Home-made weapons in illegal workshops in Darra, Pakistan (© Associated Press).

Workshops and Factories: PRODUCTS AND PRODUCERS

1

INTRODUCTION

The global small arms industry continues its process of transformation towards an uncertain future. At one extreme are large manufacturers, such as those of the Russian Federation. Under a Kremlin order announced in 2000, the numerous firms and massive arms-producing factories, some dating from Imperial times, are to be merged into two government-owned conglomerates, one of which will be responsible for the mass production of all small arms and ammunition in the country. At the other extreme are the dozens of improvised gunsmiths in Danao City in the Philippines and Darra in Pakistan, illegally fabricating small arms one at a time.

In the global small arms market, more and more suppliers and products are chasing a diminishing market.

These examples illustrate the paradox of an industry that seems to be becoming simultaneously more concentrated and more dispersed. Events in recent years, and in 2002 in particular, show that consolidation is accelerating, reflecting broader trends in the larger defence industry. At the same time, the global small arms market appears to be fragmenting, as more and more companies develop the capacity to produce small arms. Recent years have witnessed the creation of an increasingly chaotic global small arms market, with more and more suppliers and more and more products chasing a diminishing market.

The key findings of the chapter are as follows:

- The global small arms industry has not significantly changed in terms of the value and volume of production.
- At least 1,134 companies are involved in some aspect of small arms production, an increase over previous estimates. The estimated number of producing countries remains unchanged at 98.
- At least 30 countries can be regarded as significant producers of small arms.
- Major manufacturers are becoming more consolidated and more specialized, as tailored products for specific markets increasingly replace mass production.
- No major technological innovations in the military or civilian small arms market are expected in the foreseeable future, with the exception of ammunition.
- Illicit craft production of small arms is widespread in many parts of the world. Although economically insignificant, it is an important source of weapons in many places.

In the past, small arms production was characterized by technological stability, state ownership, and guaranteed markets. These characteristics combined to insulate the industry from the pressures long felt in other manufacturing sectors. Today, however, the small arms business is starting to yield to the same rules of industrial efficiency and tailored production that have already transformed manufacturing industries as diverse as cars and microprocessors. Trends in the global small arms market are also being influenced by more general trends in industry and technology.

As the number of suppliers increases, leading to excess capacity, firms are being forced to become more flexible, and often to restructure and downsize. This is particularly true in central and eastern Europe, which is a major centre of small arms manufacturing, despite the dramatic downsizing of production capabilities since the end of the Cold

War. Instead of exclusively looking for mass markets, producers in these countries are more aggressively pursuing niche opportunities. Highly specialized versions of well-known designs are increasingly common, tailored to the exact specifications of particular buyers or clients.

With few major new technologies in the small arms market expected to appear in the next five to ten years, the only way for manufacturers to differentiate themselves and their products is through narrow specialization (and marketing), even if buyers are few. This is particularly true of those producers who manufacture for the commercial firearms market. As manufacturers struggle to find profitable niche markets, so the number of product lines is expanding, while production runs and profitability are declining. The result is a confusing process of consolidation, specialization, and fragmentation.

This chapter addresses the following questions:

- **What are the latest trends in the global small arms industry?**
- **What are the current and future prospects for the development of small arms technology?**
- **What are the characteristics of illicit craft production of small arms and how important is it?**
- **Who are the main small arms producers of central and eastern Europe?**

The chapter provides an annual update on trends and patterns in the global small arms industry, as well as current data and information. It focuses especially on technology issues in the evolution of small arms and their ammunition, reviewing current and future developments. The low end of global production is illustrated here by an analysis of illicit craft production. Often overlooked, this is an important source of low-cost weapons for geographically isolated, economically impoverished, or legally prohibited buyers. The consolidation of high-end global production is examined in detail through updates on two of the world's major producers—the Russian Federation and the United States—and a regional survey which examines small arms production in central and eastern Europe, including the Former Soviet Republics (FSR).

Box 1.1 Definition of small arms and light weapons

The *Small Arms Survey* uses the term 'small arms and light weapons' broadly to cover both military-style small arms and light weapons, as well as commercial firearms (handguns and long guns). In general, it follows the definition used in the United Nations' *Report of the Panel of Governmental Experts on Small Arms* (United Nations, 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* also uses the terms 'firearms' and 'guns' to mean hand-held weapons that fire a projectile through a tube by explosive charge. The terms 'small arms' and 'weapons' are used more comprehensively to refer to all hand-held, explosively or chemically propelled or detonated devices. Unless the context dictates otherwise, no distinction is intended between commercial firearms (like hunting rifles) and small arms and light weapons designed for military use (such as assault rifles).

The UN definition was agreed through consensus by government officials. As a negotiated, political instrument, it may serve goals which are different from the needs of research and analysis. While the UN definition is used in the *Survey* as a guideline, the analysis in this and subsequent chapters is broader, allowing consideration of weapons such as craft-made firearms that might be overlooked using the UN definition.

The material presented in this chapter is based on information obtained from open sources. These include official information, defence publications, the international press, corporate and non-governmental information services, defence exhibitions and company promotional material, as well as research and analysis by small arms experts. These sources have been enriched by extensive field research and interviews in selected countries and regions.

THE GLOBAL SMALL ARMS INDUSTRY: ANNUAL UPDATE

This section provides an update and new information on the state of the global small arms industry. It focuses on the distribution of production (i.e. the number of countries and companies that have the capacity to produce small arms and/or ammunition) and on general trends and patterns. It also provides an update and new information on small arms production in two of the world's major producers: the United States and the Russian Federation.

Distribution: Bigger *and* smaller?

How many countries have the capacity to produce small arms? Is the number of countries growing? The *Small Arms Survey 2002* estimated that 98 countries have the capacity to produce small arms and/or ammunition. Based on new information and research, it appears that there has been no increase in the number of countries worldwide that have the capacity to produce small arms (see Appendix 1.1).[1] Table 1.1 shows that the largest 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. Cambodia and Ethiopia), the lack of reliable information, both official and unofficial, makes it difficult to ascertain whether any small arms and/or ammunition are currently being produced and, if so, whether regularly or only on an *ad hoc* basis. Some countries are involved only in the production of components rather than final products, while in others small arms production involves relatively marginal activities, such as loading or filling ammunition cartridges.

Table 1.1 Global distribution of small arms producing countries, 2002

Region	Number of countries (2002)	Percentage
Europe/CIS	41	42
North/Central America	5	5
South America	11	11
Asia-Pacific	20	21
Middle East	11	11
Sub-Saharan Africa	10	10
Total	**98**	**100**

Source: See Appendix 1.1

The difficulty in distinguishing between end producers and intermediate producers makes it hard to determine the total number of companies that have the capacity to produce 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 part 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, 2002).

The *Small Arms Survey 2002* estimated that small arms are produced by 1,042 companies worldwide, including both intermediate and end producers.[2] However, new information and research suggest that at least 1,134 companies worldwide are involved in some aspect of small arms production, whether as intermediate and/or as end producers.[3] Nearly half of these companies (44 per cent) are located in Europe and the CIS. The United States remains the single country with the largest number of producers. Smaller numbers of producers are found 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 and state-owned enterprises. The size of the companies ranges from establishments with fewer than ten to over 1,000 employees.

Table 1.2 Global distribution of small arms producing companies, 2002

Region	Number (2002)	Percentage
Europe/CIS	500	44
North/Central America	407	36
South America	38	3
Asia-Pacific	96	9
Middle East	59	5
Sub-Saharan Africa	34	3
Total	**1,134**	**100**

Source: Omega Foundation (2002)

The apparent increase in the number of known companies involved in some aspect of small arms production needs further explanation. While it does indicate, as a result of better information, that the industry is more widely distributed than was previously thought, it does not necessarily indicate an increase in the absolute size or production capacity of the global small arms industry. In fact, many commentators have suggested that the global small arms industry is smaller today (in terms of the capacity, value, and volume of production) than it was during the 1980s and 1990s (Forecast International, 2002).

The global small arms market also seems to be smaller, by both value and volume, than during the Cold War period, thanks to nearly a decade of declining defence budgets (SIPRI, 2002) and the downsizing of armed forces in many countries. In this context, it is worth speculating on the reasons for the apparent increase in the number of companies involved in small arms production. The prospect of quick profits, as a result of state contracts and closed markets, together with low technological barriers to entry (the fact that small arms technology is mature with few technological challenges), might explain the increasing number of small arms producing companies. However, the fact that the global market appears to be increasingly fragmented and/or differentiated (because of more and

more products), while at the same time suffering from a lack of market information as a result of governments' security concerns, means that many companies lack the ability to make rational or correct decisions about the true potential of the national and/or global market for small arms, and so may overstate the market potential for their products.

General trends

Estimating the value and volume of global production

Estimating the value and volume of global small arms production remains a challenge because of the lack of official and unofficial information about small arms production (including input prices and costs of production) in many countries, among them some of the world's most significant producers.[4]

Based on existing information and research, the global volume of small arms production, including both military-style small arms and commercial firearms, is estimated in the range of **7.5 million to eight million** units per annum. Global production of commercial firearms (approximately **seven million** per annum) is dominated by the United States (four million), the countries of the European Union (one million), the Russian Federation (one million), and a handful of other countries such as Brazil, Canada, China, the Czech Republic, Israel, Japan, Switzerland, and a few others (WFSA, 2001; Small Arms Survey, 2002). Global production of military-style small arms is estimated in the range of **500,000 to one million** units per annum.[5]

The global volume of military-calibre small arms ammunition production is estimated to be in the range of **10 billion–14 billion** units per annum. This is a lower estimate than that provided in the *Small Arms Survey 2002* because of new information suggesting significant declines in production volumes amongst European producers (Forecast International, 19 September 2002).[6] Current procurement of military-calibre small arms ammunition for the US armed forces averages approximately one billion units per annum, which represents about 66 per cent of existing production capacity (Forecast International, 2002). The global production of military-calibre ammunition is dominated by producers in the United States and a handful of European countries such as Austria, Belgium, the Czech Republic, France, and Norway. There is no information on the volume of production of ammunition for commercial firearms.

Estimates of the value of global small arms production are even more difficult to obtain, given the large discrepancies in input costs, production costs, and prices (sometimes weapons are produced and then given away for free). The *Small Arms Survey 2002* estimated that the value of global small arms production, including ammunition, in 2000, was at least **USD 7.4 billion.** There is no new information to justify revising this figure.

Significant small arms producers

While it is clear that small arms production is distributed worldwide, which companies and countries are the world's most significant producers of small arms and/or ammunition?

The *Small Arms Survey 2002* provided information on 13 of the world's most important small arms producing countries, including detailed financial information about select companies in each of these countries. However, based on new information and research, particularly concerning legal transfers (TRANSFERS), it is clear that a larger number of countries than previously identified can be considered as significant producers.

The world's three major producers—the United States, the Russian Federation, and China—remain unchallenged in their dominance of the global small arms market in terms of the value and volume of production and trade (Small Arms Survey, 2002, p. 22). However, there are at least 27 other countries (see Table 1.3) that can be regarded as medium-sized producers.[7]

The US, the Russian Federation, and China remain unchallenged in their dominance of the global small arms market.

Table 1.3 Significant small arms producers by region

Region	Major producers	Medium producers
Europe/CIS	Russian Federation	*Austria* *Belgium* Bulgaria Czech Republic Finland *France* *Germany* *Italy* Poland Portugal Romania *Spain* Sweden *Switzerland* *United Kingdom*
North/Central America	United States	Canada
South America		*Brazil*
Asia-Pacific	China	India Japan Pakistan Singapore South Korea Taiwan
Middle East		Iran *Israel* Turkey
Sub-Saharan Africa		South Africa
Total	**3**	**27**

Note: Countries in italics were identified as medium producers in the *Small Arms Survey 2002*.

Source: United Nations, Statistics Division (2002)

While it is possible to name at least 30 significant small arms producing countries, it is also important to identify the world's most important small arms producing companies. Based on new information and research, the world's top five companies can be identified in terms of the production of the following six categories: military side arms, rifles, sub-machine guns, machine guns, small arms ammunition, and grenade launchers (Gander, 2002).

Table 1.4 Top five small arms producing companies in various weapons categories*

Military side arms	Rifles	Sub-machine guns	Machine guns	Small arms ammunition**	Grenade launchers
Beretta (Italy)	Norinco (China)	Norinco (China)	Norinco (China)	Sellier & Bellot (Czech Rep)	Norinco (China)
Heckler & Koch (UK/Germany)	Heckler & Koch (UK/Germany)	Heckler & Koch (UK/Germany)	Heckler & Koch (UK/Germany)	Winchester Olin (US/Belgium)	Heckler & Koch (UK/Germany)
Smith & Wesson (US)	Izhmash (Russia)	Izhmash (Russia)	Saco Defense (US)	Nammo (Finland/ Sweden/ Norway)	General Dynamics (US)
Colt (US)	Colt (US)	IMI (Israel)	IMI (Israel)	Giat (France)	Singapore Technologies (Singapore)
FN Herstal (Belgium)	FN Herstal (Belgium)	KBP (Russia)	FN Herstal (Belgium)	FN Herstal (Belgium)	KBP (Russia)

Notes: * Only military-style small arms and light weapons (excludes commercial firearms).
** Does not take into account recent merger between RUAG and Dynamit Nobel.
Source: Gander (2002)

It is clear from Table 1.4 that a few companies, such as Heckler & Koch (UK/Germany), FN Herstal (Belgium), and Norinco (China), dominate the global market for small arms, in that they are rated among the top five producers in at least four small arms product categories. European and US firms dominate the market for military side arms. Most of the other categories are equally shared between US, European, Russian, and Asian companies. European companies dominate the small arms ammunition market. Only a few companies outside Europe, Russia, China, and the United States, such as IMI (Israel) and Singapore Technologies (Singapore), are regarded as significant producers in a few specific product categories.

Concentration and consolidation

The global defence industry has become increasingly concentrated in recent years (SIPRI, 2002; Vlachos-Dengler, 2002). As noted in the *Small Arms Survey 2002*, the small arms industry has also followed this general trend of concentration and consolidation through mergers and acquisitions. However, the process of concentration and consolidation is extremely complex, with a multitude of cross-shareholding relationships, joint ventures, and consortia, often formed around specific programmes or products, but occasionally evolving into more permanent relationships.

Consolidation in the global defence industry is extremely complex, with a multitude of relationships, joint ventures, and consortia.

For example, in recent years the global small arms ammunition industry has become increasingly consolidated. In October 1998, all the major Nordic small arms ammunition manufacturers merged to form Nammo AS. The company is a merger of Raufoss in Norway, Celsius in Sweden, and Patria in Finland. It has its head offices in Norway and subsidiaries in Finland, Germany, Norway, Sweden, and the United States. In 2001, the company had a turnover of USD 145 million and employed 1,425 people. In July 2002, two of Europe's most important ammunition manufacturers—RUAG in Switzerland and Dynamit Nobel in Germany—merged their small arms ammunition businesses to form RUAG Ammotec. The new company, which has production sites in Germany, Sweden, and Switzerland, will be one of Europe's leading suppliers of small arms ammunition (Forecast International, 2002). It will employ around 1,200 people and expects annual sales of EUR 160 million.[8] It is planned that, in 2003, all of Russia's small arms producers will be merged into a government-owned holding company, the Small Arms and Cartridges Corporation (CAST, 2002a).

Major producers

What are the trends among the world's major small arms producers? In recent years there has been an increase in the amount of official and unofficial information about the value and volume of small arms production in the Russian Federation and the United States. There is still a lack of detailed information about small arms production in China, although Beijing has set its sights on making its defence industry a top player in the global arms market by 2020 (Chin Hon, 2003).[9]

Taken together, the United States and the Russian Federation produce about five million commercial firearms per annum. There is no accurate information on the number of military-style small arms produced in either country.[10] However, recent export data suggests that between 200,000 and 300,000 military-style small arms are exported by both countries per annum (CAST, 2002a; Haug, 2002).

