declined in recent years from its peak in 1993–94, there are indications that the market might improve in the next few years as a result of the terrorist attacks on the US in September 2001. Demand for small arms from the US armed forces has also been in decline for a number of years, and this has had a negative impact on the US military's most important small arms contractors (producers) such as Colt's, FN Manufacturing, Beretta, and Saco Defense.

In the world's ten most important medium-sized producers—Austria, Belgium, Brazil, France, Germany, Israel, Italy, Spain, Switzerland, and the UK—the picture is also mixed. In some countries (e.g. Austria, Brazil, Italy) privately-owned firms like Glock, Taurus, and Beretta are doing relatively well, and witnessing either constant or increasing sales and profits. In almost all cases these companies rely heavily on sales to the US market (both military and civilian).

Total employment in most of these companies is usually fewer than a few thousand employees, and in some cases only a few hundred. In other countries such as France, Israel, and Spain, large state-owned defence companies (e.g. Giat Industries, IMI, Santa Barbara) which also produce small arms are experiencing significant financial problems. Most of these companies are currently making significant losses, have large numbers of employees, and low levels of labour productivity. Without continuing government support, it is unclear whether the small arms production activities in these firms will be maintained.

Concentration and consolidation at the company level has been increasing in recent years and is likely to continue, particularly among European and US producers. The various segments of the global small arms market (both military and civilian) also continue to be dominated by a handful of companies in these 13 countries, despite the emergence of a few 'new' players in recent years (e.g. Pakistan, Singapore). Some countries, such as Brazil, have taken significant steps to protect their domestic small arms industry from foreign competition.

Licensed production, a key feature of the global small arms industry particularly amongst developing countries, is examined in some detail in this chapter using case studies of two of the world's most significant licensors of small arms: FN Herstal (Belgium) and Heckler & Koch (Germany/UK). Altogether the products of these two firms have been produced under licence in more than 35 countries worldwide. These case studies show how licensed production can be used by licensees (e.g. Turkey) to develop and expand their domestic small arms production and export capabilities, and by licensors (Heckler & Koch) to increase their global market share, to evade strict export controls, and/or to facilitate exports to prohibited destinations.

Overall, the information presented in the chapter presents a somewhat contradictory picture. At the company level, some firms appear to be prospering while others are in crisis. Certainly some of the private firms (e.g. Beretta) appear to have more chance of survival, although of course, in some cases, state-owned companies will continue to attract government support for political and/or strategic reasons (e.g. Giat Industries). At the global level, the small arms industry seems to be shrinking (in terms of production capacity). It is also more segmented, and more concentrated than during the Cold War period, and is experiencing a significant decline in demand, particularly in the military market and certain sub-sectors of the civilian market (e.g. handguns).

Finally, what are the most important factors that will determine the industry's trends in the near future? Certainly the events of 11 September 2001 and increasing US domestic civilian demand for firearms may provide some temporary relief for the US small arms industry as a whole, and certain firms in various other countries (e.g. Austria, Brazil, Italy) that are major suppliers to the US market. Other factors, such as the expansion of licensed production or increased export sales, might also improve the short-term prospects for certain firms, depending on the stringency of domestic export controls.

However, in the longer-term, factors such as slower rates of economic growth in various regions such as North America, Europe, and Asia, negative public sentiment concerning the impact of small arms on violence, crime rates, etc., or the growing national and international efforts (e.g. within the United Nations) to regulate and tighten controls over the production, transfer, possession, and use of small arms could have a negative impact on the future prospects for the global small arms industry. In addition, shrinking demand without a corresponding decline in the number of suppliers has made the global small arms market intensely competitive, with the result that many companies have been forced to sell their products at low and often unprofitable prices. This practice does not bode well for the future of the industry.

