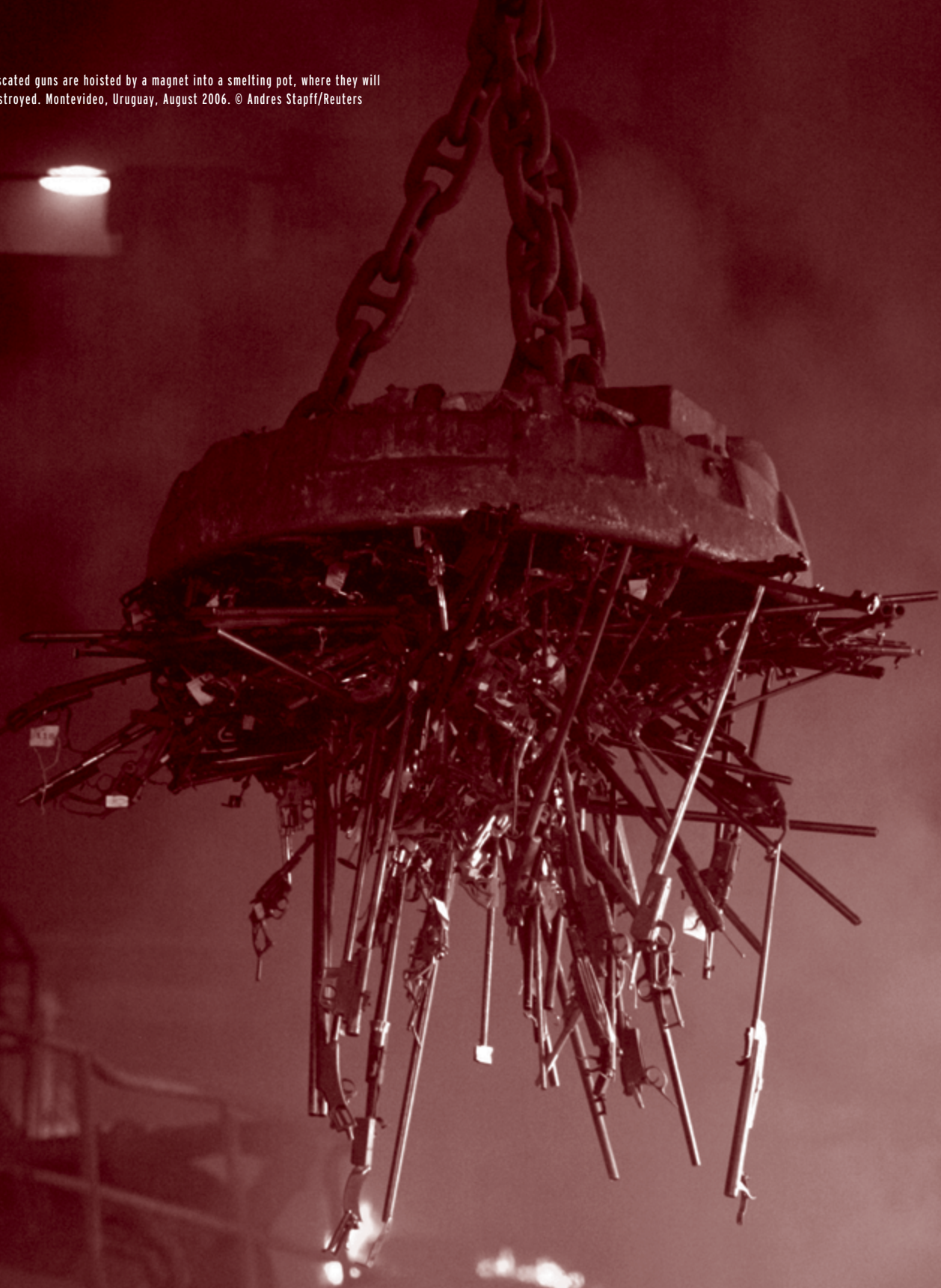


Confiscated guns are hoisted by a magnet into a smelting pot, where they will be destroyed. Montevideo, Uruguay, August 2006. © Andres Stapff/Reuters



# Completing the Count

## CIVILIAN FIREARMS

### INTRODUCTION

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Separated by geography, culture, religion, education, and wealth, the people of Ireland and Yemen could hardly be more different. Superficially, their small arms problems are equally dissimilar: Ireland has a moderate level of civilian gun ownership and little gun violence; Yemen is one of the most heavily armed and most violent societies on earth.

But observers in both countries describe their national small arms problems in remarkably similar language. Two dramatically different societies are united by a common sense that the proliferation of firearms is a basic challenge to social cohesion and future prosperity. Both are affected by swift changes in domestic gun violence patterns and global small arms proliferation. Increasingly, authorities in both countries are turning to similar solutions: trying to restrain possession, encouraging citizens to get rid of their guns, and attempting to restore the ability of national institutions to reduce violence (see Boxes 2.2 and 2.3).