The total small arms sales of the Russian industry are worth only about ten per cent of the sales of the US industry.

The US small arms industry produces approximately four million commercial firearms per annum and employs about 17,000 people. The total value of small arms production, including ammunition, was USD 2.39 billion in 2000, the latest year for which official figures are available (United States, Census Bureau, 2002). The Russian small arms industry produces more than one million commercial firearms per year, employs more than 80,000 people, and had total sales of small arms of approximately USD 250 million in 2001 (CAST, 2002a). Despite being more than four times the size of the US industry in terms of employment (in fact, JSC Izhmash, the largest small arms producer in the Russian Federation, employs more people than the entire US small arms industry), the total small arms sales of the Russian small arms industry are worth only about ten per cent of the sales of the US industry.

United States

The United States remains the world's most important small arms producer. It has the largest number of companies (for a single country) that produce small arms and/or ammunition, is a major exporter of small arms, and is estimated to have one of the world's largest domestic markets for small arms. Over 3.8 million firearms were produced in 2000, the latest year for which official figures are available (United States, ATF, 2000a; 2002a). In addition, more than one million firearms are imported annually, while about 400,000 firearms (including military firearms) are exported annually (United States, ATF, 2002a). Thus, the US domestic market consumes roughly five million firearms per annum.

In recent years there has been much speculation and confusion about the future trends of the US defence industry and small arms sector (Thurman, 2002). Since the terror attacks on the United States in September 2001, commentators assumed that sales of small arms, both military-style small arms and commercial firearms, would increase dramatically. Unfortunately, there is very little data to support or refute these assumptions.

A recent report on the state of the US firearms industry indicates that 'despite industry hype following September 11, fewer Americans bought handguns in 2001 than in previous years ... in 2002 the industry will continue to experience changes as it struggles to compete with a recreation-saturated society ... firearm production is down because people aren't buying guns, or the agenda of the gun lobby' (*Gun Policy News*, 2002). According to William Vizzard, a gun-control expert at the University of California in Sacramento, 'the long-term trend in the US ... is going down ... the culture of shooting ... is slowly ebbing away' (quoted in Sappenfield, 2002).

While some sectors of the US small arms industry (e.g. handguns) are experiencing dramatic declines in sales, the ammunition sector is seeing an upsurge in orders and sales, in some cases linked to the US government's 'war on

terror'. In May 2002, Alliant Techsystems was awarded a supplementary contract of USD 92 million from the US Army for 265 million rounds of small arms ammunition (Ciarrocca, 2002). Alliant Techsystems is the main supplier of small arms ammunition to the US armed forces, and has a USD 1 billion, ten-year contract, awarded in July 1999, to supply ammunition to them. The company produces on average 500 million–600 million rounds of small calibre ammunition per annum.

While sales in certain sectors of the US small arms industry are plummeting, ammunition sales are rising.

The total value of US small arms production, including ammunition, declined slightly in 2000, the latest year for which official figures are available, to USD 2.39 billion (USD 2.48 billion in 1999) (United States, Census Bureau, 2002). However, this was slightly above the four-year average. Total employment in small arms manufacturing, including ammunition, was constant in 2000 at 17,038 (17,061 in 1999), although slightly above the four-year average (United States, Census Bureau, 2002). Table 1.5 gives details of total employment and the value of production for US small arms production, including ammunition.

Table 1.5 US production of small arms and ammunition, employment and value of production, 1997–2000

Year	Total employment	Value of production (USD bn)*
1997	16,976	2.22
1998	16,761	2.26
1999	17,061	2.48
2000	17,037	2.39
Average	**16,959**	**2.34**

Source: United States, Census Bureau (2002)

Note: * Based on value of shipments.

The volume of total firearms production in the US declined by five per cent in 1999–2000, after increasing by nearly ten per cent in 1998–99. The decline was blamed on various factors, including the economy, anti-gun legislation, and uncertainty about the presidential election (Thurman, 2002). The production of handguns (pistols and revolvers) is at its lowest point since 1981, and the production of shotguns has declined to its lowest level since 1992. However, categories such as machine guns and other weapons showed marked increases over 1998 and 1999 (Sappenfield, 2002).

Table 1.6 US domestic production of firearms, 1998–2000

	1998	1999	2000	% change (1999–2000)
Pistols	960,365	995,446	962,901	- 3.3
Revolvers	324,390	335,784	318,960	- 5.0
Rifles	1,345,899	1,569,685	1,583,042	0.9
Shotguns	1,036,520	1,106,995	898,442	-18.8
Machine guns	32,866	22,490	47,400	110.8
Other (unspecified)	25,151	55,114	62,465	13.3
Total	**3,725,191**	**4,085,514**	**3,873,210**	**- 5.2**

Sources: United States, ATF (1998; 1999; 2000a)

The top five manufacturers of firearms in 2000, based on volume of production, were: Sturm, Ruger & Co. (672,728), Remington Arms Co. (605,427), OF Mossberg (352,502), Marlin Firearms (288,541), and Smith & Wesson (220,993). In terms of specific weapons types, the top US producers have remained unchanged since 1998 (United States, ATF, 2000a).

Table 1.7 Top US producers of firearms, ranked* by weapons type

Type	Company	1998	1999	2000
Pistols	Sturm Ruger & Co.	161,058	213,876	233,598
Revolvers	Smith & Wesson	139,583	152,724	130,587
Rifles	Sturm, Ruger & Co.	332,538	426,226	309,017
Shotguns	Remington Arms Co.	336,527	364,354	355,178

Notes: * Ranked according to 2000 production.

Sources: United States, ATF (2000a); Thurman (2002)

Box 1.2 Firearms producers and liability suits in the United States

Since civilians in the United States buy over half of the seven million commercial firearms manufactured globally every year, few forces have the potential to reshape the global small arms industry as much as changes in United States firearms law and legal precedents. Historically, law and regulation have only modestly affected American civil firearms. Recent efforts to bring civil law suits against gun makers and dealers threaten to change this.

A series of lawsuits in the 1980s and 1990s consistently failed to convince the courts that the firearms industry was responsible for the illegal use of its products. But the threat of such action led 30 states to pass legislation granting the industry immunity from lawsuits (Butterfield, 2002a). Bucking this trend, in September 2002 California repealed its own version of this law, passed in 1983. The change comes after mounting evidence that the industry failed to act on official warnings that one per cent of dealers account for about half of all guns recovered from crime scenes, adhering instead to a hands-off policy that its critics dismiss as 'hear no evil, see no evil' (Butterfield, 2002b). Now cities in the state will be able to bring suits to force manufacturers to take responsibility for the sales of their products, regulating their distribution to make it harder for criminals to buy them (Warren and Morain, 2002). Suits have also been filed in some of the other states where this is still allowed (Glaberson, 2002).

The direct impact of such suits on production may be considerable, although sales to criminals do not appear to be a major component of the market. The most prominent study on the issue examines 88,570 crime guns seized by American police in 2000, but it is far from complete (United States, ATF, 2002b; Wintemute, 2002). Even if the total number of crime guns were sharply reduced through better industry oversight, there is not likely to be a dramatic reduction in the five million new firearms (including one million imported) sold in the US every year. Of far greater significance would be any indirect effects. American gun makers would be exposed for the first time to civil court litigation and the threat of punitive damages. Manufacturers in other countries with substantial American sales—such as Glock (Austria), Beretta (Italy), SIG Arms (Germany/Switzerland), Heckler & Koch (Germany/UK), and Taurus (Brazil)—could be found liable too. According to Lawrence Keane, General Counsel for the National Shooting Sports Foundation, 'The California Legislature has opened a Pandora's Box, and courts in California will now be flooded with suits designed to hold manufacturers of legal, highly regulated, non-defective products responsible for criminal shootings' (Broder, 2002).

So far, gun manufacturers have been immune to the kind of American jury awards that have become the bane of other industries such as tobacco. In practice, such awards rarely bankrupt whole industries, but the effect on individual firms can be substantial. Damages of hundreds of millions or even billions of dollars would compel manufacturers to become much more involved in marketing and sales, screening prospective buyers. But the American firearms industry has friends like few others; it may still emerge from its legal conflicts relatively unscathed.

Source: Karp (2002)

Russian Federation

After the United States, the Russian Federation is the world's second largest producer of small arms. In recent years, there has been a significant improvement in both official and unofficial information about small arms production in Russia (CAST, 2001; 2002a).[11] The Russian military-industrial complex, including the country's small arms producers, has been undergoing a dramatic process of restructuring in recent years (CAST, 2002a).

In 2000, the Russian government formulated a new policy for the country's small arms industry. The aim is to merge all Russian developers and manufacturers of small arms and light weapons into two major government-owned holding companies: the **Small Arms and Cartridges Corporation** and the **High-Precision Weapons Corporation.** This consolidation of the Russian small arms industry reflects some of the more general processes of concentration and consolidation occurring in various sectors and sub-sectors of the global small arms industry.

The Small Arms and Cartridges Corporation will be set up in early 2003 with JSC Izhmash as its core company. It will bring together 12 other companies, including parts of JSC Kovrov Mechanical Plant (KMP) and JSC Degtyaryov Plant (ZID), part of Tula Arms Plant, Vyatskiye Polyany Machine Building Plant Molot, and several research centres. The High Precision Weapons Corporation, which was set up during 2002, brings together manufacturers of light weapons, primarily man-portable surface-to-air missiles. It is centered on the Tula-based Instrument Building Design Bureau, part of the JSC Kovrov Mechanical Plant, JSC Degtyaryov Plant, and others.

A few companies dominate the production of small arms in the Russian Federation. JSC Izhmash is the most important domestic producer of small arms. In 2001 the company had total sales of nearly USD 200 million, of which over 12 per cent was accounted for by exports.[12] Another important domestic producer, particularly of commercial firearms, is JSC Izhevsky Mekhanichesky Zavod (IMZ), which according to some commentators now controls a growing share of the global market for commercial firearms (CAST, 2002a). Together, Izhmash and IMZ account for 85 per cent of all small arms produced in Russia. The remaining 15 per cent are produced at the Molot plant and at various companies in Tula (CAST, 2002a). Selected financial information for Russia's most important small arms producers is provided in Table 1.8.

Table 1.8 Russia's small arms producers, selected financial indicators, 1999-2001

Company	Total sales*			Employees		
	1999	2000	2001	1999	2000	2001
JSC Izhmash	90.0	170.7	199.5	22,900	25,400	27,300
VA Degtyarev Plant (ZID)	51.9	59.7	84.3	n/a	15,368	15,000
JSC Izhevsky Mekhanischesky Zavod (IMZ)	40.9	46.6	57.7	n/a	14,954	15,200
JSC Tulsky Oruzheiny Zavod	29.4	22.0	13.4	n/a	n/a	7,000
JSC Kovrov Mechanical Plant (KMP)	n/a	15.8	22.2	n/a	n/a	3,000
Vyatskiye Polyany Machine Building Plant Molot	24.7	25.6	21.2	n/a	n/a	7,430

Note: * Total sales (in current USD millions), including sales of small arms and other weapons, also includes non-military sales.

Source: CAST (2002a)

Based on the figures presented in Table 1.8, it is clear that the value of total sales (including small arms) amongst Russia's most important small arms producers during 2001 was about USD 400 million, and that nearly 80,000 people were employed in this sector of the Russian defence industry. However, total sales of small arms amounted to approximately **USD 250 million,** given that many of the most important producers, such as JSC Izhmash, produce a wide range of civilian goods (CAST, 2002a).

As for the volume of production, more than one million commercial firearms were produced in the Russian Federation during 2001, of which at least four-fifths (800,000) were produced by JSC Izhevsky Mekhanichesky Zavod. Other significant producers of civilian firearms in 2001 included JSC Izhmash (87,000), Tula (60,000), and KBP Instrument Design Bureau (18,000) (CAST, 2002a). Details of the volume of production of military-style small arms are not available.

Russian ammunition production has dropped from five billion units per annum in the Soviet era to only 50 million today.

Annual production volumes in the Russian small arms ammunition industry have plummeted from five billion units per annum during the Soviet period to around 50 million units per annum today (CAST, 2002a). Government contracts are virtually non-existent because the Russian Defence Ministry is using cartridges from its old arsenals in the absence of funds for purchasing new ones. The situation is forcing most companies in the Russian ammunition business to switch to the production of cartridges for commercial firearms which have better export prospects. The most important Russian manufacturers of small arms ammunition include:

- Novosibirsk Low Voltage Equipment Plant;
- Ulyanovsk Machine-Building Plant;
- Vympel State Production Association;
- Tula Cartridge Plant;
- Pribor Federal Scientific and Production Centre; and
- Bazalt State Research and Production Enterprise.

Both Pribor and Bazalt are heavily involved in the production of ammunition rounds for grenade launchers. Amongst Russian ammunition producers, only Vympel is in a critical condition. In 2001, it had debts of more than USD 10 million as a result of unpaid invoices for goods already delivered to the Russian Defence Ministry, various law enforcement agencies, and North Korea (CAST, 2002a).

SMALL ARMS TECHNOLOGY

Small Arms Technology: Current developments and future trends

Small arms technology has not changed significantly in the last 50 years. With few major new technologies expected to appear in the medium term, the only way for manufacturers to differentiate their products is through specialization, even if relatively few buyers can be found. As manufacturers struggle to find profitable niche markets, some product lines are expanding while production runs are declining (Housson, 2002). In this context, firms are under enormous pressure to innovate. Since R&D is relatively affordable in this industry, it is only the natural laws of physics and chemistry that restrain innovation. The lack of change is due not to a lack of trying, but because of the *technological plateau* on which the industry has been stuck for decades. Small arms technology is likely to remain on this plateau for years to come.

Although the civilian market is certainly the largest part of the global small arms business, accounting for more than 80 per cent of annual production, it is innovation in the military market that generally defines the cutting edge of small arms technology. The military market establishes not only the trends for future requirements and technology, but also expectations about performance and capability that gradually seep into the civilian market as well.

Innovation in the military market defines the cutting edge of small arms technology.

This section examines current technology developments and future trends in the military small arms market. The military market for small arms differs fundamentally from police and civilian markets. Its products are intended to kill or maim an enemy under extreme conditions. Police weapons, although lethal, are primarily authority symbols employed rarely and in less extreme situations. They can afford adornments, such as cosmetic finishes and elaborate safeties, that would be of limited use to the military. Technological developments in light weapons will be examined in future editions of the *Small Arms Survey*.

Of paramount importance to the military is reliability. Anything that works as required is likely to be preferred to the 'perhaps better but unknown', an approach supported by the need for extra training, new spares holdings, and so on, that follow the adoption of any weapon. Weapons like Kalashnikov and M16 rifles continue to find favour since they deliver all that is likely to be required. Military organizations typically have no interest in fixing that which is not broken. Technical changes, such as new materials, are unlikely to be widely embraced unless the case for change is overwhelming. At present there is no sign of any such technical innovation. This point is emphasized by the failure of any nation's armed forces to adopt any fundamental design innovation, other than spin-stabilized grenades, since the introduction of fully automatic rifles in the 1940s. The technical changes mentioned below are all relatively minor. Metal Storm is the leading exception. For the most part, though, even if a weapon such as the British SA-80 rifle is perceived as unreliable, any eventual replacement is unlikely to be technically any more advanced, however more ergonomically user-friendly and better made.[13]

A British soldier fires an SA-80, a rifle which is imperfect, but still widely used by armies.

Recent technological developments[14]

Technological development has increased the lethality, accuracy, and penetration of military small arms.

While the impact of individual technological innovations is easily exaggerated, cumulative development has yielded significant enhancements to the overall lethality of military small arms through increased accuracy, penetration, and rate of fire. The introduction of laser sighting systems, for example, facilitates a move towards bulls-eye targeting. Incremental advances in the quality of small arms engineering can be expected to produce significant enhancements to the overall precision and power of future weapons. But basic designs and capabilities seem much more stable.