1. Appendix

Small arms producers, 2002

	Country	Small arms*	Ammunition
1	Albania	x	x
2	Algeria	x	
3	Argentina	x	x
4	Armenia	x	x
5	Australia	x	x
6	Austria	x	x
7	***Bangladesh***	x	x
8	Belarus	x	x
9	Belgium	x	x
10	Bolivia		x
11	Bosnia & Herzegovina	x	x
12	Brazil	x	x
13	Bulgaria	x	x
14	Burkina Faso	x	x
15	***Cambodia***	x	x
16	Cameroon		x
17	Canada	x	x
18	Chile	x	x
19	China	x	x
20	Colombia	x	x
21	Croatia	x	x
22	Cuba	x	x
23	***Cyprus***		x
24	Czech Republic	x	x
25	Denmark	x	x
26	***Dominican Republic***	x	x
27	Ecuador		x
28	Egypt	x	x
29	Estonia	x	
30	***Ethiopia***	x	
31	Finland	x	x
32	France	x	x
33	Georgia	x	
34	Germany	x	x
35	Greece	x	x
36	Guatemala		x
37	***Guinea***	x	x
38	Hungary	x	x
39	India	x	x
40	Indonesia	x	x
41	Iran	x	x
42	Iraq	x	x
43	Israel	x	x
44	Italy	x	x
45	Japan	x	x
46	Kazakhstan	x	
47	Kenya		x
48	Korea, North	x	x
49	Korea, South	x	x
50	Kyrgyzstan	x	x
51	Lithuania	x	
52	Luxembourg	x	
53	Macedonia		x
54	Malaysia	x	x
55	***Malta***		x
56	Mexico	x	x
57	***Moldova***	x	
58	Monaco	x	x
59	Morocco	x	x
60	Myanmar (Burma)	x	x
61	***Nepal***	x	x
62	Netherlands		x
63	New Zealand	x	x
64	Nigeria	x	x
65	Norway	x	x
66	Pakistan	x	x
67	***Papua New Guinea***	x	
68	Paraguay		x
69	Peru	x	x
70	Philippines	x	x
71	Poland	x	x
72	Portugal	x	x
73	Romania	x	x
74	Russian Federation	x	x
75	Saudi Arabia	x	x
76	Singapore	x	x
77	Slovakia	x	x
78	Slovenia	x	x
79	South Africa	x	x
80	Spain	x	x
81	Sudan	x	x
82	Sweden	x	x
83	Switzerland	x	x
84	Syria		x
85	Taiwan	x	x
86	Tanzania		x
87	Thailand	x	x
88	Turkey	x	x
89	Uganda		x
90	Ukraine	x	x
91	United Arab Emirates		x
92	United Kingdom	x	x
93	United States	x	x
94	Uruguay		x
95	Venezuela	x	x
96	Vietnam		x
97	Former Republic of Yugoslavia	x	x
98	Zimbabwe		x

*Notes: * Small arms include firearms (handguns and long guns) and light weapons.*
Bold italics: *uncertainty regarding current production.*

Sources: BICC (2001); Feldman and Shapir (2001); Forecast International (2002); Gander and Cutshaw (2001a; 2001b); Reed (2001); Jane's Sentinel Security Assessment (various issues); OMEGA Foundation (2001b); United Nations (1999)

1. List of Abbreviations

Armscor	Armaments Development and Production Corporation of South Africa
BATF	US Bureau of Alcohol, Tobacco, and Firearms
CAST	Centre for Analysis of Strategies and Technologies
CBC	Companhia Brasiliera de Cartuchos
CIS	Commonwealth of Independent States
CNGN	China North Industries Group Corporation
COSTIND	Commission of Science, Technology and Industry for National Defence
CSG	China South Industries Group Corporation
DEFA	Direction des Études et Fabrications d'Armements
DICON	Defence Industries Corporation of Nigeria
DIO	Defence Industries Organisation
DMA	Direction Ministérielle des Armements
DTAT	Direction Technique des Armements Terrestres
FNNH	Fabrique Nationale Nouvelle Herstal
GIAT	Groupement Industrial des Armements Terrestres
GUP	State enterprise (Russian Federation)
HK	Heckler & Koch
IDF	Israeli Defence Force
IMI	Israel Military Industries
IP	Intellectual property
ISS	Institute for Security Studies
JSC	Joint-stock company (Russian Federation)
KMP	Kovrov Mechanical Plant
KOFC	Kenya Ordnance Factories Corporation
LIW	Lyttleton Engineering Works
LMG	Light Machine Gun
MDMP	Ministry of Defence and Military Production (Egypt)
MKEK	Makina ve Kimya Endustrisi Kurumu (Turkey)
Norinco	China North Industries Group Corporation
OECD	Organization for Economic Co-operation and Development
OICW	Objective Individual Combat Weapon
PLA	People's Liberation Army
PMP	Pretoria Metal Pressings
POF	Pakistan Ordnance Factories
RO	Royal Ordnance
RSAF	Royal Small Arms Factory
SADF	South African Defence Force
SAF	Small Arms Factory group
SANDF	South African National Defence Force
SIPRI	Stockholm International Peace Research Institute
SM	Swiss Ammunition Enterprise
SRIC	Security Research and Information Centre
SW	Swiss Ordnance Enterprise
UNCTAD	United Nations Conference on Trade and Development
WIPO	World Intellectual Property Organization
WFSA	World Forum on the Future of Sport Shooting Activities