Compared to small arms proliferation elsewhere, Ireland's problems might seem quaint and Yemen's extreme, but they are united by the *universal challenge* posed by small arms to society. Like people in many other places, the Irish and Yemenis feel compelled to reconsider popular assumptions and official policies in order to catch up with social forces otherwise beyond their control. And like many other states, these countries are grappling with trends that are felt more than understood.

The relationship between society and small arms is changing the world over. Small arms are proliferating virtually everywhere. And it is civilian ownership, the focus of this chapter, that appears to be changing most rapidly. Among the major findings of this chapter are the following:

- Civilians own approximately 650 million firearms worldwide, roughly 75 per cent of the known total. Civilians in the United States own some 270 million of these.
- There are at least 875 million combined civilian, law enforcement, and military firearms in the world today.
- This is equal to roughly one gun for every seven people worldwide (without the United States, the figure drops to about one gun for every ten people).
- These figures do not include older, pre-automatic small arms still maintained by armed forces or craft-produced civilian guns.
- Nearly 79 million civilian firearms are known to be registered with authorities, roughly 9 per cent of the suspected civilian total.
- The rising availability of handguns has transformed urban weapons ownership, while semi- or fully automatic rifles have transformed possession in urban and rural settings.
- Organized destruction projects have eliminated at least 8.5 million small arms since 1991, three-quarters of which came from armed services. An unknown number are also lost through accidental wastage.

As the first detailed global assessment, this chapter offers the most complete outline so far of the global distribution of factory-made civilian firearms. Rather than a definitive statement, though, it should be regarded as part of a process of continuous investigation. The total of 650 million civilian firearms and 875 million in total is a significant increase over previous Small Arms Survey estimates. This does not represent a real increase in the number of firearms, rather it results from better global reporting, additional research and more effective research methods. More focused research is absolutely essential in order to transform the relatively crude map of global firearms into a more textured portrait. And research has only begun to explore relationships between weapons holdings and their destructive effects.

The analysis presented here relies mostly on *static* data, creating only a snapshot of the global firearms balance in the year 2006. There are not yet enough *dynamic*, time-series reports to permit a reliable sense of how civilian holdings are developing in most countries. The general global impression, though, leaves no doubt that civilians are continually acquiring more-powerful guns. There is a connection between per capita wealth and gun ownership, which is strong enough to suggest that so long as gun ownership laws are not changed, greater national wealth leads to greater gun ownership.

Recent  
improvements in  
reporting and  
research allow for  
more accurate gun  
ownership  
estimates.

The connection between gun availability and violence is one of the most controversial topics of gun policy debate. It is widely accepted that “[g]un cultures” do not automatically translate into armed conflict’ (Schwandner-Sievers, 2005, p. 206). Many of the examples explored in this chapter illustrate a strong connection between ownership levels and depravity. Others show that weapons proliferation does not always lead to social chaos. However, this chapter does not try to resolve debates over the connection between guns and violence. It is intended, rather, to facilitate investigation of broader enigmas: the forces that determine when small arms proliferation has a marginal effect and when it causes catastrophe.

By clarifying the global geography of small arms, the chapter helps to show where problems and solutions can be found. It adds support to the belief that in this field, as in others, the state is often not the dominant actor (Castles, 2007; Florini, 2000). In most of the world, the state is not the primary holder of guns; civilians are. Furthermore, state-owned weapons are often not the most likely to be used. Although the issue of the relative dangers of civilian and military small arms still requires systematic investigation, civilian-owned weapons appear to be increasingly prominent in global small arms phenomena. Regions with the highest rates of firearm killings, such as Brazil, Colombia, Darfur, Gaza, and Iraq, are also the centre of debates over who controls the most deadly weapons.

To be sure, state-controlled arsenals are more coherent than civilian holdings. Only military and some law enforcement small arms tend to be stockpiled and inventoried. As a result, state arsenals are much more amenable to policy. But the overwhelming quantitative dominance of civilian firearms makes state-owned arsenals less important. State-owned small arms tend to be more powerful, weapon for weapon, than civilian-owned firearms, but this too is changing. The data reported here points to the need for new ways of thinking about small arms pathologies, and the need for a paradigm that emphasizes the salience of society as much as, and possibly more than, the state.

## A BRIEF HISTORY OF GUN NUMBERS

The emergence of small arms proliferation as a major international issue was accompanied by widespread frustration at ignorance over how many small arms existed and where they mattered most. Although it is usually clear enough where the worst damage is being done, a lack of understanding of the geography of small arms itself hindered policy-

making and action. All too often, priorities have responded to crises and opportunities, without the strategic dimension that only broader insights permit.