Side arms. There has been only one significant innovation in military side arms in recent years. That has been the almost universal acceptance of the safety systems that allow the user to carry a pistol with a round in the chamber and the hammer lowered. Only a positive pull on the trigger will allow the pistol to be fired. There has also been a tendency to produce lighter and more compact variants to allow pistols to be more comfortably used by physically weaker users, or for concealment, although these have a smaller ammunition capacity than the full-size models. The increasing use of hard plastics (e.g. Glock pistols) and other polymer-based materials with their smooth moulded outlines are now virtually standard for newly designed models of side arms.

Rifles. The use of polymers and similar moulded materials to create ergonomic handling outlines for rifles is becoming commonplace. The number of models on offer is now too great for the market to absorb, although some nations, such as Singapore with its 5.56mm SAR 21, continue to maintain a rifle design and production capability for local political or economic reasons. The move to 5.45mm or 5.56mm calibre is almost complete for assault rifles. The change has been prompted by the realization that most combat fire fights take place at ranges under 400m, so most combat bullets do not need the full power capabilities of the larger calibres. Since the rounds are smaller and lighter, a soldier can carry more and logistics are eased.

At the opposite end of the calibre scale, 0.50 inch or 12.7mm has been adopted as the standard for long-range sniper or anti-material rifles. In most of these weapons, the original bolt actions are being replaced with semi-automatic actions. Full-power 7.62mm rifles are now largely confined to specialist marksmen or snipers, as their heavier bullets maintain accuracy over long ranges. The 7.62mm cartridge for the Kalashnikov family of weapons remains in widespread service and shows no indications of ever being dislodged, even though the standard Russian army rifle, the AK-74 series, has become well established using 5.45mm ammunition.

Sub-machine guns. Sub-machine guns, which fire short-range pistol ammunition, are increasingly obsolete amongst armed forces. Light carbines can, however, fulfil the same function with added range and ammunition commonality advantages. Sub-machine guns, however, continue to find favour with many paramilitary and special forces. Few technical innovations have occurred in this category of weapon other than the emergence of the personal defence weapon (PDW) concept with special intermediate power (between pistol and rifle) ammunition to deliver fire up to 200m. This is intended to provide support personnel with something better than a pistol, but not as bulky as a rifle. As yet this concept has not found wide acceptance and sales have been slow, although adoption by a few of the richer nations seems certain.

Machine guns. In this category of weapon, the main innovation has been the wider introduction of true light machine guns. These are capable of providing sustained fire for longer periods than assault rifles. Examples such as the FN Herstal 5.56mm Minimi (known in the United States as the M249) or the Heckler & Koch MP-43 can produce far more supporting firepower than the heavy-barrelled versions of well-known assault rifles. Heavy machine guns

(12.7mm) continue to gain acceptance. The 60-year-old Browning M2 HB is back in favour for many applications, from anti-personnel to anti-vehicle or air defence. General purpose machine guns (GPMGs) also remain in widespread use, although many, such as the FN Herstal MAG or US M60 series, are now considered too heavy for the portable light machine gun role.

Small arms ammunition. Several new pistol calibres have appeared in recent years in an attempt to provide more power for pistols. Innovations have included the Smith & Wesson 0.40 inch, the SIG 0.357 inch, and the Russian 9 x 21mm, the latter for special forces. In all calibres, armour-piercing (AP) rounds have appeared to counter the increasing use of body armour for soldiers. Special high-accuracy ammunition for sniping has also appeared, such as the Lapua 0.338 inch cartridge for specialist marksman and sniper duties. The recently introduced Winchester Short Magnum 0.300 inch also seems certain to find many military rifle applications.

Grenade launchers. Low-velocity grenade launchers are now a widespread combat accessory. The launcher tube, slung under a rifle barrel, is almost universal and unlikely to be improved upon. Multi-chambered launchers such as the South African Milkor Multiple Grenade Launcher (MGL) have attractions but demand a dedicated firer and have, as yet, found only limited tactical applications. Crew-served high-velocity grenade machine guns are widely deployed, but their bulk, weight, and relative complexity still attract criticism, even though they deliver fragmenting grenades to ranges of well over 1,500m. Recent years have witnessed several determined moves towards reducing their weight and bulk.

Future technological developments[15]

The widespread R&D programmes of the world's more than 1,000 small arms producers are unlikely to lead to drastic changes to the established form of almost any existing category of small arms. As mentioned above, the established technical scene seems set to prevail in the long term. What is now established works well and reliably, so there is no perceived need for change. The major exceptions relate to greater use of electronics for monitoring and control, improved aiming devices with lasers, and the introduction of lighter materials such as titanium and composites. Even these relatively minor changes, which will meet widespread acceptance, are likely to be gradual.

Sidearms. Few innovations can be foreseen here, other than the introduction of new special automatic and semi-automatic pistols to combat body armour or destroy high-value equipment (radar, radio, etc.) by firing special armour-piercing ammunition. Many US soldiers do not like the standard Parabellum ammunition for their M9 Beretta pistols. They are demanding a return to the .45 inch calibre round, although that seems unlikely to happen. Much of the longing for .45 calibre, apart from conservatism, springs from its extreme human-stopping qualities. But the recoil and muzzle blast demand more careful and time-consuming training than less powerful rounds.

Rifles. Increasing use will be made of embedded electronic microprocessors in all manner of weapon-operating functions, from monitoring and recording the number of rounds fired to automatically controlling cyclic rates of fire (firing speed) to suit the specific target range. Microprocessors will also be used in advanced miniature fire-control system sighting arrangements, integrating night vision, target tracking, and laser range-finding features.

The Objective Individual Combat Weapon (OICW),[16] which is intended for the US armed forces, will also introduce an integral long-range air-bursting fragmentation grenade firing capability in addition to US troops' normal kinetic energy weapon. Anticipated shortcomings of the 20mm grenades now under development for the OICW seem likely to lead to heavier grenade calibres (30, 35mm, or greater) in their place, although these impose recoil force-attenuation

challenges. Another challenge is the cost. The OICW is forecast to cost more than USD 20,000 per unit, and it is likely to be some time before it—or any other smart rifle—makes its way into the hands of the common US foot soldier (Eng, 2001). Furthermore, sales outside the United States and western Europe are extremely unlikely, especially since few armies see any need for such a complex system.

More common will be modular assault rifle systems, such as the FN Herstal 5.56mm F2000. This permits fully integrated (rather than add-on) grenade launchers, sub-lethal riot control accessories, tactical lights, etc., to be readily installed in the field. Other seemingly modest technologies are less likely to win acceptance. It is not anticipated that the overly-complicated Russian 5.45mm AN-94 from Izhmash will find many adherents, despite its official acceptance as a Kalashnikov replacement within the Russian army. Its rapid initial cyclic-rate to increase hit probability, going from 1,800 rounds per minute for the first two rounds to 600 rounds per minute thereafter, runs counter to the imperative for reliability. Instead, the aging Stoner rotary bolt locking system will continue to be employed. Even competitors like Heckler & Koch are using it for their G36 rifle. Muzzle-attached suppressors to disguise firing sound and flash also seem certain to become more widespread.

Sub-machine guns. Few innovations can be foreseen in this category of weapons other than the introduction of new weapons to pierce body armour or high-value equipment (radar, radio, etc.) by firing special ammunition. Some models can be expected to be adapted for the more powerful .40 calibre Smith & Wesson cartridge, in place of the otherwise universal 9mm Parabellum round.

Machine guns. Once again, few innovations can be foreseen in this category other than the introduction of electronics-based sighting systems containing night vision, range finding, and target tracking. It seems certain that many current 7.62mm GPMG weapons will continue to be employed into the distant future, although increasingly as tripod- or vehicle-mounted weapons rather than in the portable light machine gun role. Many existing GPMGs will be modified to accommodate heavier, chrome-lined barrels, both to improve accuracy and to eliminate the need to change barrels during prolonged fire.

Small arms ammunition. In contrast to the technological stability of most kinds of small arms, numerous changes seem imminent in small arms ammunition, with more concentration on accuracy, especially at long ranges, and enhanced destructiveness. There have been indications that a return towards intermediate power calibres in the 7–7.62mm bracket is under active consideration. The light 5.45 and 5.56mm calibres are increasingly thought to lack sufficient deadliness, and are too easily affected by side winds, vegetation, and other environmental factors, especially at longer ranges. Heavier bullets might be introduced as an interim measure. However, any such changes will be gradual and spread over a very long period.

Numerous changes are imminent in small arms ammunition– increased accuracy, especially at long ranges, and greater destructiveness.

Another likely innovation is the Metal Storm[17] approach, where projectiles, stacked nose-to-tail in a single tube, are fired under electronic control at whatever rate is considered necessary (de Borchgrave, 2002). Electric firing of bullets uses no firing pins, no primers, and no mechanical ammunition feeding systems: just propellant and projectiles stacked one on top of the other. After firing, the tube is replaced by a new pre-loaded component. Multiple barrels enable Metal Storm to achieve astonishingly high fire rates of 90,000 rounds per minute or 1,500 rounds per second. Machine guns can fire at a rate of 6,000 rounds per minute, while a typical gas-operated assault rifle, by comparison, has a rate of fire of 700–1,200 rounds per minute. Metal Storm ammunition can also be fired at much slower and more practical rates, including single shots.

Although no longer a novelty, caseless rounds in which the bullet is embedded in a block of fully consumable propellant instead of a metal jacket seem unlikely to reappear in the foreseeable future.[18] Too many technical challenges remain unsolved. In addition, many ammunition manufacturers will be unwilling or unable to establish the necessary large-scale production facilities.

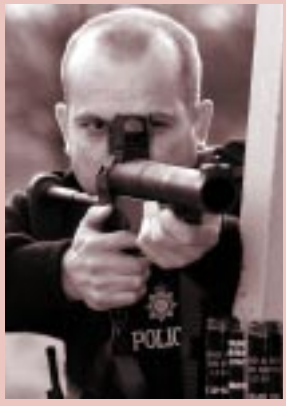
Grenade launchers. Air-bursting munitions are the main future innovation here, from the American OICW to the Singapore Technologies Kinetics Air Bursting Munition (ABM). In these weapons an electronic fuse is initiated at the instant of firing or as the grenade exits the muzzle. The intention is that the grenade bursts over the target area to scatter blast and fragments, hitting targets protected behind frontal cover. The ABM can be supplied in kit form to be retrofitted to most current 40mm automatic grenade launchers. For the foreseeable future it seems that the techniques involved will be applied only to 40mm high-velocity grenades, the smallest projectiles into which the necessary sensors and electronics can be packed, although it is anticipated that significant weight reductions will be introduced on future launchers of smaller spin-stabilized grenades. The first example of these self-homing applications will probably be the future US Light Fighter Lethality (LFL) projectile. This will autonomously home onto a target, irrespective of environmental influences and incorrect aiming. In time it is anticipated that similar techniques will be introduced to rifle calibre projectiles.

Future small arms are likely to be information-interactive.

More distant prospects. Small arms are increasingly being understood as key elements in a larger system, making them the deadly component in a military 'nervous system'. Future small arms are likely to be information-interactive, used by soldiers who themselves are part of an integrated information network which provides direct data feeds on who is friend, who is foe, and where they are.

Box 1.3 Non-lethal weapons[19]

While the pace of technological innovation in conventional small arms may not be accelerating, innovation has been easier and faster in the area of non-lethal weapons (Alexander, 1999; Lewer, 2002). Non-lethal weapons are defined as those weapons that are explicitly designed and primarily employed so as to incapacitate personnel or material while minimizing fatalities, permanent injury to personnel, and undesired damage to property and the environment. Unlike conventional lethal weapons that destroy their targets principally through blast, penetration, and fragmentation, non-lethal weapons employ means other than gross physical destruction to prevent the target from functioning. Non-lethal weapons can be classified by either function (anti-personnel or anti-material) or technology (e.g. chemical agents, optical weapons, acoustics) (Siniscalshi, 1998, pp. 4–5).



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A Heckler & Koch non-lethal baton gun.

The market for non-lethal weapons currently appears to be much smaller than for conventional small arms, but it shows every sign of growing as these weapons gain greater acceptance in law enforcement, military police operations, private security services, and even civilian markets (Lewer, 2002). Most commentators on the small arms industry have neglected the emergence of non-lethal weapons, regarding them as mere riot control technologies. Indeed, many of these types of weapons have been around for over 30 years. Many European police forces continue to research variants of these weapons to upgrade their crowd control arsenals. An example of technology already in widespread use for law enforcement is the Air Taser Weapon, a device that shoots, up to 15 feet away, multiple darts carrying 50,000 volts, paralysing the muscles. The target collapses while remaining fully conscious.[20]

According to current US military doctrine, 'Non-Lethal Weapons must achieve an appropriate balance between the competing goals of causing death, permanent injury and collateral material damage, and a high probability of having the desired anti-personnel or anti-materiel effects' (quoted in Grossman, 2002). This approach notes that it is unrealistic to assume away civilians and non-combatants. Instead, it takes the view that the United States must be able to execute military missions even when operating in the midst of civilians. Therefore the US Army non-lethal warfare requirement assumes a 'dirty battlefield' where civilians are mixed with combatants.

Source: Wright (2002)

ILLICIT CRAFT PRODUCTION

In addition to the fact that more than half the world's countries are engaged in the regular, legal production of small arms and/or ammunition, illicit craft production of small arms takes place in many countries. According to information supplied to the United Nations, illicit production of small arms takes place in at least 25 countries.[21]

Box 1.4 Definition of craft production

This type of production occurs in small private workshops or homes without any legal (i.e. governmental or company) authorization. It tends to be crude and small-scale (e.g. single weapons or small batches), and is usually done by hand rather than via complex manufacturing processes (e.g. production lines). Most craft production involves the manufacture of simple single-shot weapons and/or illicit copies of existing types of small arms. Most craft-produced weapons would be excluded from the definition of small arms and light weapons, as used by the United Nations Report of the Panel of Governmental Experts on Small Arms (United Nations, 1997) (see Box 1.1).

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A home-made weapon.

This section examines the issue of illicit craft production, using case studies from countries such as Chile, Ghana, Pakistan, the Philippines, South Africa, Turkey, and various states in the Pacific Islands. Although craft production is often associated with the hand production of costly hunting or sporting weapons and collectibles (usually in the United States or western Europe), it is more important as a source of low-cost weapons for geographically isolated, economically impoverished, or legally prohibited buyers. Although illicit craft production takes slightly different forms around the world, it is uniformly characterized by the desperation of its buyers and increased likelihood that its products will be used to kill.

Craft production supplies low-cost weapons to isolated, impoverished, or illegal buyers.

In economic terms, craft production is a minor, but not negligible, segment of global small arms production. It tends to be a low-scale, relatively low-profile, informal (and illegal) economic activity, carried out in small private workshops, garages, huts, or backyards. In terms of technology, the weapons are usually hand-made and use rudimentary technology, often recycling spare parts or remnants of more sophisticated arms. Craft-produced arms are usually crude, although in certain cases they may reach higher levels of sophistication. In general, there are three broad types of craft produced weapons:

(1) single-shot weapons without barrels, which are simple to make;

(2) lookalikes, mostly of older weapons types, which require a lot of skill but are technologically inferior to the original product, and are produced mostly for collectors; and

(3) rebuilt weapons, which use critical components delivered from industrial production or taken from partly destroyed or non-functioning weapons.

In almost all cases, craft products are fabricated and sold outside legal frameworks and the formal economy. Craft production is cheaper than regular legal production because it is a low-scale, low-key economic activity for which no large investments are needed. Craft work is usually not remunerated according to formal economic regulations, wages are low, there are no expenses related to permits and licences or research and development, and overhead costs are usually minimal because production takes place in household premises or makeshift workshops. Craft production usually starts in response to the needs of a local group or community. Products are often customized for particular users. Since production usually directly meets (local) demand, there are often no intermediate costs such as storage or transport.