1. Endnotes

1 The Small Arms Survey has in its possession verifiable information on the production of small arms and/or ammunition in 98 countries, based on research conducted by Omega Foundation.
2 The Small Arms Survey has in its possession verifiable information on the production of small arms and/or ammunition in 1,042 companies, based on research conducted by Omega Foundation.
3 It is not possible to provide estimates for 2001, as no information is available on the production of commercial firearms for this year.
4 Many of the countries and companies identified by the Small Arms Survey as current producers of small arms are not included in the Forecast International estimates.
5 Information from Forecast International (2002) suggests that the US army procured 29,000 small arms in 2000, and was likely to procure 25,000 in 2001. No figures are available for navy, air force, and marine corps procurement.
6 These figures are difficult to verify, although the figures for US production can be confirmed by annual production figures from the BATF.
7 Many of the countries and companies identified by the Small Arms Survey as current producers of military-calibre small arms ammunition are not included in the Forecast International estimates.
8 In 2000, the US armed forces procurement of small arms, based on contracts, was worth USD 98 million. In 2001 procurement was estimated to be worth USD 82 million (Forecast International, 2002).
9 The average price for units of commercial ammunition is lower than for military-calibre ammunition. The average price is likely to be 10–12 US cents a round (see <http:www.shooterz.com/ammo.html>), compared with 20 US cents for military-calibre ammunition.
10 This estimate is a significant increase on the figure of USD 4 billion presented in the *Small Arms Survey 2001*. Based on new information and research, it reflects a better estimate of the value of global small arms production for both military and commercial markets.
11 The countries of the Middle East include: Algeria, Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Palestinian territories, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, Turkey, United Arab Emirates, Yemen, Western Sahara (Feldman and Shapir, 2001).
12 The information in this section is based on Miller (2001), Steinberg *et al.* (2001), Feldman and Shapir (2001), Reed (2001), and *Jane's Sentinel Security Assessment* (2001).
13 See the *Small Arms Survey 2001* pp. 38–40 for details of small arms producers in the Middle East.
14 Some countries in the region, such as Jordan, Libya, and Oman are reported to possess a domestic capacity to produce small arms and/or ammunition (Feldman and Shapir, 2001; Forecast International, 2002). However, it is difficult to verify the reliability of this information.
15 Some countries in east and central Europe, such as Bulgaria, the Czech Republic, Hungary, and Romania are significant exporters of small arms (often surplus, or used arms). However, most of these countries are not currently producing significant quantities of new weapons.
16 According to BICC (2001, p. 62), the major European producers of conventional weapons are France, UK, Germany, Italy, Spain, and Sweden.
17 In the US, only 55 out of a total of 191 producers of small arms have more than 20 employees (United States, Census Bureau, 1997a).
18 Information in this section from Brömmelhörster (2001)
19 See Mulvenon (2001) for a discussion of arms production in the PLA military enterprises.
20 Information in this section from CAST (2001a; 2001b).
21 Figure covers both military and civilian output of Izhmash. A report of the Izhmash press service, 20 January 2001 <http:www.izhmash.ru>
22 INFO-TASS database, Vega base, 18 December 2000.
23 Statement by First Deputy Director of the Russian Agency for Conventional Armaments, Valery Rychkov, 2 April 2001.
24 Information in this section from V. Ezell (2001).
25 The company was ranked by SIPRI as the world's 39th largest defence company in the OECD and developing countries in 1999 (SIPRI, p. 309).
26 The company was ranked by SIPRI as the world's 69th largest defence company in the OECD and developing countries in 1999 (SIPRI, p. 309).
27 Information on Austria's small arms producers from Lock (2001).
28 It is not clear whether these figures are merely for production activities in Austria, or for the company as a whole.