Unable to pinpoint where the weapons are most common and where they are most dangerous, activists and policy-makers have been handicapped in their efforts to formulate priorities and articulate concrete agendas. The lack of hard data is the result of many forces. Sometimes it comes from weak official oversight; at other times from deliberate state secrecy, or ideological or political opposition to transparency (Small Arms Survey, 2004, p. 51; Tiaht, 2004).

In the early days of international small arms research, scholars relied on indirect techniques to approximate the scale of global firearm numbers: for example, using firearm suicides as a proxy to assess civilian holdings is fairly effective for Western societies (Killias, 1993; Killias, Kesteren, and Rindlisbacher, 2001). The first efforts to articulate estimates for global firearm totals used nothing more than a sense of feel. Jasjit Singh and Owen Greene proposed separately in 1995 that there were roughly 500 million firearms of all sorts in the world (Singh, 1995, p. ix).<sup>1</sup> In 2001 small arms specialist Gregory Fetter maintained that the total was closer to 594 million, although his method of arriving at that figure does not appear to have been more sophisticated (Fetter, 2001). Such figures remain in widespread use, which explains how a recent US government report could conclude that

*estimates indicate that the overall number of small arms and light weapons in circulation globally range from 100 to 500 million and up. Efforts to obtain precise data on totals regarding these weapons and their sources, whether legal or illegal, is generally guesswork* (Grimmit, 2006, p. 3).

In reality, research has gone far beyond such early approximations. The Small Arms Survey has consistently striven to elevate global estimation, initially through building-block methods. Relying on techniques designed to ensure reproducible results, this approach benefitted from the rapid growth of the field in the period just before and after the 2001 UN Conference on the Illicit Trade in Small Arms and Light Weapons in All Its Aspects. Through incremental accumulation of national reports and country research, a continuously more detailed picture of the global distribution of firearms began to emerge. This led to the conclusion in 2002 that there were more than 639 million firearms whose existence could be documented with sufficient certainty (Small Arms Survey, 2002, ch. 2). These findings were exclusively for firearms. The total number of other types of small arms and light weapons, especially, remains more elusive, with the partial exception of man-portable air defence missile systems (Bevan, 2004).

The subsequent five years have permitted the accumulation of evidence and the development of more sophisticated analytical techniques, creating a rich basis for extrapolation. Although these methods rely on estimation methods, their confidence levels have improved dramatically over the years. The 2006 edition of the *Small Arms Survey* concluded that there were ‘at least 26.3 million law enforcement weapons’ in the world and ‘approximately 200 million modern, official military firearms worldwide’ (Small Arms Survey, 2006, p. 37). The current edition establishes that, in addition to these weapons, civilians privately have approximately 650 million firearms, for a combined total of roughly 875 million firearms of all types worldwide.

**There are at least 875 million civilian, law enforcement, and military firearms in the world.**

## NO NEUTRAL NUMBERS

Animated debates over data such as conflict fatalities leave no doubt that statistics have profound implications for policy-making and action (Burnham et al., 2006). Estimates of the *absolute size* of small arms holdings play a major

role in focusing international attention on small arms issues. Cumulative data on small arms holdings is also an essential scientific tool and provides the basis for more conclusive insights into the role of small arms in human affairs. The *relative scale* of holdings in different countries and among different categories of actors—law enforcement, military, civilians, non-state groups—shapes priorities for specific action.

Perceptions of the scale of small arms proliferation colour all aspects of the issue. The 2001 *UN Programme of Action*, for example, stressed the illicit trade in small arms, suspected as the most serious aspect of small arms proliferation (Laurance and Stohl, 2002). The belief that the small arms of non-state actors are especially dangerous for regional stability justifies investments in the disarmament, demobilization, and reintegration of former combatants. Weapons destruction and stockpile security improvement emphasize military stockpiles, in the belief that these are an especially important target for efforts to control illegal trade. Destroying surplus military weapons today, in other words, reduces the risk that the same weapons will be used by terrorists, insurgents, or criminals tomorrow. Military stockpiles are also more amenable to destruction than civilian holdings, which usually are not so conveniently concentrated.

Only in recent years, however, has evidence accumulated to show that, almost everywhere, civilian holdings are significantly larger than law enforcement or military stockpiles (see Table 2.1). The cumulative data shows that most

of the world's firearms are owned by civilians—roughly 75 per cent of the known total—greatly outnumbering the other two categories. As experts became aware that civilian-owned firearms play a major role in the illicit trade and regional violence, previously overlooked civilian holdings began to attract greater political attention. The *relative size* of civilian weapons holdings, the major theme of this chapter, is important for informing initiatives—national, regional, and international—to address firearm-related violence.