The link between craft production and regular, legal small arms production seems to be rather weak. Thus, craft production occurs in countries with significant small arms manufacturing capabilities, like Chile, South Africa, or Turkey. But it also occurs in countries where regular, legal small arms production does not occur, like Ghana or the Solomon Islands.

Why craft production?

There are multiple reasons for the emergence of craft arms production in any particular country (Kiss, 2002a). For analytical purposes, these can be divided into political, economic, social, cultural, and historical factors.

Political factors tend to be the most important determinants of craft production. Acute political conflicts, tribal or civil wars, or wars between states inevitably create an incentive for craft arms production. This type of conflict-related craft arms production usually dies out when the conflicts themselves settle down, unless other economic or political interests keep them going. Craft production can also have a clear connection with the general level of security in a community or society. If citizens are convinced that the state is unable or unwilling to protect them, they will resort to craft arms production as part of their search for individual safety and security. Paradoxically, sometimes strict legal controls over the arms business can also create incentives for illicit production. Alternatively, provided there is a relatively high demand for arms, loopholes in domestic arms legislation can also create the 'space' for craft production.

Economic factors can also be a significant determinant of craft production. Illicit craft production emerges when there is a demand for arms that is not easily satisfied by regular, legal production, or when the channels of illicit trade are closed. In some cases, the (high) prices of imported small arms can also be decisive in prompting the appearance of craft production. In traditional societies, craft production is principally driven by local demand. There are significant economic factors on the supply side as well, for craft production can provide economic livelihoods for individuals and whole communities.

A final set of factors are social, cultural, and/or historical. Craft production often has very deep roots, especially in societies that have had to defend themselves repeatedly against outside aggression or have a tradition of blood feuds. In South Africa, craft production emerged as a response to apartheid. Later it evolved into a tool of criminal activity. In Afghanistan and the tribal regions of Pakistan, domestic arms production was originally part self-defence and part security for the community, until it became a principal economic activity. In many parts of the world, craft production was originally part of the traditional culture in which guns are a symbol of masculinity and prosperity.

Craft production can become a serious security problem when it is taken out of this context and used for purposes other than individual or community self-defence. In the traditional local economy, demand for craft weapons is determined by the needs of the community. Once demand becomes determined by outside market forces, the scale of production expands. Production itself does not respond any longer to the original security needs of the community. Instead of providing security, large-scale commercialized craft production can undermine the security of an entire country or neighbouring countries, even if it provides a livelihood for those communities that participate in it.

Whether it is a response to insecurity, economics, or tradition, craft production can be extremely difficult for governments to regulate or restrain. As a feature of weak or highly-polarized states, craft arms production is both a manifestation of the state's weakness and a cause of its inability to reform. To reduce the number of weapons circulating in the society, some governments launch disarmament projects that inevitably include collecting craft-produced or home-made firearms and/or stamping out illicit craft production. However, weak states are often unable to control or even monitor illicit craft production. Unfortunately, it is often in countries where the state is weak that the problem of craft production can grow to threatening dimensions.

Chile: Craft production in the shadow of the state[22]

With its well-regulated, state-owned small arms industry, Chile might seem an unlikely candidate for the existence of illicit craft production. However, the country has a low-key, low-level culture of craft production of small arms, catering largely for the criminal market. Overall, craft production in Chile is relatively insignificant in economic terms.

Production of small arms in Chile is dominated by the state-owned Fábricas y Maestranzas del Ejército (FAMAE), which is part of the Ministry of Defence (Montes, 2002, p. 30). The company produces a wide range of small arms (including various weapons under licence agreements with companies in Switzerland and Brazil), for the domestic and export markets (Small Arms Survey, 2001, p. 30).

Chile has a long tradition of craft production, which involves the illegal manufacture of home-made firearms or *armas hechizas*, produced in small metal workshops in urban areas. This practice is very common in the poor neighbourhoods south of Santiago and is widely associated with street crime. It was developed in part by Chile's small urban insurgent groups, such as the *Frente Patriótico Manuel Rodríguez* and the *MAPU Lautaro*, which were active until the mid-1990s. According to police sources, this know-how has been assimilated and adapted by criminal groups.

In Santiago craft production is limited to the manufacture of rudimentary, rough, inaccurate, and unreliable weapons, which tend to be effective only at short range, if at all. There are no records of exports of these arms to neighbouring countries or of large production and commercialization within the country. The *hechizas* seem to be just a cheap alternative source of firearms for the criminals and gang members of Greater Santiago.

Craft production in Chile is the result of a combination of factors that make it extremely difficult for criminals to acquire firearms. The geographical isolation of Chile by the Andes, intensive border control, and the relative honesty of the national police make illicit smuggling of small arms difficult. In addition, Chile is far from regional arms trafficking hubs such as Ciudad del Este in Paraguay. Legal restrictions on ownership of small arms are another factor.

To buy a gun, one has to request an official purchase authorization from the regional military command headquarters. The document can be obtained only after the presentation of identification, verification of one's police records, and payment of a fee of about USD 20.

With the manufacture of small arms monopolized by the state through FAMAE, whose main markets are the armed forces and police, the civilian small arms market is fed by high-priced imports (mainly from Brazil, Europe, and the United States). Revolvers and pistols (both domestically manufactured and imported) can be bought legally for between USD 150 and USD 620, equal to prices in Europe or North America (Lobos, 1999). In the criminal market such weapons can be bought from USD 42 to USD 112, depending on the quality and condition of the gun (Rojas, 2002). Also, criminals can hire an M-16 assault rifle for a few hours at USD 280 (Rojas, 2002). Locally made craft shotguns or *tamaras* can be purchased for up to USD 40; they suit the needs of petty criminals and drug-related gangs (Rojas 2002). According to police sources, the increase in the manufacture and use of craft small arms was paralleled by the increase in local cocaine trafficking in the 1990s.[23]

Box 1.5 Small arms counterfeiting in São Paulo

Unlike in Chile, in Brazil large private companies such as Taurus, Rossi, and CBC supply the civilian market with commercial products like automatic pistols (Taurus), revolvers (Taurus, Rossi), hunting rifles (Rossi), and shotguns (CBC) (Small Arms Survey, 2002, p. 32). An important proportion of Brazil's pistol and revolver production is exported to Paraguay and then smuggled back to arm powerful drug-trafficking organizations based in São Paulo and Rio de Janeiro. Increasingly, these groups are turning to assault rifles and sub-machine guns. The domestic production of such weapons is, however, restricted to the armed forces and the police, and arms trafficking controls are getting tighter. In response, the criminal underworld of São Paulo has resorted to illicit craft production. In May 2002, police in São Paulo raided an illegal sub-machine gun factory that allegedly was producing about 50 weapons a month. The price of each weapon was about USD 2,500, more than double the legal market value. The police estimate that the factory had been able to produce up to 600 guns before it was discovered and closed down. The weapons were manufactured in a metallurgic workshop with sophisticated metal pressing devices. Although it is too early to state whether or not this is an indicator of the development of a local 'illicit small arms manufacturing industry', this case should be taken as a warning about the capacity of organized crime to find alternative sources of supply for deadlier automatic weapons.

Sources: Dreyfus (2002); Lombardi (2002)

Ghana: Social breakdown and illicit economies[24]

In Ghana, traditional gunsmithing has evolved into large-scale illicit craft production. A network of large-scale local craft shops has emerged, producing high-quality weapons, some of which are sold in neighbouring countries. These weapons are sold through illegal channels, mainly to local criminal groups. Illicit craft production has become a crucial source of revenue for various local communities in Ghana.

There is no regular legal production of small arms in Ghana, nor is there a legal framework for local production. However, recent research has shown that illicit craft production of various types of small arms occurs in Ghana across all ten regions of the country.[25] While officially there are no registered arms producers in Ghana, several families have survived on the skill of gunsmithery for generations. The skill is handed down from father to son or uncle to nephew. Gunsmithing remains a man's business, and is based on traditional practices where guns and muskets play an indispensable role in traditional festivals and celebrations.

Craft production as a cultural and historic profession can be found in societies such as the Akan, who occupy the central and southern belt, the Dagomba of the northern region, and the Ewe who occupy the south-western region of Ghana.

Craft production includes pistols, single-shot rifles, repeating rifles, and traditional 'Dane' and double-barrel shotguns. Most weapons are manufactured from scrap metal, and tropical hardwoods are used for the stock. Craft production has become increasingly accomplished with time and the introduction of more sophisticated production equipment. Locally produced guns are now of a remarkable quality. In the Volta region, for example, there is little to distinguish imported weapons from local ones.

Locally produced guns in Ghana are of such high quality that they are often indistinguishable from imported ones.

In the rural areas where craft production often takes place, it is an important source of income, especially to the families involved in the production of the weapons. Since it takes between 12 hours and a week to manufacture a gun, but at least six months to sow and reap corn or cassava, the economic value of craft production is significant. It can provide more value to the local economy than agriculture. In June 2001, a craft-produced single-barrelled gun sold for USD 60. With increasing demand, the same gun (as of August 2002) now sells for about USD 150. Demand for Ghanaian guns stretches across west Africa. Locally manufactured guns are trafficked through illicit channels into Benin, Burkina Faso, Côte d'Ivoire, Nigeria, and Togo. Presently, it is impossible to determine whether these countries are the end-station for exports or serve only as transit points for re-exportation. The volume of trade between Ghana and Nigeria and the role of brokers in this commerce have concerned both governments enough to sign a Memorandum of Understanding in August 1999 to exchange information on illicit trafficking of small arms, including craft-produced weapons.

The Ghanian government has made only feeble attempts to control the illegal production of small arms. The most recent effort to mop up excess unregistered weapons occurred barely a month after President Kufour assumed power in January 2001. His Ministry of Interior announced a two-week weapons buy-back moratorium under which those in possession of unregistered weapons could surrender them to the police. After the period elapsed, a joint police-military operation, code named *etuo mu ye suom* ('inside the barrel of the gun is dark' in Asante-Twi), was launched. After 18 months, the quantity of small arms retrieved has yet to be publicized. A small ceremony took place in which almost 900 small arms were destroyed. Yet it is estimated that there are at least 40,000 illicit small arms in Ghana. To better cope with this situation, the Arms and Ammunitions Act of 1972 is being revised by the Ministry of Justice and the Attorney-General's Department to conform to the new challenges posed by local craft production and societal demands and needs.

South Africa: A legacy of apartheid[26]

In South Africa, home-made weapons were extensively used in the political struggle against white-minority rule. At present, craft production is a relatively small activity due to the country's liberal arms licensing regime and the availability of commercially produced weapons. Craft-produced arms are mostly used in fighting between rival groups in some of the country's rural provinces. South Africa is a medium-sized small arms producer (see Table 1.3). In 2001, the country exported more than USD 800,000 worth of small arms and ammunition, amounting to eight per cent of the value of its total defence exports.[27] Domestic sales have been facilitated to date by a liberal licensing regime.

Only whites could obtain firearm licences before 1983, when the Firearms Act was amended. Legislation concerning legal firearm ownership lost its racial basis only in 1994, with the end of apartheid. This meant that,

during the violent decades of the past, much of the fighting inside South Africa was carried out with crudely fashioned home-made firearms. Home-made weapons remain common and their quality continues to improve. Commercially manufactured firearms have always been more readily available in urban areas, while home-made weapons are increasingly common in the vast rural areas of the country, and especially the provinces of KwaZulu-Natal and the Eastern Cape.

It is very difficult to estimate the scale of home-made production in South Africa. According to police sources, both the number of home-made weapons seized and the quality of these weapons have risen over the years. It appears that home-made weapons account for approximately 11–22 per cent of total illegal firearm seizures in the country. To date, the South African police, while noting the increasing dexterity in the manufacture of these home-made weapons, see little evidence to show that they are being produced on a large scale or that their production is becoming more widespread. There seems to be little to indicate that the production of these weapons is generating significant income. The main reason for their use seems to be that they are cheaper than commercially made firearms.

Generally, home-made weapons found in South Africa are crude, with some fantastic variations. For example, police recently destroyed a triple-barrel gun made of a block of wood and a metal pipe that weighed about 2kg. Some weapons are no more sophisticated than a metal tube with a firing pin, while some show evidence of knowledge of metal casting. Home-made weapons rarely show up at urban crime scenes in South Africa. Most of these weapons are seized by police in the rural provinces of KwaZulu-Natal and the Eastern Cape. They are used for a variety of purposes, ranging from the protection of livestock to what is still called 'faction-fighting' between rival groups in these provinces. There is little evidence that South African home-made guns are sold to other countries, although there may be some back-and-forth trade between South Africa, Lesotho, and Swaziland. The Firearms Control Act of 2000 prohibits the manufacture, possession, or use of all home-made firearms, and establishes strict penalties for those found guilty of possessing them. The South African Police Service has also prioritized the policing of firearms, including the seizure of illegal weapons. In combination, these measures should serve to limit the incidence of craft production in South Africa in the coming years.

Turkey: From Ottoman art to government inefficiency[28]

In Turkey, the production of firearms was traditionally a craft for skilled artisans, and over the centuries it has become increasingly sophisticated. Firearms were originally manufactured mostly for self-protection, hunting, and/or personal display. Today, Turkish craft-produced arms still retain many of the traits of their high-end, artisan roots. This often makes them more sophisticated and costly than craft weapons in many other countries. Today they tend to be bought mainly by local people, generally farmers, but also criminals. When the rules for obtaining a gun permit were recently tightened, individual demand for craft production increased. Craft production in Turkey is still mainly geared for domestic demand, but allegedly there have been some illicit supplies to Syria and Iran (Forecast International, 2002).

In the 1980s, the government made an effort to legalize illicit small arms production by incorporating craft producers into a national programme of small- and medium-scale enterprise development (Altınsoy, 2001). Regular, legal production of small arms in Turkey is concentrated in the state-owned Machinery and Chemical Industry Establishment (Makina ve Kimya Endustrisi Kurumu, MKEK) founded in 1950. Until the early 1990s, MKEK was the only company legally permitted to produce small arms in Turkey.

Craft production occurs mainly in the north-eastern area of Turkey on the Black Sea coast, principally in towns such as Giresun, Gumushane, Ordu, Rize, Samsun, and Trabzon. This area is famous for its skills and expertise, which have been passed down from father to son for generations. The prices of craft guns are claimed to be about 30 per cent lower than for legally produced ones, and it is claimed that the quality of craft products is higher than those produced by MKEK (Akca, 2002). There is no data available to assess the economic value of craft production or the number of home-made firearms in circulation. However, police data shows that between 1995 and 1999 an average of 900 illicit small arms, of which at least 20 per cent were home-made, were seized per annum.[29]

In order to improve state control over small arms, the then president of Turkey, Turgut Ozal, started the north-eastern Black Sea Region Arms Project in the mid-1990s. Craft production was shifted from back-street workshops to factories established through the Small and Medium Scale Enterprise Board (KOSGEB) and MKEK. In 1995, five companies were established: Tisas in Trabzon, Asilsan in Rize, Kussan in Gumushane, Girmas in Giresun, and another firm in Ordu (*Turkish Daily News*, 17 October 1996). All rely exclusively on government and MKEK contracts. At first the companies collectively employed around 200 craftsmen, most of whom previously worked illegally (Altınsoy, 2001).