29 See Danssaert (2001) for details of Steyr's licensed production of the 7.62mm FN FAL rifle (renamed the StG-58). The blueprints and the tooling for the StG-58, together with spare parts, were sold by Steyr to the US firm DS Arms. The company currently produces the StG-58 in several versions.
30 See <http://www.steyr-mannlicher.com>
31 Information in this section from Danssaert (2001) and Mampaey (1997; 1998; 2000).
32 During 1995 the original name FN Herstal was re-installed.
33 Information on Brazil's small arms producers from Viva Rio/ISER (2001) and Omega Foundation (2001b).
34 Information in this section from Riddell (2001).
35 Information on Germany's small arms producers from Lock (2001).
36 Information on Beretta from Cattaneo (2001).
37 Information on Israel's small arms producers from Steinberg *et al.* (2001).
38 Israel (2001).
39 See <http:www.imi-israel.com>
40 It should be noted that IMI's sales of small arms to the IDF over recent years have consisted primarily of the light sub-machine gun 'Negev' and spare parts for firearms. Indeed, the majority of small arms used by the IDF are imported from the US. Some of these American-made products are American army surplus and are therefore significantly cheaper than their Israeli counterparts (Israel, 2001).
41 Information on Spain's small arms producers from Riddell (2001).
42 See <http:www.santa-barbara-sa.es>
43 General Dynamics' purchase of Santa Barbara was prompted by the company's expertise in land systems (e.g. tanks) rather than small arms and light weapons, and by its funded backlog of USD 2 billion, including a contract for the Leopard main battle tank (*Defence Systems Daily*, 26 July 2001).
44 Information on Switzerland's small arms producers from Lock (2001).
45 See <http:www.gunnery.net>
46 Information on the UK's small arms producers from Omega Foundation (2001a; 2001b).
47 The US subsidiary of Heckler & Koch was established in 1976.
48 The Omega Foundation has detailed information on all the UK's small arms producers. See also NISAT <http:www.nisat.org>
49 For a detailed account of licensed production see Abel (2000).
50 See studies by Keller (1995) and Klare and Andersen (1996).
51 For more details of these various terms see United States, Bureau of Export Administration (1988).
52 Information on FN Herstal from Danssaert (2001) and Mampaey (2000).
53 See Danssaert (2001) for a detailed description of the history of FN Herstal's Engineering division.
54 The information in this section is from SRIC (2001) and Danssaert (2001).
55 Eldoret is the tribal homeland of President Daniel arap Moi. During 1996 an international airport was built in Eldoret.
56 The information in this section is from Ebo (2001), Danssaert (2001), and Reed (2001).
57 According to Gen. Danjuma, DICON was established with the aid of Fritz Werner (Germany), Beretta (Italy), and FN Herstal (Belgium). See 'Defence Industry Corporation Reported to be in Financial Difficulty', *Radio Kudirat*, Nigeria, Voice of Democracy, 15 October 1999.
58 See <http:www.nigerianbusiness.com/nigreg/dicon.html>
59 Personal communication with Johan Jooste, South African Department of Defence, 20 June 2001.

60 Personal communication with Ettienne Hennop, 23 January 2001.
61 Personal communication with Ettienne Hennop, 23 January 2001.
62 Information on Heckler & Koch from Omega Foundation (2001c).
63 Until 1981 German legislation prohibited German companies from exporting weapons to many regions of the world, particularly conflict zones. As a result, licensed production was a way of getting around this legislative prohibition.
64 See <http.www.rofnottingham.co.uk> for more details of the closure of the RO facility in Nottingham.
65 A company in the US, Special Weapons LLC, claims to be the home of the best copies of HK weapons in the world. It is unclear whether this production of 'copies' is licensed or authorized by HK.
66 Fritz Werner won the contract in competition with FN Herstal (Belgium). See Herssens (2001).
67 Georges Forrest previously obtained Belgian licences for the construction of ammunition plants in Iran and China. See Herssens (2001).
68 The French company Manurhin received a sub-contract from Fritz Werner worth BEF 400 million (USD 9 million).
69 Information from DIO company brochure (1998).
70 DIO brochure, Defence Services Asia exhibition, Malaysia, April 2000.
71 Presentation by Georg Stevens, Bonn Bureau of Heckler & Koch, to workshop on Small Arms organised by the Swiss Government, 22–23 November 1999, Geneva.

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