Growing awareness of the relative dominance of civilian guns has led some to call for civilian access to be better reflected in multilateral small arms policy-making (Cukier and Sidel, 2005; Karp, 2006a). A prominent report acknowledges that the *UN Programme of Action*, with its focus on illegal transfers and state-owned weapons, has been 'a useful guide for action' (CHD, 2005, p. 9), but also a barrier to dealing with some of the most serious problems. Instead of focusing exclusively on illegal transfers and official inventories, 'efforts to control guns and ammunition must address the fact that the bulk of the world's small arms arsenal are in the hands of civilians, and that civilian misuse is a primary source of firearm-related death and insecurity' (CHD, 2005, p. 9).

While basic data quality is improving considerably, none of our basic categories is comprehensive. Numerous small arms belong to unidentified *law enforcement* agencies, such as fish and wildlife pro-



A police officer carries guns seized from a house in Dartford, UK, in September 2006. The raid targeted the supply of US guns to London criminals. © Akira Suemori/AP Photo

### Box 2.1 The attrition enigma

One of the great mysteries of weapons totals is the rate of attrition, whether through intentional destruction or accidental loss. Weapons are durable goods and can remain in useable condition for centuries with minimal care. Weapons also often have considerable market value and are therefore unlikely to be destroyed or abused frivolously. But like any human creation, firearms are subject to the principle of entropy, which ensures that all matter deteriorates over time. How long does it take for a typical gun to disappear? This is a vital question for any attempt to ascertain total firearm numbers, but one that cannot be resolved today.

A prominent example of this problem is the tens of millions of military bolt-action rifles and revolvers manufactured in the first half of the 20<sup>th</sup> century. Although largely replaced in military service by automatic rifles and semi-automatic pistols, vintage weapons are commonly seen in service in Africa, Asia, and Latin America. How many of these have been destroyed? And what is the overall rate of attrition among the approximately 875 million firearms believed to exist worldwide? At this point, we can only speculate.

The actual rate of loss from wastage and misuse can only be guessed. An attrition rate of one per cent (which assumes that typical weapons last 100 years) would result in the elimination of roughly eight million guns per year, independently of destruction programmes like those discussed above. This can be compared to the estimated seven million new weapons manufactured each year. If true, this difference would suggest that total global firearm numbers are declining. Yet, the overall attrition rate could be lower. Resolution of the *attrition enigma* requires further research.

tection agencies, prison authorities, and domestic security agencies. Of greater statistical importance are older, *pre-automatic military firearms* (mostly revolvers and bolt-action rifles), the generation of equipment acquired by the world's armed forces in the first half of the 20<sup>th</sup> century. Although they retain only limited military importance, they remain popular with civilian buyers. They probably number in the tens of millions, perhaps over a hundred million. *Civilian ownership* in much of the world is heavily influenced by local craft production. Although these typically crude firearms might look unimpressive, tens of millions exist, causing considerable destruction in much of the world. These three groups are seldom included in the statistics developed here.

The number of uncounted firearms is offset to some extent by the destruction of small arms from state-owned stockpiles and civilian holdings. There are currently no formulas for estimating such losses. Some, but not all, formal destruction programmes are publicized, as discussed below. Even less is known about the rate of routine attrition. Most firearms are designed to endure harsh treatment, and can remain serviceable for centuries. Even the definition of wastage is problematic, since firearms in bad condition can often be repaired. But an unknown number become permanently unusable through bad storage or are irreparably broken. Currently, the effect on global holdings can only be guessed (see Box 2.1).

Table 2.1 The division of global firearms (millions)

Category	Low total	Average	High total	Proportion
Law enforcement	26	26	26	2.5–3.5%
Military	150	200	250	20–25%
Civilian	570	650	730	73–77%
<b>Global total</b>	<b>745</b>	<b>875</b>	<b>1,000</b>	

**Notes:**

Law enforcement totals cover only known law enforcement agencies (see Small Arms Survey, 2006, ch. 2). Military totals do not include older, non-automatic weapons. Civilian totals do not include craft production. Global totals do not equal the totals of the three categories, due to rounding. Percentages do not equal 100, due to rounding.

Sources: Annexe 3; Small Arms Survey (2006, pp. 37, 56)

### Box 2.2 Ireland: isolated no longer

Long an active participant in international small arms diplomacy, the Republic of Ireland used to act more out of a sense of international responsibility than domestic need (Ireland, 2005). Insulated by geography and culture, gun problems were assumed to be something that happened elsewhere. This sense is changing rapidly. By international standards, Ireland still has relatively little gun crime, but the country is acutely aware that old assumptions no longer hold true. No country, it seems, is isolated from global trends.

Previously, Irish small arms problems were associated exclusively with terrorism in Northern Ireland. This declined sharply following the Downing Street Declaration of 1993. With most Irish Republican Army (IRA) weapons reportedly 'decommissioned' under the terms of the April 1998 Belfast Agreement, the underlying small arms problem seemed to be resolved. In September 2005 the Independent International Commission on Decommissioning reported that 'the IRA has met its commitment to put all its arms beyond use in a manner called for by the legislation' (IICD, 2005, p. 2; see also BBC, 2005). Although scepticism about IRA decommissioning remains, an era of violence seems to be at an end.