The results of this initiative have not been particularly successful. Between 1993 and 1997, these companies delivered 10,000 side arms to MKEK (Forecast International, 2002). Total production by all five firms amounted to approximately 50,000 weapons by early 2002 (Akca, 2002), but the quality of the firearms produced has been problematic. The expected levels of demand for these weapons from MKEK and the Turkish security forces have not materialized, and many of the companies are struggling to survive. In addition, the introduction of stricter rules for issuing gun permits has shifted demand towards illicit craft production. The companies in Ordu and Gumushane have stopped production (Akca, 2002). Among the surviving firms, Tisas in Trabzon is the most successful. The company currently has 38 workers, down from 150 workers a few years ago, but it still makes handguns for various clients including the Turkish navy and air force. The remaining three factories (in Rize, Trabzon, and Giresun) will probably close in the near future unless they receive new government production orders. If these factories close, it is likely that many of the workers will simply revert to illicit craft production.

Pakistan: Tribal traditions and entrepreneurship[30]

In the tribal areas of Pakistan's Northwest Frontier Province, traditional small-scale craft production of small arms has experienced dramatic change in the last two decades. Rising demand from outside the region and the introduction of profit goals have given an old business new vigour. The combination of strong traditions, highly skilled labour, flexible production methods, dynamic local entrepreneurs, and steady demand has spawned a flourishing illegal firearms production network that caters to both domestic and foreign clients, legal and illegal markets. The central government, whose influence in this region is limited, has made some efforts to eradicate the system, but with meagre results.

Darra Adam Khel is infamous as the centre of Pakistan's small arms craft production industry (Malik, 2000; Small Arms Survey, 2001, p. 47). A town of about 300,000 people in the tribal belt bordering on Afghanistan, it is known for the illegal manufacture and supply of small arms, and is home to more than 3,000 'father-and-son' operations manufacturing, trading, and selling weapons (Bonner, 2002). Prior to the 1980s, they catered to the traditional demand of the tribal area, mostly for repeating rifles. The flood of weapons supplied to the mujahideen forces in

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A boy employed in an illegal workshop, making home-made Kalashnikovs in Darra, Pakistan.

Afghanistan between 1982 and 1988 transformed Darra, enhancing the local smiths' knowledge and capacity to repair and produce a wide range of more lethal weapons. Since then, production has continued to serve local demand as well as Afghan fighters, Kashmiri separatists, and Islamist militants. Production of all types of weapons is estimated at roughly 20,000 units annually.[31]

Interestingly, craft production in Darra has catered to the demands of both the legal and the illegal market. 'Legal', in this case, is defined as involving people who acquire equipment after the granting of a firearm licence. According to figures provided by the Pakistani Ministry of the Interior, there are approximately seven million licence-holders in the country (Siddaqa-Agha, 2002).[32] There are an even greater number of illegal buyers.

Curiously, under Pakistani law there is no prohibition on the purchase of weapons from illegal manufacturers, such as in Darra. As a result, even Pakistanis with licences tend to buy their equipment from craft makers in Darra because of the lower prices. An entirely locally manufactured AK-47 can be obtained for USD 80–100. A locally assembled AK-47 (with foreign components) costs USD 360–400, while an original Russian-manufactured AK 47 costs USD 700–1,000.

The quality of weapons produced in Darra varies considerably, but production methods tend to be crude and do not require high skills. Raw materials like steel are acquired from local markets, and sub-standard materials are often used (Kartha, 2000). For many buyers, attracted by low prices or illegal needs, quality concerns are secondary. Illicit craft production in Pakistan was highly profitable until 11 September 2001, when strategic imperatives forced Islamabad to adopt stricter measures to reduce the availability of illicit weapons in the country (Bonner, 2002). In this context, the government tried to convince the gunsmiths of Darra to convert their production facilities to other products, such as kitchenware. A plan to employ some workers from Darra in the Pakistan Ordnance Factories (POF) to produce small arms and ammunition for the armed forces has not been particularly successful.[33] Despite these measures, it seems that craft production of small arms in Darra will continue, given that the central government has never been able to fully exert its authority over the tribal areas.

Illicit small arms production occurs throughout the Philippines, supplying separatist groups and organized crime.

The Philippines: When ammunition is plentiful[34]

Craft production of small arms has a long history in the Philippines. During the period of Spanish colonial rule, Filipinos were already manufacturing small arms. Today, craft production of small arms is widespread throughout the country.[35] This activity is a manifestation of a long-standing gun culture, and is fed by the demand for low-cost weapons from criminals and rebel groups, and for personal defence.

As of April 1998, there were about 45 legal firearms manufacturers, 522 authorized dealers, and 133 gun repair shops in the Philippines, according to the Firearms and Explosives Division of the Philippine National Police

(Lubang, 2002). The largest concentration of these manufacturers is around Danao City and Mandaue City in the Visayas, where arms production has been a way of life for decades. In Danao alone, there are estimated to be 3,000 gunsmiths, and as many as 25,000 people are believed to rely on the gun trade for their livelihood (Capie, 2002, p. 71). Apart from the Government Arsenal, the largest domestic legal manufacturer of small arms in the country is a private company, the Arms Corporation of the Philippines (Armscor), which can trace its roots back to the early twentieth century. The company, which is based in Marikina City, manufactures a wide range of small arms, and its products are sold to more than 20 countries.[36]

A Filippino gunsmith checks the quality of a home-made pistol. Some home-made weapons are indistinguishable from legally-produced ones.

Illicit small arms production and trafficking are prevalent throughout the Philippines, serving the needs of various Islamic separatist groups and organized crime. For many would-be Philippine gun owners, though, bullets are easier to obtain than firearms. Although a buyer needs a gun licence or a private security licence issued by the Philippine National Police to buy ammunition, unscrupulous bulk buying by licence-holders serves a large black market.

In addition to a large legal small arms industry, the Philippines is home to a significant number of illicit craft producers, many of which are based around Danao and Mandaue City (Capie, 2002, p. 72). The easy availability of ammunition has also assisted in the development of a widespread craft production industry in the country, where home-made firearms are manufactured from ordinary household plumbing materials (like pipes), steel bars, and even old car parts. Known locally as *sumpak*, these home-made weapons have contributed to the country's growing stockpile of illicit firearms.[37]

People commonly ask their friends with Private Security Licences to buy ammunition for them. This is a simple legal transaction that feeds illegal *sumpak* production. The price of these home-made weapons reportedly ranges from USD 6 to USD 20, depending on the quality of the materials, workmanship, and safety for the user. *Sumpaks* are

a cheap substitute for quality firearms, with shortcomings that directly impair their usefulness. They are risky to use, are effective only at short ranges, and better for maiming than killing. Since quality and value are low, *sumpaks* have little or no export appeal. According to police reports, *sumpaks* are commonly used in street crime like robbery, predominantly in or near poor urban communities across the country. Rebel movements like Abu Sayyef are better financed and rely on smuggling to acquire better-quality weapons—typically preferring automatic rifles.

The Philippine government has made some efforts to control illicit craft production. The number of illicit guns is estimated by the Philippine Police to be between 270,000 and 600,000 (Capie, 2002, p. 72). Outside analysts, however place the total closer to 4.2 million illegal firearms (Small Arms Survey, 2002, p. 99). Presidential Decree 1866, as amended by the Republic Act 8294, penalizes the unlawful manufacture, acquisition, disposition, or possession of firearms, parts of firearm or ammunition, and the machinery tool or instrument used or intended to be used in the manufacture of any firearms or ammunition. However, existing laws do not control and monitor the 'illegal' acquisition of ammunition, the primary element driving craft production in the Philippines.

Pacific Islands: When nothing else is available[38]

In the Pacific region, craft production of small arms has in the past been fairly rare and relatively unimportant, providing limited economic benefits to the producers. This has begun to change, as armed crime and political conflict have become increasingly endemic to the region.

No country or territory in the southern Pacific other than Australia and New Zealand currently engages in the legal manufacture of small arms or ammunition. Market demand and economies of scale simply do not exist to support a viable small arms production capacity in most of the smaller island states. However, pockets of craft production have sprung up in some areas, for different reasons. Improvised weapons were prominent in both the recent Bougainville and Solomon Islands conflicts. According to some sources, craft production was facilitated by the ready availability of old stocks of ammunition from the Second World War, of mostly .30 or .50 calibre.[39] Though the normal deterioration of chemical and metal products in humid climates suggests that only small stocks of ex-Second World War firearms remain, ammunition of this calibre can still be found in useable condition.[40] As in the Philippines, the availability of such ammunition lends itself to the production of craft weapons made from plumbing materials such as pipes.

In the southern Pacific, home-made guns are predominantly supplied to criminals and militant factions engaged in conflict. In Bougainville, craft produced weapons were used by the Bougainville Revolutionary Army (BRA). The Bougainville Resistance Forces, which emerged in reaction to the BRA, relied more heavily on factory-made weapons stolen or 'gifted' from the Papua New Guinea Defence Force. During the nine-year conflict, the BRA was able to construct a mini-hydro scheme from disused mine equipment, which powered a small gun factory.[41] Many of the 892 home-made weapons turned in by 24 October 2002 as part of the current peace process may have been manufactured in this way.[42]

In the Solomon Islands conflict, home-made firearms were predominantly used by the Isatabu Freedom Movement. The Malaita Eagle Force had less need for them, since most of its arms were sourced from police armoury raids.[43] These home-made weapons were originally very crude, with a sliding bolt-type door lock released under spring action. As time passed, production became more refined with better stocks, stepped barrels, and bolts fitted with internal firing pins—very much like a traditional bolt-action rifle.[44] Yet there still appear to be limits to what can be accomplished in isolation. While other home-made weapons which have appeared in these conflicts include

12-gauge shotguns, .22 and .303 rifles, 5.56mm and 7.62mm rifles, 40mm cannons, and even an anti-tank gun, observers of both conflicts report no hard evidence of any local production of self-loading, semi-automatic, or automatic firearms.[45]

In the post-conflict environments of the Pacific, home-made weapons seem to be virtually worthless. There is, though, a small craft production industry on the Papua New Guinea (PNG) mainland. Here, too, water pipes are the main raw material, and production is generally very crude.[46] Home-made single-shotguns and pistols have been found throughout Papua New Guinea, from Lae to West New Britain and the Highlands.[47] It is difficult to identify the main locations for production, or what volume is being produced, but the Highlands are certainly a key centre of both demand and supply.[48] Price gives an indication of the comparative value of home-made weapons. In the PNG Highlands, a home-made shotgun reportedly costs between USD 25 and USD 50. In the same region, an Uzi fetches up to USD 500, and a highly desirable M16 or AR-2 will fetch about USD 1,250–2,500.[49]

During the Cold War, the countries of CEE were major suppliers of small arms to many parts of the world.

REGIONAL SURVEY: SMALL ARMS PRODUCTION IN CENTRAL AND EASTERN EUROPE

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Workers in a Kalashnikov factory in Bulgaria.

The global small arms industry is not homogenous and the production of small arms and ammunition varies considerably between countries. In this section we focus specifically on one region, central and eastern Europe (CEE),[50] which is home to some of the world's oldest and best-known small arms producers. In selected countries, case studies of the most important companies are also presented.[51]

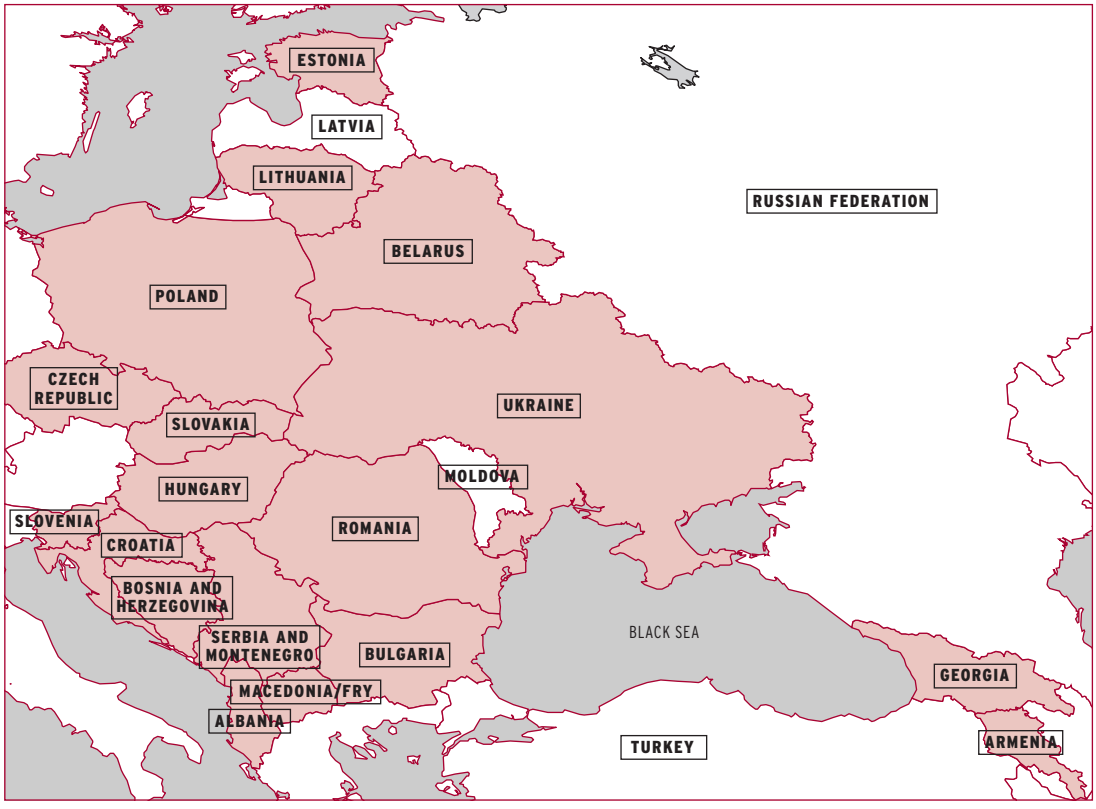
During the Cold War, many of the CEE countries, together with producers in the United States and western Europe, were major suppliers of small arms to many parts of the world.

Since the end of the Cold War, the defence industry and the small arms sector in CEE have undergone a dramatic process of downsizing, restructuring, consolidation, and privatization. In many countries in the region, output and employment in the defence sector have shrunk by nearly 90 per cent since the Cold War. Companies have been forced to modernize their production processes, develop new products (including a switch to NATO standards), adopt market principles, and develop international linkages (Kiss, 2002b). As a result of these processes, many small arms producers in CEE (both state-owned and private) have disappeared through bankruptcy, mergers, or acquisitions. Those that have managed to survive either rely

heavily on state handouts (or contracts) or have been forced to aggressively pursue export markets, including sales to a number of highly questionable destinations in Africa and other parts of the world (TRANSFERS).

Based on existing information and research, it is clear that at least **18 countries** in CEE, which excludes the Russian Federation, have the capacity to produce small arms and/or ammunition. Current production capacities vary considerably between countries, but more than half of the countries in the region have a known capacity to produce a variety of small arms such as side arms (pistols, revolvers), rifles, and sub-machine guns.

Map 1.1 Central and eastern Europe, small arms-producing countries



Defence production, including the production of small arms, declined dramatically in many countries in CEE in the decade after the Cold War. However, by the end of the 1990s the general crisis in the CEE defence industry was over, and the defence production base had more or less stabilized, thanks to general economic recovery in many countries in the region, NATO membership for countries such as the Czech Republic, Hungary, and Poland (and the possibility of other countries in the region to be admitted to NATO in the near future), renewed state assistance for the defence sector, and defence companies' own restructuring efforts (Kiss, 2002b).

Governments' and companies' policies for adapting to the dramatic decline in demand for defence goods varied from country to country. In Hungary, for example, the government pursued an outward-oriented, hands-off strategy

Table 1.9 Countries producing small arms and ammunition in central and eastern Europe*

Region/Country	Small arms**	SALW ammunition
Central Europe		
Czech Republic	X	X
Hungary	X	X
Poland	X	X
Slovakia	X	X
South-east Europe		
Albania	#	#
Bosnia and Herzegovina	X	X
Bulgaria	X	X
Croatia	X	X
Macedonia/FRY		X
Romania	X	X
Serbia and Montenegro	X	X
Slovenia	X	X
Former Soviet Republics		
Armenia	X	X
Belarus	X	X
Estonia	X	
Georgia	X	
Lithuania	X	
Ukraine	X	X
Total (known)	**16**	**14**

Notes: * Assessment of current production capabilities based on both primary and secondary sources.
** This column indicates unspecified production of small arms (including commercial firearms) and light weapons.
X Known production.
Unknown production.