Instead of Northern Ireland, now it is the Republic of Ireland that is feeling the effects of criminal gun violence. Historically, its gun laws were restrictive. Handguns were banned in the early 1970s. The Firearms and Wildlife Act of 1976 banned high-calibre rifles and repeating shotguns (Cusack, 1996). Despite these measures, in the early 2000s the Irish police (the Garda Síochána) were reporting steep increases in gun crime. Absolute numbers were low by international standards—from 450 firearm offences in 2001, increasing to 600 in 2002—but the change was a shock (Breslin, 2004). By 2006 the press were describing the phenomenon as an 'epidemic' of gun crime (*Emigrant Online*, 2006). Officials began to speak of an emerging 'gun culture' (Connolly, 2006).

The problem, as described by Justice Minister Michael McDowell, is

*Drug dealing is dealing in death, firearms possession is dealing in death. And they are to be regarded in my view both by An Garda Síochána, by the legislature, by Government and by the judiciary as people who are potential or actual murderers. They are in the business of homicide, be it delayed or threatened or actual. They must be dealt with as that, they must be dealt with by the same severity and the same degree of energy as the paramilitaries were in the past* (UTV, 2006).

Despite restrictions, Ireland is not unarmed: shotguns are relatively common. Garda spokespersons said that their 2006 amnesty was based on the assumption that the rate of public gun ownership in Ireland is roughly the same as in Britain (Connolly, 2006), but the number of licences suggests that legal ownership is considerably higher. In England and Wales there are 1.5 million licences for individual gun owners, one for every 28 residents (Ellis and Coleman, 2006). It has been reported that Ireland issued 209,000 firearm licences in 2004, one for every 19 residents (O'Keeffe and Hogan, 2004). Unregistered weapons are estimated to number at least 150,000, and this figure could be considerably higher, for a total of at least 360,000 firearms in civilian control.

Garda spokespersons maintain that the organization's most serious concern is not traditional shotgun ownership, but an invasion of handguns and automatics smuggled in from Europe. Of greatest concern are some 5,000 firearms in the hands of criminal gangs (McDonald, 2006). Many are semi-automatic pistols and sub-machine guns, previously unknown in public hands (Clonan, 2005). They have fueled unprecedented, murderous rivalries among drug gangs. Small arms proliferation appears to be an unexpected consequence of integration into a border-free Europe, leaving national leaders and law enforcement officials struggling to cope (Mulqueen, 2007).

The official reaction has been threefold: a police crackdown on smuggling, an amnesty for illegal firearms, and expansion and possible rearming of police. Under Operation Anvil, about 800 illegal firearms are seized annually and illegal firearm possession and misuse are kept down, with 715 seizures in 2005 (Garda Síochána, 2006, pp. 23, 80; Lally, 2006). An amnesty in 2006 was expected to net 3,000 guns, projected from the number received by English and Welsh police in a similar amnesty (Connolly, 2006). Instead, only 562 were received (McDonald, 2006). Finally, the Garda are increasing the number of officers and weighing demands that more be armed: currently 3,000 out of 12,265 officers are qualified to carry guns (Garda Síochána, 2006, p. 4; *Sunday Business Post*, 2006).

These steps will help Ireland deal with rising gun crime, but they have been tried elsewhere and found wanting. It is hard to avoid the conclusion that Ireland is becoming more like the rest of the world in terms of firearm-related problems.

### Box 2.3 Yemen: deadly and elusive

Concerned that firearms undermine stability and discourage investment, the Government of Yemen has tried to reduce their visibility in the country, discouraging the carrying of firearms in public and restricting markets (Allen, 2000). There is no evidence that official efforts have significantly affected the country's exceptional gun culture. One result is chronic violence. For the first six months of 2005, official statistics report 614 homicides—80 per cent of which involved guns (Al-Qadhi, 2005b). These do not include most incidents of ethnic and tribal violence—rarely reported to official authorities—thought to kill another 2,000 annually (Brandon, 2006; IRIN 2006a; 2006b). UN studies also conclude that Yemen has become a major exporter of weapons and ammunition to conflicts in the region (UNSC, 2006, pp. 27–29).

Assertions that its 20–25 million people have 50, 60, or even 80 million guns are very popular in Yemen, where they have become a nationalist trope (see Table 2.2). Such figures are impossible to accept literally. For a start, most of the country's

guns appear to be AK-47 versions, of which no more than about 100 million are believed to exist worldwide (Karp, 2006b, p. 54). Rather, the meaning of these exaggerated figures is metaphorical.

Much lower figures come from more systematic estimates. An influential study, based on field research and analysis, concludes that Yemen has 6–9 million guns (Miller, 2003, p. 169). Another approach focuses on ownership among typical Yemeni adult men, who are believed to own 3–4 firearms each. This view is reaffirmed by Eiz Eddin al Asbahi, director of the Human Rights Information and Training Centre, a leading Yemeni gun control NGO (Madayash, 2007). Estimates of the size of the Yemeni population vary from the official figure of 19.7 in 2005 to demographic estimates of 24.5 million in 2006 (IRIN, 2005; CIA, 2006). With about half Yemen's people still children (WRI, 2007), adult men constitute roughly one-quarter of the population, or 5–6 million people. A similar conclusion comes from a survey of 2,083 respondents by Abdul Salam al Hakimi, showing that 60 per cent of all adults (both men and women) have a gun (Madayash, 2007). Asbahi's and Hakimi's perspectives support estimates of at least 17 million civilian firearms.

The Small Arms Survey concludes that Yemenis own between 6 million and 17 million firearms, averaged to an estimated total of 11 million civilian firearms for the country.

Yemenis demonstrate in September 2005 to demand the adoption of a proposed gun ban that was submitted to parliament more than a decade earlier.  
© Khaled Fazaa/AFP/Getty Images





**Table 2.2 Published estimates of Yemeni civilian firearm ownership (millions)**

Estimate	Origin	Sources
6-9	Interviews and analysis	Miller (2003, p. 169)
9	'Estimates'	<i>Arab News</i> (2005)
9	Eiz Eddin al Asbahi	Madayash (2007)
17	'Unofficial estimates'	Al-Qadhi (2005b)
17	'NGO estimate'	Al-Qadhi (2005a)
17	'Unofficial estimates'	IRIN (2005; 2006b)
50-60	Former Interior Minister Yahia al-Mutawaki	Al-Qadhi (2005a)
60	N/A	Brandon (2006)
60	'Interior Ministry'	<i>Yemen Observer</i> (2005)
60	'Estimated'	Allen (2000)
60-80	'Government officials'	Willems (2004)
12	Estimate	Krott (2007, pp. 31-32)

## INVISIBLE GIANT: THE WELL-ARMED CIVILIAN

If evenly distributed, there would be at least one civilian firearm for every nine people worldwide; one for every seven people when military and law enforcement weapons are included. But distribution is far from even. Gun ownership is highly concentrated among the largest and wealthiest societies. The ten largest gun-owning societies have roughly 380–480 million civilian firearms, 60–75 per cent of the global total (see Table 2.3). This is partially because the biggest gun-owning societies also tend to be the most populous, but this figure is also genuinely disproportionate, because such societies contain only about half the world's people. The same figure shows that the disproportion is even clearer when considering the top 30 gun-owning societies, which have about 450–590 million civilian firearms, or 70–90 per cent of the global total.

With less than 5 per cent of the world's population, the United States is home to roughly 35–50 per cent of the world's civilian-owned guns, heavily skewing the global geography of firearms and any relative comparison (see Table 2.3). Of some eight million new firearms manufactured annually around the world, roughly 4.5 million are bought by the people of the United States (US ATF, 2000, p. 1). With this sustained and unsurpassed level of routine gun-buying, American civilians will become even more dominant in global gun ownership. Therefore, any discussion of civilian gun ownership must devote disproportionate attention to the United States, if only because of the scale of its gun culture.

Exceptional civilian gun habits in the United States distort impressions of global trends. Without the US share, the global civilian total falls from 570–730 million to roughly 320–440 million civilian firearms, and instead of outnumbering military firearms by three or five to one, civilian weapons would outnumber their military counterparts by two