Sources: Forecast International (2002); Gander and Cutshaw (2002a; 2002b); Omega Foundation (2002); Reed (2002); CAST (2002a; 2002b); Kiss (2002b); Grillot (2002)

towards the defence sector, whereas in Slovakia the government pursued a more inward-oriented, interventionist strategy. In the Czech Republic, the government moved from a policy that advocated defence–industrial conversion and curbing defence-related exports in the early 1990s towards a laissez-faire industrial policy, which promoted defence-related exports from the mid-1990s. By the end of the 1990s, many governments in CEE had reconfirmed the importance of their domestic defence industries. To this end, they implemented important measures on both the demand and the supply side, actively promoted exports, placed significant orders with domestic producers, and re-established state ownership of certain companies (Kiss, 2002b).

Out of sheer necessity, and in some cases with government support, some countries in CEE have emerged as major exporters of small arms, particularly to the United States and other western markets. Table 1.10 provides some information about CEE exports of firearms to the United States.

Table 1.10 CEE exports of firearms to the United States, 2000–2001

Country	2000				2001			
	Handguns	Rifles	Shotguns	Total	Handguns	Rifles	Shotguns	Total
Bulgaria	6,429	0	0	6,429	6,142	6,429	0	12,571
Croatia	5,500	0	0	5,500	0	0	0	0
Czech Republic	19,006	19,425	115	38,546	27,874	14,515	20	42,409
Hungary	12,200	3,100	0	15,300	13,328	0	0	13,328
Poland	0	0	0	0	3,000	0	0	3,000
Romania	2,000	21,060	0	23,060	1,000	42,100	69	43,169
Serbia and Montenegro	0	0	0	0	0	1,584	0	1,584
Ukraine	0	0	0	0	8,835	0	0	8,835
Total: CEE	45,135	43,585	115	88,835	60,179	64,628	89	124,896
Total US imports	712,662	308,348	317,368	1,338,378	712,005	321,713	378,261	1,411,979
CEE/ total (%)	6	14	<1	7	8	20	<1	9

Sources: United States, ATF (2002a); Thurman (2002)

From Table 1.10, it is clear that the Czech Republic and Romania are the largest CEE suppliers, by volume, of firearms to the United States. Between 2000 and 2001, CEE countries collectively increased their volume of firearms exports to the United States by 42 per cent (from 88,000 to 125,000), and their share of total US firearms imports from seven per cent to nine per cent. In 2001, eastern Europe accounted for 20 per cent of all rifles imported into the United States (United States ATF, 2002a).

In 2001, countries in CEE accounted for 20 per cent of all rifles imported into the United States.

Production of small arms has a particular position within the defence industry in CEE. Since these products constitute the personal equipment of infantry troops, their production in general is maintained at least at the level of domestic demand, even when other sectors of the defence industry are left to fend for themselves. This means that in many countries small arms production facilities are kept open, even with very low levels of output, in order to maintain a domestic production capability. Due to the relatively unsophisticated nature and low technological level of small arms production in CEE, many producers have been left out of the large-scale, high-tech modernization projects, often associated with NATO membership, that have been occurring in some countries in recent years (Kiss, 2002b).

Central Europe

The countries of central Europe, with the exception of Slovakia, are among the most important producers of small arms in CEE. The Czech Republic, Hungary, and Poland all have well-established, diversified small arms production capabilities, and are significant exporters of small arms.[52]

Czech Republic

Exports of small arms are an important component of Czech defence exports.

The Czech Republic is one of CEE's largest and best-established small arms producers.[53] The country's defence industry was significantly restructured and downsized in the early 1990s. After 1993, government policy shifted towards promoting arms exports. There are currently at least 100 defence-related companies in the Czech Republic, of which about 25 are involved in the production of small arms and/or ammunition (Omega Foundation, 2002). Small arms

production and export takes place in a highly competitive environment (Grillot, 2002). Total employment in the defence industry is about 18,000 (BICC, 2002). The total value of small arms production in 2001 was USD 6 million, approximately five per cent of total defence industry output (USD 125 million). Nearly 80 per cent of Czech defence production is for export (USD 100 million), and exports of small arms (particularly handguns, rifles, and ammunition) are an important component of Czech defence exports (Kiss, 2002b).[54]

Ceska Zbrojovka is one of the oldest and most famous companies in the Czech Republic. Established in 1936, it managed to survive the years of defence industry crisis by converting to sport and hunting weapons production. In the mid-1990s, it was the first Czech company to produce weapons to NATO standards (using largely its own resources). Even though at the time the government decided not to order these products, the company managed to find important western markets, including Germany and the United States. By the late 1990s, however, some of the company's western markets had eroded and it was facing serious financial difficulties. A major government order to supply the Czech police with 46,000 CZ 75 pistols in November 2001 provided a considerable boost to the company. In November 2001, Komercni Bank, which owned about 70 per cent of the company's shares, sold its stake to the Eximat Company from Hradec Kralove for USD 6.1 million (Lesmeister, 2002, p. 3). At present the company produces a range of pistols, sniper rifles, automatic weapons, and sporting and hunting rifles. The company employs 2,100 people, and its products are exported to around 80 countries worldwide. Exports account for about 90 per cent of production. The company has two subsidiaries, located in Slovakia and the United States.

Zbrojovka Arms was established in 2000 as an independent private company.[55] It was created from the former special division of Zbrojovka Brno, a large-scale heavy metallurgical plant with significant military-related production. During the transition years Zbrojovka Brno was decentralized and its former branch enterprises were privatized or liquidated separately. At present Zbrojovka Arms is owned by the Zbrojovka Brno Holding, whose majority owner is a private Czech entrepreneur. After a thorough inventory of the company's assets, Zbrojovka Arms was reorganized and production started in May 2001 with 110 employees. The whole production and management process was reorganized; productivity was significantly increased by strict quality control introduced. The company exports high-quality sporting and hunting weapons to western markets, mainly in the European Union, and is now a serious competitor to Ceska Zbrojovka. There is no current production of military-style small arms.

Sellier & Bellot, established in 1825, is one of the world's leading producers of small arms ammunition, for both military and commercial markets.[56] Until 1989 the company's main business was military cartridges for the Czech armed forces. It is one of the few Czech enterprises that managed to handle the difficult years of transition relatively smoothly. Alternative, civilian production lines—sport and hunting ammunition—were introduced from the very beginning of the 1990s. The company's majority owner is a Czech institutional investor. At present only 20 per cent of its output is for the military market; the rest is civilian. More than 80 per cent of the company's production is exported (to more than 70 countries), and the main markets are the United States, Germany, and other western European countries. After a decrease in the early 1990s, output started to increase from the late 1990s, and in 2001 over 460 million units of ammunition (up from 247 million in 1995) were produced. Total sales in 2001 were USD 30 million and the company aims to achieve total sales of USD 40 million by 2005. Since only approximately 75 per cent of the company's production capacities are being used at present, management foresees a further increase of output in the coming years. The company currently employs 1,400 workers, down from approximately 4,000 in the mid-1980s (Kiss, 2002b).

Policske Strojirny, established in 1920, is one of the oldest ammunition producers in the Czech Republic.[57] In 1989, at least 80 per cent of the company's output was military, but after 1990, military-related orders came to an abrupt end. In the early 1990s the company underwent a deep crisis due to large-scale indebtedness, loss of markets, and a lack of feasible projects. However, in the mid-1990s the company started to recover. Total sales in 2001 were USD 5 million and the company at present employs 440 workers, down from 1,300 in 1989. The company's military-related profile concentrates on high-calibre ammunition and special firearms for security forces or civilian defence. At least 20 per cent of the company's output, mainly civilian products, is exported. Military-related production stopped in 2000 and the company is able to meet small-scale orders from its existing stocks. Despite the low level of military-related demand, since 1995 the company, along with some other military-related research institutes, has been participating in a project to develop electronically-controlled ammunition.

Hungary

Hungary is also one of CEE's most established small arms producers, but its defence industry is small compared with other countries in the region.[58] Unlike the Czech Republic or Slovakia, the government in Hungary has followed a relatively 'hands-off' approach to defence industry restructuring, and has assisted only those companies that have managed to survive through their own efforts (Kiss, 2002b). Domestic demand for small arms is extremely low despite a ten-year modernization of the Hungarian armed forces (linked to the country's membership of NATO). Nearly 60 companies in Hungary are registered as defence-related producers, but only 10–15 companies account for the bulk of defence production and exports (Saferworld, 2002). At least eight companies or enterprises are involved in some aspect of small arms production (Omega Foundation, 2002).

At present, the total output of the Hungarian defence industry is worth an average of USD 34 million per annum, of which approximately one-third (USD 11 million) is exported. At least 50 per cent of total defence output is accounted for by the production of small arms, light weapons, and/or ammunition. Currently 1,600 people are employed in the Hungarian defence industry. Hungary has in recent years adopted fairly strict arms export regulations (in line with the EU Code of Conduct) and this has limited the country's export potential. Exports of small arms (mainly handguns) and related ammunition represent approximately 35-40 per cent of total Hungarian defence-related exports. Production of handguns amounts to approximately 10,000 pieces a year, with sales worth about USD 1.7 million per annum (Kiss, 2002b). The main markets for Hungarian small arms exports are the United States[59] and Germany.

Fegarmy (FEG) was once Hungary's most important and successful producer and exporter of small arms, particularly handguns. It produces a range of small arms, including assault rifles, hunting rifles, sub-machine guns, and pistols for Hungary's armed forces, police, and a number of foreign clients. However, the company has not managed to overcome its recent financial problems. Even though the government authorized its complete privatization, the state asset managing company, APVRT, has been unable to sell it (Kiss, 2002b).

MFS 2000 Magyar Loszergyarto was originally a branch of Matravideki Femmuvek, a large-scale heavy industrial complex.[60] The mother company was decentralized in the early 1990s; its different production profiles were reorganized into independent companies and privatized one by one. The company went through a rather difficult period during most of the 1990s (Small Arms Survey, 2001). At the end of 1999, the company was bought by a Hungarian investment company, Innoterv. MFS is currently Hungary's most important domestic small arms ammunition producer. At present the company employs 250 people. More than 80 per cent of its output is military-

related; the rest consists principally of hunting and sporting ammunition. Domestic demand represents 30 per cent of the company's output. MFS exports its products worldwide; its main recipients are the United States, Germany, Austria, Italy, Venezuela, Turkey, Lebanon, and Israel. The company has actively pursued international co-operation in recent years. It has participated in an international development project with Finland, Germany, Norway, and Sweden to create a new type of ammunition. In 2001, the company set up a joint venture with the Austrian company Hirtenberger.

Nike-Fiocchi is a joint venture between the Hungarian company Nitrokemia and the Italian company Fiocchi Munizioni.[61] The company produces small arms ammunition (for hunting and sport) and is Hungary's only producer of hand grenades. In 2001, the company had total sales of USD 5.3 million, and employed 90 people. Approximately 20 per cent of total output goes to the domestic market. The rest of the company's output is exported; sporting and hunting ammunition is sold to the United States, Japan, and several western European countries.

Poland

During the late 1980s, Poland had one of the largest defence industries in CEE, ranked third in size after the Soviet Union and Czechoslovakia (Saferworld, 2002). After the fall of the Soviet Union and the dissolution of Czechoslovakia, Poland emerged as the largest weapons producer in CEE. However, by the late 1990s the defence industry was struggling to survive, despite the country's impressive economic growth. The industry currently employs about 60,000 people (BICC, 2002), and 38 companies are considered to constitute its core (Wieczorek and Zukrowska, 2000, p. 123). According to government officials, the small arms industry in Poland is 'dying' because the available profits are too small and competition is too great (Grillot, 2002). At least 20 companies or enterprises are reportedly involved in some aspect of small arms production (Omega Foundation, 2002). Government officials state that only four companies are currently licensed to export small arms (Grillot, 2002).

After the Cold War, Poland emerged as the largest weapons producer in CEE. Today, the country's defence industry is struggling to survive.

Privatization of the defence industry began only in 1999 and most companies remain in state hands, under the control of the state industrial development agency. Some privatization has taken the form of debt–equity swaps. In recent years, the government has provided significant financial assistance and placed orders with domestic companies to help the industry survive. The country's major small arms producer, **Zaklady Metalowe Lucznik,** which manufacturers a range of small arms, was declared bankrupt in November 2000, despite an order earlier in the year from the Polish government worth USD 1.8 million for 4,000 assault rifles for the country's border guards (*NewsEdge*, 7 September 2000).[62] Other manufacturers of small arms include: **Fabryka Broni** (assault rifles, sub-machine guns), **H.Cegielski-Poznan** (machine guns), and **Zaklady Metalowe Dezamet.** The country's major small arms ammunition producers include **Zaklady Metalowe Mesko** and **Zaklady Tworzyw Sztuczynych Pronit** (Small Arms Survey 2001; Saferworld, 2002).

Slovakia

Most of the former Czechoslovakia's defence industry was located in what is today Slovakia. The Slovak defence industry has downsized quite dramatically in recent years. Currently, about 2,000 people are employed in the industry, down from approximately 40,000 in the late 1980s (Grillot, 2002). Most of the Slovak defence industry is grouped together in the **DMD Holding Group,** which was established in 1995 with the aim of co-ordinating development and production in the defence industry, and preventing the sector's decline. There are still 140 defence companies in Slovakia, all of them primarily state-owned. Most of these companies are survivors of subsidiary companies of two

former large-scale industrial companies, ZTS and ZVS, which had plants all over the country (Kiss, 2002b). Only between eight and ten companies or enterprises are involved in some aspect of small arms and/or ammunition production (Grillot, 2002; Omega Foundation, 2002). **PS Povzbroj** manufactures a 9mm pistol and associated ammunition. **Zavody Vseobecneho Strojarstva (ZVS)** produces small arms ammunition (Saferworld, 2002). **Technopol,** a semi-private company, produces small arms ammunition (Forecast International, 2002).

South-eastern Europe

A number of countries in south-eastern Europe, such as Bosnia and Herzegovina, Bulgaria, Croatia, Romania, and Serbia and Montenegro have well-established small arms production capabilities. Macedonia/FRY has the capacity to produce small arms ammunition (Gander and Cutshaw, 2001b, p. 684; Omega Foundation, 2002). There is no information on whether small arms or ammunition are currently being produced in Albania.[63]

Bosnia and Herzegovina

During the era of the former Socialist Federal Republic of Yugoslavia (SFRY), Bosnia was home to more than 40 per cent of the federal republic's defence industry, employing some 38,000 workers. The bulk of SFRY small arms production took place in Bosnia. The civil war starting in 1992 divided the factories along ethnic lines with the Federal Republic of Yugoslavia retaining the majority of production facilities (BICC, 2002, p. 131). Since the end of the war in 1995, many of Bosnia's production facilities have been re-established, and the country has the capacity to produce various types of small arms and ammunition. Small arms ammunition is produced at plants in Konjic (Igman), and at Gorazde (Pobjeda) (Gander and Cutshaw, 2002b).[64] It is not clear whether other ammunition plants located in Seljo, Bugojno, and Vogosca are currently operational. In recent years, Bosnian small arms companies have reportedly sold various types of small arms to countries such as Azerbaijan, Croatia, and Turkey (*Jane's Defence Weekly*, 25 March 1998). Total defence industry employment amounts to 5,000 (BICC, 2002, p. 169) and it is estimated that Bosnia's current defence exports are worth USD 10 million annually (*Jane's Defence Weekly*, 25 July 2001).