**Table 2.3 The 30 largest civilian firearm holdings (in descending order)**

Country	Averaged total firearms	Low total estimate	High total estimate	Population	Low est. firearms per 100 people	High est. firearms per 100 people
1. United States	270,000,000	250,000,000	290,000,000	300,000,000	83.0	97.0
2. India	46,000,000	32,000,000	60,000,000	1,064,000,000	3.0	5.6
3. China	40,000,000	30,000,000	50,000,000	1,288,400,000	2.3	3.9
4. Germany	25,000,000	20,000,000	30,000,000	82,551,000	24.0	36.0
5. France	19,000,000	18,000,000	20,000,000	59,725,000	30.0	34.0
6. Pakistan	18,000,000	18,000,000	18,000,000	148,400,000	12.0	12.0
7. Mexico	15,500,000	15,500,000	15,500,000	102,291,000	15.0	15.0
8. Brazil	15,300,000	15,300,000	15,300,000	174,471,000	8.8	8.8
9. Russian Federation	12,750,000	6,500,000	19,000,000	143,425,000	5.0	13.0
10. Yemen	11,500,000	6,000,000	17,000,000	19,000,000	32.0	90.0
11. Thailand	10,000,000	10,000,000	10,000,000	62,000,000	16.1	16.1
12. Canada	9,950,000	7,900,000	12,000,000	31,600,000	25.0	38.0
13. Iraq	9,750,000	7,000,000	12,500,000	25,000,000	28.0	50.0
14. Turkey	9,000,000	7,000,000	11,000,000	71,000,000	10.0	16.0
15. Italy	7,000,000	4,000,000	10,000,000	57,646,000	6.9	17.3
16. Saudi Arabia	6,000,000	4,500,000	7,600,000	23,000,000	19.6	33.0
17. South Africa	5,950,000	4,200,000	7,700,000	45,300,000	9.3	17.0
18. Argentina	4,850,000	4,100,000	5,600,000	38,377,000	10.7	14.6
19. Spain	4,500,000	4,500,000	4,500,000	41,101,000	11.0	11.0
20. Philippines	3,900,000	2,800,000	5,000,000	81,500,000	3.4	6.1
21. Iran	3,500,000	3,500,000	3,500,000	66,000,000	5.3	5.3
22. England and Wales	3,400,000	2,000,000	4,700,000	60,400,000	3.3	7.8
22. Switzerland	3,400,000	2,300,000	4,500,000	7,344,000	31.0	61.0
24. Ukraine	3,100,000	2,200,000	6,200,000	48,356,000	5.0	13.0
25. Colombia	3,100,000	2,300,000	3,900,000	42,954,279	5.4	9.1
26. Australia	3,050,000	2,900,000	3,200,000	19,900,000	15.0	16.0
27. Serbia	3,050,000	2,100,000	4,000,000	8,104,000	26.0	49.0
28. Finland	2,900,000	2,150,000	3,600,000	5,210,000	41.0	69.0
29. Sweden	2,800,000	2,100,000	3,600,000	8,956,000	23.0	40.0
30. Angola	2,800,000	1,500,000	4,000,000	13,500,000	11.0	30.0

Sources: See Annex 4

Figure 2.1 Total civilian firearms in 30 countries



or three to one. After the United States, a few disproportionately armed societies stand out. Only Switzerland and Yemen begin to approach American levels of gun ownership, and both of these cases are clouded by great doubt (see Boxes 2.3 and 2.5). Others also stand out, such as Germany, Finland, France, Iraq, and Serbia. But civilian ownership tends to be more even among other large gun-owning societies, where ownership rates of 5–15 per 100 residents are common.

Of course, these comparisons assume that the types of guns are equally powerful across national civilian holdings—a gross distortion. This chapter cannot elucidate the character of various civilian weapons, but only describes their relative scales. We can, however, identify certain trends. Prior to the 1960s, there was little difference in the destructive capabilities of civilian and military handguns and rifles. This changed when most military organizations switched to weapons capable of fully automatic operation, giving them much greater firepower. Many law enforcement agencies made a similar transition in the 1980s to semi-automatic pistols and smaller numbers of fully automatic weapons. The armed services and law enforcement agencies also have substantial quantities of specialized small arms and light weapons seldom seen in civilian hands in most countries, including grenades, grenade launchers, medium machine guns, and rocket launchers.

Other leading gun-owning societies tend either to be *large*, or *wealthy*, or have a recent history of intense *violent* conflict. Sheer national size accounts for the importance of societies such as China and India, where low levels of relative ownership nonetheless

lead to large holdings in absolute terms (Table 2.3). The significance of wealth is revealed by the prominence of European countries, many of which have large civilian holdings, despite other factors militating against civilian gun acquisition. Countries such as Angola and Colombia, on the other hand, illustrate the way armed conflict permanently affects civilian gun possession.

## WAYS OF KNOWING: REGISTERING, ESTIMATING, AND CORRELATIVE MODELLING

There is no single scientific technique that can ascertain the total number of firearms in civilian hands. Small Arms Survey country data has been assembled using numerous sources and methods, following an order of precedence (see Table 2.4). It relies when possible on official registration data, with independent estimates used to give greater comprehensiveness. The largest group of civilian weapons has been identified through such independent assessments alone, presented here as low to high estimates. When neither registration data nor independent assessments are available, estimates have been based on correlative statistical analysis by the Small Arms Survey, as described below. The latter includes a large group of countries—76 in all—but since most are small or poor, they have only 12–16 per cent of the civilian firearms identified. Greatest use is made, in other words, of the strongest data sources; less reliable methods are introduced progressively, when necessary, to ensure completeness.

## NATIONAL REGISTRATION DATA: SOLID BUT PARTIAL

The most reliable data is official gun registration statistics, but they tell an incomplete story. The registration data made available to the Small Arms Survey establishes the existence of a total of 78 million firearms in civilian hands worldwide. Compared to the civilian firearms estimated using other techniques explained below, declared registration covers roughly 10–14 per cent of all civilian firearms believed to exist.