Bulgaria

Bulgaria is one of CEE's largest producers of small arms, and experienced a 'golden age' during the Iran–Iraq war in the 1980s.[65] Most of its small arms production is Soviet-standard equipment, initially produced under Soviet licence and now manufactured under Russian licence. In the 1990s, the country began moving towards producing NATO-standard equipment. In recent years, the defence industry has declined quite dramatically, and today about ten per cent of the industry's production capacities are in use. Employment is currently 25,000–30,000, down from more than 100,000 in the late 1980s, and is likely to decline even further in the coming years (Kiss, 2002b). Since 1998, large parts of the Bulgarian defence industry have been privatized through manager and/or employer buyouts. There are about 23 core defence-related companies at present, 18 have been privatized and five remain in state ownership. Current output is at about ten per cent of the record levels of the mid-1980s, and most companies are in a difficult situation because of the lack of local demand and loss of traditional export markets. In order to survive, most companies have tried to increase their civilian production and have aggressively pursued export markets (Grillot, 2002). About 30 per cent of the defence industry's output is accounted for by small arms. Another 30 per cent is accounted for by small arms ammunition. The value of defence industry output is estimated at USD 100 million per annum, of which 90 per cent is exported (Kiss, 2002b).

Since 1998, large parts of the Bulgarian defence industry have been privatized through manager and/or employer buyouts.

Arsenal is a large-scale industrial company and the most important small arms producer in Bulgaria.[66] Still 34 per cent state-owned,[67] it produces a wide range of small arms products, and is most famous for its Kalashnikov assault rifles and light machine guns and Makarov sub-machine guns. Most of these weapons are variations on original Soviet designs. From the mid-1990s, Arsenal developed a new, NATO-standard Kalashnikov-type machine gun, which was tested and accepted by the Bulgarian MoD, but no major orders were placed for it. Arsenal is also able to produce certain types of commercial firearms, mainly for sport and hunting. At present, 80 per cent of Arsenal's output is military-related, although management intends to increase the share of civilian production. About 90 per cent of the company's output is sold abroad. Military-related products are sold in Asia, Africa, and the Middle East, including a small US niche market for carbines. The company is profitable, but this is mostly due to the favourable exchange rate and the fact that the company's enormous unsold stocks are accounted for at amortized prices. In 1999, a large part of the company's debts to the Bulgarian state were cancelled, which helped improve the company's financial situation. Arsenal currently has 4,500 employees, down from 20,000 in the mid-1980s.

Arcus was established in the 1960s and today produces a wide range of small arms.[68] It also introduced a variety of civilian products—drills and automobile parts—in the 1990s, to offset the decline in demand for defence products. The company started to develop NATO-calibre firearms in response to a tender from the Bulgarian MoD in the mid-1990s. Using its own resources, the company gradually created a range of handguns, which was produced for the Bulgarian army and sells in small quantities outside the country. The company also serves a minor market niche for civilian handguns in the United States and western European markets. Arcus was privatized in 1996 through a management–employee buyout scheme. The former managers knew the company well and quickly identified its development potential. They also created several stable product lines that provided the necessary stability to continue developing or adapting new products. Current employment is 2,600. Total output in 2001 was worth approximately USD 20 million. The share of military-related production is 60 per cent; more than 90 per cent of the company's output is exported (Kiss, 2002b).

Other producers of small arms include **Vazovski Mashinostroitelni Zavodi** (grenades, ammunition), **Niti Kazanlak** (small arms, ammunition), **Dunarit-Ruse** (ammunition), **Pima** (small arms, ammunition), and **Montaz i Mechanika** (grenades). In addition, at least 30 companies have arms trade licences. The two most important arms trading companies are **Kintex,** which is state-owned and the country's oldest and most important arms trading company and the primary distributor and exporter of Bulgarian small arms, and **Armimex,** which is privately owned.

Croatia

The Croatian defence industry constituted approximately seven per cent of the former SFRY defence industrial base when the war of independence broke out in 1990–91.[69] When the hostilities started, many Croatian engineers and workers employed by the federal defence industry in other parts of the former federation returned home to Croatia, taking documentation and know-how with them. This formed the base of the independent Croatian defence industry. In the war effort approximately 15 per cent of the budget was directly spent on defence, and by 1992 more than 62 military-related firms had a contract with the MoD, among them seven or eight small arms producers. After the war ended, the new government cut the defence budget and scaled back the active promotion of the defence industry. The MoD put increased emphasis on quality and regularized production, while defence-related companies were expected to struggle like their civilian counterparts. In this context, only a handful of enterprises managed to survive the transition, while many had to close down or continue to suffer from a lack of orders, markets, and resources (Grillot, 2002).

Currently, there are approximately 25 companies, mostly private, that have the potential to produce defence goods, directly employing 1,500 people (down from around 10,000 during the peak of the war). Output has dropped to 15 per cent of 1993 levels, the period of the greatest war effort. However, most of the productive capacities developed during the war still exist (Kiss, 2002b). Most arms exports take place through the state-owned RH Allen Company, although several producers have their own export licences. Total small arms exports are valued at less than USD 1 million annually, indicating that production is largely for the domestic market (Small Arms Survey, 2001, p. 148).

HS Product was originally part of a large heavy industrial complex, IM Metal, based in the city of Karlovac.[70] One workshop of the mother company started to produce small arms during the war of independence, relying on the knowledge of some engineers and workers. After independence, two former company managers bought the small workshop and launched a new product, P.H.P. ('first Croatian pistol', in Croatian) for the newly organized Croatian army. Later, new models were developed and in 2000 the company presented the HS 2000 model, which proved to be fairly successful on the world market. Designed entirely by Croatian experts and developed by the company, the pistol is designed for the police and special armed forces in Croatia and western markets. In 2001, the company concluded a contract with the US-based small arms company Springfield, which markets the product in the United States.[71] In 2002, the company employed 200 people, up from 30–40 in 1992. Output has grown tenfold since 1991. HS Product is an exclusive supplier of small arms for the Croatian defence and security forces. However, because of low domestic demand, exports have grown rapidly, amounting to about 90 per cent of the company's output by 2002.

RH Allen is a state-owned trading company, whose task is to import weaponry for the Croatian national army, export arms produced by the domestic defence industry, and keep a central database for all arms-related transactions.[72] RH Allen also has a mandate to issue permits for the export of military products, on the basis of contracts with foreign partners.

Romania[73]

Romania is one of CEE's most important small arms producers, and during the 1980s it produced a wide range of small arms for its own use and for export to the Soviet Union, Soviet allies, and non-aligned countries in the Middle East and Africa (Saferworld, 2002). In the last decade, the domestic defence industry has downsized dramatically. It continues to be a severe drain on the economy and is still struggling to survive. The government has used a mixture of bankruptcy, modernization, nationalization, and conversion to civilian production to assist with the rationalization of the defence industry (Kiss, 2002b). The defence industry employs around 35,000 people, down from 200,000 in the late 1980s. The industry's total output is estimated at USD 45 million (ten per cent of its 1989 value), of which more than 80 per cent is exported.[74]

The Romanian government has used diverse strategies to assist with the rationalization of the country's defence industry.

The country's most important defence companies are grouped under Romarm, which was created in October 2000 by a merger of two state-owned companies, Romarm National Company and Arsenalul Armatei (*Jane's Defence Weekly*, 22 November 2000). Those firms that were not selected to be placed under Romarm can in principle be privatized and even exit the defence sector. Most of Romania's export sales, including small arms, take place through Romtehnika, a state-owned specialist arms trading company under the Ministry of National Defence.

Romarm is a state-owned holding company, established in 2000 under the supervision of the Ministry of Industry and Resources.[75] It was created within the framework of a defence industry restructuring programme that aims to increase transparency and efficiency in the sector. Romarm unites 16 enterprises (15 producers and one R&D Institute), which

produce a wide range of small arms including pistols, sub-machine guns, machine guns, mortars, and ammunition. Most of Romarm's small arms and ammunition production is concentrated in three plants: Sadu-Gorj, Victoria-Brasov, and Dragomiresti-Dambovita. About 70 per cent of Romarm's output is military-related and 65 per cent of the company's output is sold on the domestic market. The company currently employs 29,000 people. The companies which are now part of Romarm employed around 120,000 people during the late 1980s. All companies are dual-purpose and the goal is to increase the share of civilian production in all companies to approximately 70 per cent in the near future (Kiss, 2002b).

Cugir was established as part of Skoda Works before the Second World War, and during the 1980s became one of Romania's leading producers of small arms.[76] The company has four productive units, two of which produce small arms and ammunition. The company employs 6,000 people, down from 16,000 in the late 1980s. Small arms and ammunition production still represents 60 per cent of the company's output, even though output has significantly decreased since the mid-1980s. More than 60 per cent of the company's output is exported, but the bulk of military-related items are sold on the internal market, principally to the MoD. The company's most profitable activity is small arms ammunition. Originally, ammunition production was based on Soviet licences, but since 1995 the company has been producing NATO-standard ammunition. As a result of the decline in demand for defence goods, the company has diversified into commercial firearms (sporting and hunting weapons) and other goods for the civilian market (*Tribuna Economica*, 2002).

Slovenia

Slovenia has a small defence industrial base, inherited from the SFRY era. In the last decade the defence industry has been substantially reduced, but the country maintains a limited capacity to manufacture small arms and/or ammunition (BICC, 2002, p. 139). Currently about 46 companies are registered with the government as defence-related. In most of these companies, 10–25 per cent of production is defence-oriented (Grillot, 2002). Approximately 80 per cent of these companies are largely privately owned, with the remaining companies scheduled for privatization in the next few years. At least five companies are involved in some aspect of small arms production: **Orbis** (sub-machine guns), **Sto Ravne** (gun parts, ammunition), **Kemijska Industrija Kamnik** (explosives, grenades), **Technicni Zavod** (gun parts), and **Alpimex SL** (rifles) (Saferworld, 2002; Omega Foundation, 2002; BICC, 2002). Most production is for domestic military consumption, with few exports.

Serbia and Montenegro

The defence industry was a pillar of the economic and political system in the former SFRY and produced a wide range of small arms products.

Defence production was a pillar of the economic and political system in the former SFRY.[77] Most defence-related production facilities were concentrated in the territories of the present Serbia and Montenegro, and Bosnia and Herzegovina. The former SFRY defence industry was an important player in the global defence market before 1989, due to the country's non-aligned status (BICC, 2002, p. 128). The country produced a wide range of products, including small arms under both western and Soviet licences, which were exported in substantial quantities to a large number of countries on both sides of the Cold War (BICC, 2002, p. 128). Before the NATO bombing campaign in the spring of 1999, the local defence industry consisted of 15 plants, which employed 30,000 people (*Jane's Sentinel Security Assessment*, 10 December 1999). During the NATO air strikes, some of the federal (Serbian) defence production facilities were destroyed, but many remained operational. The defence industry still employs approximately 20,000 people (BICC, 2002, p. 170). The bulk of the production facilities and companies are still state-owned and, despite intense efforts to re-establish trade and co-operation links with western partners, investments and export markets are still much reduced.

Zastava Arms Company is the oldest military plant in the territory of the former SFRY, having been established in 1853.[78] During the 1960s, when military-related demand was relatively low, the company diversified into civilian products, including cars. From the early 1990s, in the framework of a conversion project, it began producing sporting and hunting weapons. The company is part of a wholly state-owned holding company that shares an industrial estate with several other Zastava branch companies, including the famous carmaker. During the NATO bombing in 1999, several parts of the industrial estate were destroyed, but the weapons-producing facilities were not touched. Due to a lack of demand, at present the company only uses 30 per cent of its production capacity. There have been no new investments in the last ten years and the company's financial situation is very fragile. Despite its precarious state, in the last few years the company has managed to develop some new weapons, for example an advanced version of a police revolver based on a US design.[79] At present, the company's main products are handguns. In the late 1980s, 90 per cent of the output was military-related; now the share is 40 per cent. During the 'golden age' of 1975–90, the company exported its products worldwide (including large amounts to the US market) and employed 9,000 people. Today, the number of employees has dropped to about 4,500, and of those about 40 per cent do no actual work but are paid. Both export and internal markets have shrunk dramatically, and the company's main customers are the Ministry of Defence and police of Serbia and Montenegro. The company's management has recently decided to try to recover the company's lost export markets (especially in the United States), including those that have been taken over by companies from other countries in CEE (e.g. the Czech Republic) during the last ten years.

Prvi Partizan (located in Uzice) is the main producer of small arms ammunition in Serbia and Montenegro. In the former SFRY most ammunition production was concentrated in Bosnia.[80] Since in the past its military-related role was secondary, the company has recently focused on producing sporting and hunting ammunition, most of which is exported to western Europe and the US.[81] Present output is very low, and only 20 per cent of the company's productive capacities are currently used. Employment has dropped by 35 per cent since the late 1980s. Although 70 per cent of current production is military-related, the bulk of the company's income derives from commercial products. The company, which is still worker-owned, is currently in a very difficult financial situation. The management hopes it will be privatized soon, with the state retaining an important share of the company's equity.

Other ammunition factories, such as Krusik (in Valjevo) and Slobada (in Cacak) were destroyed during the NATO air strikes in 1999 (*New York Times*, 19 April 1999). There are unconfirmed reports that the plant in Cacak is operational again (Traynor and Wood, 2002). It is not clear whether other ammunition plants such as Milan Blagojevic (in Lucani) and Miloje Zadic (in Krusevac) are currently operational.

Former Soviet Republics

A number of FSRs, such as Armenia, Belarus, Estonia, Georgia, Lithuania, and Ukraine, have small arms production capabilities.[82] In some cases these production capabilities were established after the disintegration of the former Soviet Union.

Armenia

In the early 1990s, Armenia launched its own domestic production of small arms and ammunition, as it was short of weaponry needed in the conflict with Azerbaijan over Nagorno Karabakh. The government supported the establishment of such production capabilities. However, in the latter part of the decade the volume of production slowed, as the Armenian armed forces and law enforcement bodies received large amounts of small arms from the distribution of

former Soviet army property. Nevertheless, in the last decade the **Armenian Ministry of Defence Military Industrial Department** has developed several indigenous models of small arms such as: K-3 assault rifle, K-11 sniper rifle, K-2 army pistol (Gander and Cuthshaw, 2002a).[83] Even though the Armenian army has adopted the K-11, the volumes of both domestic and export orders for Armenian small arms are not expected to be significant. The company **Neutron Research and Production,** located in Yerevan, produces Russian standard (7.62 x 39mm) small arms ammunition (Gander and Cutshaw, 2001b, p. 687).

Belarus

There is information to suggest that factories under the control of the Belarus Ministry of Defence have the capacity to produce pistols, sub-machine guns, and small arms ammunition (Forecast International, 2002). No further information is available.

Estonia

There is information to suggest that factories under the control of the Estonian Ministry of Defence have the capacity to produce rifles and machine guns, based on a licensed production agreement signed with IMI (Israel) in 1994 (Forecast International, 2002). No further information is available.

Georgia

There is information to suggest that the **Automatic Systems Scientific Research Institute** is producing some type of sub-machine gun, and mortar ammunition. The **State Military Scientific and Technical Centre** is apparently producing various types of grenades (Omega Foundation, 2002). No further information is available.

Lithuania

There is information to suggest that a Lithuanian company, **Kaunas Experimental Enterprise,** is producing a sub-machine gun (Omega Foundation, 2002). No further information is available.

Ukraine

At the time of the disintegration of the Soviet Union, Ukraine did not have its own design bureaux or industrial facilities specializing in the development and production of small arms and light weapons. In the 1990s the Ukrainian government made a strategic decision to develop the capacity to produce small arms in order to guarantee independence in supplies for the national armed forces and law enforcement agencies (CAST, 2002b). At present, some 20 Ukrainian design bureaux and factories, all under state control, are involved in some aspect of the production of small arms and/or ammunition.[84] Small arms exports account for about three per cent of total Ukrainian arms exports, and in 2001 were worth approximately USD 10 million–15 million. Most exports are destined for the countries of CEE—such as Bulgaria, the Czech Republic, Poland, Slovakia, Slovenia—and Uzbekistan, although the country has recently sold a small quantity of firearms (handguns) to the US market.

The **State Specialized Scientific Association (Fort)** was established in 1991 to supply Ukrainian security forces and law enforcement agencies with small arms. Fort received some USD 1.2 million to develop its own models of small arms; in March 1998 it started regular serial production of different modifications of Fort pistols of its own design (Badrak, 2001). Also, since 1998, the company has supplied various types of pistols to the Ukrainian Ministry of Interior and other

law-enforcement agencies.[85] The facility is working on a pistol modification that would employ NATO-standard ammunition. In addition to pistols, the company has also developed several models of shotguns (CAST, 2002b). In December 2000, Fort signed a contract with Uzbekistan for the delivery of an experimental batch of Fort pistols (Badrak, 2001).

Other small arms producers include: **Fine Mechanics Plant State Enterprise** (machine guns), **Tasko Corporation** (sniper rifles, ammunition), **KB-S** (pistols), **RadioPribor** (pistols), **the State Scientific and Technical Centre of Artillery and Rifle Arms** (assault rifles, pistols), and **Lugansk Machine Tool Plant** (ammunition) (CAST, 2002b; Omega Foundation, 2002).

CONCLUSION

Prosperous industries are usually distinguished by consistent growth and clear patterns of innovation and development, facilitating long-term investment. The small arms industry, by contrast, is weakened by poor overall prospects and an uncertain technological future. With its core technology stuck on a plateau for the past 50 years, and almost certain to stay there for many years to come, it has no obvious possibilities for dramatic growth by developing new markets. While some individual firms are prospering, the sector as a whole is restructuring downwards, anticipating a decline that is already visible in areas like civilian handguns and military rifles.

Instead of a single pattern, observers of the global small arms industry find numerous and contradictory trends. Sales are down, but the number of firms is up. Instead of focusing on the creation of new markets, major firms appear to be basing their future on consolidation through mergers to capture bigger shares of old markets. Firms are consolidating while the market declines and becomes more fragmented, trying to innovate while most of their technology stands still. Such a contradictory process cannot be sustained indefinitely. It is hard to escape the conclusion that the global small arms industry has only postponed a more fundamental reckoning.

With a stable technology, unlikely to change in the foreseeable future, the military small arms business is little affected by larger trends (and increases) in defence budgeting and procurement. The most dynamic sector, in terms of technology, appears to be non-lethal weapons. However, there is no evidence that non-lethal weapons will replace traditional firearms and other small arms. Rather, they will likely join existing small arms inventories as supplementary weapons, to be used when circumstances are right and particularly in 'dirty battlefields'.

Illicit craft production is far more common than often assumed. The strong demand for improvised or home-made firearms is proof that demand for guns often exceeds supply. Whether because they cost too much or because they are legally banned, factory-made firearms are out of reach for large groups of people around the world. Illegal craft production appears to be a second choice for these people, but it is a surprisingly widespread choice. Although not economically significant except for within particular communities, it is an important source of weaponry for marginalized groups, including the poor, criminals, rebels, and the politically oppressed.

Although the problems facing small arms producers in central and eastern Europe are not unique, they are especially acute. What is clear is that most of them have managed to survive the turbulence of the decade since the end of the Cold War only through state subsidies and government contracts. The information presented in this chapter shows that most firms are shrinking and merging. Almost no firms have revealed major new products in recent years, most have little or no real work, yet few if any have left the business for good. As a result, the region still has enormous productive capabilities.

APPENDIX 1.1 SMALL ARMS PRODUCERS, 2003

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 and 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	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	x
47 Kenya		x
48 Korea, North	x	x
49 Korea, South	x	x

Country	Small Arms*	Ammunition
50 Kyrgyzstan		x
51 Lithuania	x	
52 Luxembourg	x	
53 Macedonia/FRY		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	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 Serbia and Montenegro	x	x
77 Singapore	x	x
78 Slovakia	x	x
79 Slovenia	x	x
80 South Africa	x	x
81 Spain	x	x
82 Sudan	x	x
83 Sweden	x	x
84 Switzerland	x	x
85 Syria		x
86 Taiwan	x	x
87 Tanzania		x
88 Thailand	x	x
89 Turkey	x	x
90 Uganda		x
91 Ukraine	x	x
92 United Arab Emirates		x
93 United Kingdom	x	x
94 United States	x	x
95 Uruguay		x
96 Venezuela	x	x
97 Vietnam		x
98 Zimbabwe		x

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

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

1. LIST OF ABBREVIATIONS

ABM	Air Bursting Munition
AP	Armour-piercing
BRA	Bougainville Revolutionary Army
CEE	Central and eastern Europe
CIS	Commonwealth of Independent States
FRY	Federal Republic of Yugoslavia
FSR	Former Soviet Republic
GPMG	General purpose machine gun
JNLWD	Joint Non-Lethal Weapons Directorate
JSC	Joint Stock Company
LFL	Light Fighter Lethality
MoD	Ministry of Defence
MGL	Multiple grenade launcher
NATO	North Atlantic Treaty Organization
OICW	Objective Individual Combat Weapon
PDW	Personal defence weapon
PNG	Papua New Guinea
POF	Pakistan Ordnance Factories
SALW	Small arms and light weapons
SFRY	Socialist Federal Republic of Yugoslavia

1. ENDNOTES

[1] This information is based on research conducted by the Omega Foundation.

[2] It is important to distinguish between those intermediate producers that manufacture components for final assembly and those that manufacture components for intermediate products. The *Small Arms Survey* definition of intermediate producers includes only those companies that manufacture components for final assembly (e.g. barrels).

[3] This information is based on research conducted by the Omega Foundation.

[4] See information on global small arms production in the *Small Arms Survey 2002*.

[5] Forecast International (2002) estimates that global production of military-style small arms in 2002 is likely to be in the range of 500,000–700,000 units (Forecast International, 27 November 2002). However, this can be considered a conservative estimate, taking into account information from a range of other sources (CAST, 2002a).

[6] It is estimated that an average of 21 billion units of small arms ammunition were produced worldwide during the period 1980–99 (Small Arms Survey, 2001).

[7] See the *Small Arms Survey 2001* for details of criteria used to define major and medium-sized producers.

[8] <http://www.army-technology.com, 26 July 2002>

[9] China South Industries Group Corporation (CSG), which manufactures mostly small arms and ammunition, as well as cars, announced sales of USD 5.2 billion in 2002. See the *Small Arms Survey 2002* for an analysis of China's small arms industry.

[10] Forecast International (2002) estimates that approximately 30,000 military-style small arms will be procured by the US armed forces during 2002. These weapons are produced by a handful of suppliers, including Beretta USA, Saco Defense, Colt's Manufacturing, FN Manufacturing, FN Herstal, and Ramo Manufacturing. See the *Small Arms Survey 2002* for more details.

[11] The *Small Arms Survey 2002* provided a detailed analysis of Russia's small arms industry.

[12] Approximately 50 per cent of Izhmash's total sales are derived from civilian production (e.g. motor vehicles).

[13] The SA-80 or L85 assault rifle has been in use with the British army since 1986, when it replaced the Self-Loading Rifle, which had been in service since the early 1960s. At least 300,000 are in regular use. First faults with the rifle were reported in 1991. It is reported that the weapon has undergone 83 modifications over the last 16 years. In 2000, Heckler & Koch (Germany) was awarded an USD 118 million contract to modify all 300,000 rifles (*BBC News*, 26 July 2002).

[14] This section is largely based on Gander (2002).

[15] This section is largely based on Gander (2002).

[16] The British-designed OICW, in development since 1994, is being jointly developed by Alliant Techsystems (US), Heckler & Koch (Germany/UK), and Brashear LP (US) (Small Arms Survey, 2002, p. 34).

[17] The technology known as 'Metal Storm' is also the name of the Australian research and development company that has developed and owns the technology.

[18] One of the most important developments in ammunition technology—caseless ammunition—spearheaded by Heckler & Koch and Dynamit Nobel as part of a programme that started in the late 1960s to replace the H&K G3 rifle, was eventually abandoned in the early 1990s for various political and technical reasons. The reported improvements of caseless ammunition are: the elimination of the cartridge case, compact design, and increased cook-off temperature. Information from Heckler & Koch. See also <http://matrix.dumpshock.com/raygun/basics/caseless.html>

[19] This section is based on Wright (2002).

[20] For more details about the Taser range of non-lethal weapons, see <http://www.taser.org>

[21] Some information on illicit production, including craft/homemade production, is reported in United Nations (1999).

[22] Information on craft production in Chile is from Dreyfus (2002).

[23] See Gobierno de Chile (2002, pp. 12–15).

[24] Information on craft production in Ghana is from FOSDA (2002).

[25] See Aning *et al.* (2001) for further details of illicit craft production of small arms in Ghana.

[26] Information on craft production in South Africa is from ISS (2002).
[27] Information on South Africa's arms exports can be found on the Department of Defence website <http://www.mil.za>
[28] Information on craft production in Turkey is from Sezgin (2002).
[29] Information from Turkish Ministry of Interior, <http://www.kom.gov.tr>
[30] Information on craft production in Pakistan is from Malik (2000) and Siddiqa-Agha (2002).
[31] Based on information from interviews conducted in Darra. See Siddiqa-Agha (2002).
[32] In a recent report, the Ministry of the Interior estimates that there are approximately 18 million illegally-held weapons in Pakistan, compared to some two million weapons in the hands of legally licensed owners. See Akhlaque (2003) and the *Small Arms Survey 2002*.
[33] Interview with Lt. Gen. Abdul Qayyum, Chairman of Pakistan Ordnance Factories, March 2002.
[34] Information on craft production in the Philippines is from Capie (2002) and Lubang (2002).
[35] For further details of illicit production of small arms in the Philippines, see the *Small Arms Survey 2001* and Capie (2002).
[36] Further information about Armscor's small arms products can be found on the company's website <http://www.armscor.com.ph>
[37] There are over 700,000 licensed weapons in the Philippines, and according to the police more than 65,000 new guns are registered every year (Capie, 2002, p.72).
[38] Information on craft production in the Pacific Islands is from Alpers and Twyford (2002).
[39] Personal communication with John Fennessy, Leader of the International Peace Monitoring Team, and Tony McLeod, IPMT Deputy Leader, Honiara, 28 May 2002; personal communication with Lt. Col. Andrew Morris, Defence Adviser, New Zealand High Commission, Port Moresby, 20 May 2002.
[40] Personal communication with Robin Kenaus, Area Coordinator, Bougainville Ex-combatants' Trust Account, Buka, 10 June 2002; Personal communication with Lt. Col. Vagi Oala, Director, Land Operations, Papua New Guinea Defence Force, Port Moresby, 4 June 2002.
[41] See Dorney (2000, p. 146).
[42] Bougainville Weapons Containment Update, Bougainville Peace Monitoring Group, 24 October 2002.
[43] Personal communication with Trisha Gray, Solomon Islands Desk Officer, AusAID, Canberra, 24 April 2002.
[44] E-mail communication with RNZAF Flight Sergeant John Phillips, former Solomon Islands International Peace Monitoring Team armourer, June 2002.
[45] Personal communication with John Fennessy, Leader of the International Peace Monitoring Team, and Tony McLeod, IPMT Deputy Leader, Honiara, 28 May 2002; e-mail communication with Bougainville Peace Monitoring Base, Arawa, 15 August 2002.
[46] Personal communication with Vince Shaw, First Secretary Defence Liaison, Australian High Commission, Port Moresby, 21 May 2002.
[47] Personal communication with Frank Clair and Leisa James, Australian Federal Police advisers, Australian High Commission, Port Moresby, 3 June 2002.
[48] Dorney (2000, pp. 318–19).
[49] Personal communication with Vince Shaw, First Secretary Defence Liaison, Australian High Commission, Port Moresby, 21 May 2002.
[50] For the purposes of this chapter, central and eastern Europe (CEE) includes the following countries: **central Europe** (Czech Republic, Hungary, Poland, and Slovakia), **south-eastern Europe** (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia/FRY, Romania, Slovenia, Serbia and Montenegro), and **former Soviet Republics** (Armenia, Azerbaijan, Belarus, Estonia, Georgia, Latvia, Lithuania, Moldova, and Ukraine). The Russian Federation is not included in the definition of CEE.
[51] Information on small arms producers in CEE from Kiss (2002b) and Grillot (2002). Information on small arms producers in FSRs from CAST (2002b).
[52] Information on small arms producers in CEE from Kiss (2002b) and Saferworld (2002).
[53] Information on small arms production in the Czech Republic based on interviews with government and company officials, April 2002.
[54] The United States imported 38,546 firearms from the Czech Republic in 2000, and 42,409 in 2001 (United States, ATF, 2002a).
[55] Information on Zbrojovka Arms based on interviews with company officials, April 2002.
[56] Information on Sellier & Bellot based on interviews with company officials, April 2002.
[57] Information on Policske Strojirny based on interviews with company officials, April 2002.
[58] Information on small arms production in Hungary based on interviews with government and company officials, April 2002.
[59] The United States imported 15,300 firearms (mainly handguns) from Hungary in 2000, and 13,328 (exclusively handguns) in 2001 (United States, ATF, 2002a).
[60] Information on MFS 2000 Magyar Loszergyarto based on interviews with company officials, April 2002.
[61] Information on Nike-Fiocchi based on interviews with company officials, April 2002.
[62] Other small arms producers include Dezamet, Kombinat Przemyslu Narzedziowego, Widezewskie Zaklady Masyn Wlokienniczych, Zaklady Mechaniczne Tarnow, Osrodek Badawaczo, and Zaklady Sprzetu Precyzynego.
[63] Research conducted by the Omega Foundation lists three companies in Albania that have the capacity to produce small arms and/or ammunition (Omega Foundation, 2002).
[64] Information about Pobjeda's ammunition products can be found at <http://www.pobjeda.com.ba>
[65] Information on small arms production in Bulgaria based on interviews with government and company officials, March and May 2002.
[66] Information about Arsenal based on interviews with company officials, March 2002.
[67] In 1999, 51 per cent of the equity in Arsenal was sold to the Arsenal 2000 Worker-Manager Association.
[68] Information about Arcus based on interviews with company officials, March 2002.
[69] Information about small arms production in Croatia based on interviews with government and company officials, June 2002.
[70] Information about HS Product based on interviews with company officials, June 2002.
[71] In 2002, the company's XD pistol won several prizes and was declared the best buy of the year in the United States by various gun magazines.
[72] Information about RH Allen based on interviews with company officials, June 2002.
[73] Information on small arms production in Romania based on interviews with government and company officials, May 2002.
[74] In 2001, Romania was the largest CEE supplier of firearms (43,169) to the United States (United States ATF, 2002a).
[75] Information on Romarm based on interviews with company officials, May 2002.
[76] Information on Cugir based on interviews with company officials, May 2002.
[77] Information on Serbia from Kiss (2001).
[78] Information on Zastava based on interviews with company officials, May 2001.
[79] During the 1980s, Zastava produced a variety of small arms based on Russian designs. It also produced an indigenous family of small arms which used 7.62 x 39mm cartridges (BICC, 2002, p. 128).
[80] Information on Prvi Partizan based on interviews with company officials, May 2001.
[81] See <http:www.prvipartizan.com>
[82] Information on small arms production in FSRs from CAST (2002b).
[83] See ITAR-TASS, 14 January 2000.
[84] Report on the conference: 'Small Arms Design and Development Problems and Prospects in Ukraine.' Kiev Polytechnical Institute, April 2001.
[85] UNIAN-VPK, No. 20, 1998; Interview by 'Fort' Director Viktor Pisarenko to Defense Express Agency, 3 October 2001.

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