More registration data exists, but it has not been made available for research. Some countries have registration data, but do not make it available publicly. Others maintain registration records in ways that inhibit national accumu-

**Table 2.4 Sources of civilian firearm data (all firearms in millions)**

Number of countries	Registered firearms	Independent est. low	Independent est. high	Small Arms Survey est.
52	74.3	106.9	188.7	0.0
25	3.7	0.0	0.0	8.9
25	0.0	301.4	377.8	0.0
76	0.0	0.0	0.0	76.4
<b>178</b>	<b>78.0</b>	<b>408.3</b>	<b>566.5</b>	<b>85.3</b>

Notes: Sources cover 178 countries with populations over 250,000. Complete country data appears in the annexes. Countries for which independent estimates only are given include Mozambique and Sudan, for which low-confidence registration data has been disregarded. The very low official registration figures of China and Tunisia have also been disregarded, and they have been treated as Small Arms Survey estimate countries. Their registration figures appear in Annexe 3.

Sources: Annexes 1, 2, and 3

lation. Germany illustrates this problem (see Box 2.4). In a few countries, such as China, Mozambique, Sudan, and Tunisia, registration laws are not consistently applied or are ignored. An egregious example is Sudan, where the Ministry of the Interior recently reported 6,724 registered firearms, out of some 2.2–3.6 million guns believed to be in civilian hands (Karp, 2006b).

The world's largest nation is affected by similar enigmas. China's firearms law of 1996 (China, 1996) forbids civilians to own guns unless specifically approved by law enforcement authorities. In practice, this has been interpreted to sharply limit ownership. According to a report from 2005, the country of 1.3 billion people had only 680,000 legally registered civilian firearms. But the same source noted that over five million military firearms were distributed to Chinese civilians in the 1950s and 1960s, and never recovered (*Courrier international*, 2005). Registration is not comprehensive anywhere, but China is typical of cases where relatively few of the guns in civilian hands are known to authorities. A completely different sense of scale comes from a series of police campaigns against illegal firearms since 1996. As of 2002, these campaigns reportedly seized 2.3 million guns (Small Arms Survey, 2005, p. 82). In 2005 total seizures were said to be five million guns (Hu, 2005). More recently, the chief Chinese public security official responsible for firearm issues maintained that 38 million firearms were seized by police in the period 1996–2006 (Xiao, 2006). While such figures test credulity, they convey a sense that civilian ownership in China is much more common than official registration data suggests.

**Gun registration is a vital clue to the scale of civilian holdings.**

A more typical example of the weaknesses of registration is Jordan, where some 126,000 firearms are registered, but at least 500,000 more are believed to be in civilian hands (Al-Fawz, 2002, p. 91). The situation is even more complicated in countries such as the Czech Republic, the Philippines, or South Africa, where registration is temporary. When owners fail to renew or surrender weapons as their registration expires, a growing pool of unregistered weapons emerges. Even in such cases, though, registration is a vital clue to the scale of civilian holdings. Some of the largest gun-owning societies—such as Iraq, the United States, and Yemen—simply do not have systematic registration.

Even where comprehensive registration is the long-standing law of the land, compliance is imperfect. One of the best-known examples is England and Wales (Scotland and Northern Ireland keep separate statistics). There were 1,742,300 legally registered firearms in England and Wales as of 31 March 2005 (Ellis and Coleman, 2006). The number of illegal, unregistered weapons there has been estimated by various observers at between 300,000 and 4,000,000 (Cramb, 2006; Goodchild and Lashmar, 2005). Some of these firearms were held back when comprehensive registration was introduced in the 1960s (Greenwood, 1972, pp. 17–38). Others have been smuggled into the country since then.

British uncertainty is exacerbated, though, by idiosyncrasies of categorization. Low estimates appear to refer only to guns in criminal hands. The high figures appear to include CO<sub>2</sub>-powered air guns, starter pistols, and imitation guns, many of which can be converted to fire standard small arms ammunition. A recent study, sponsored by the British Home Office, described the country's illicit market cautiously. It noted that

*[t]he market in illegal firearms appears fragmented with prices being sensitive to a number of variables, notably including the type, age and alleged provenance of any particular firearm. Supply is reinforced by a number of processes, including illegal importation, leakage from legitimate sources and the conversion of imitation firearms (Hales, Lewis, and Silverstone, 2006, p. 112).*

Semi-automatic pistols and sub-machine guns also appear in the UK with increasing frequency (Hales, Lewis, and Silverstone, 2006, pp. 54–56, 111–12).

### Box 2.4 Germany's very private arsenal

Germany illustrates typical problems of estimation. The country has a long history of civilian gun ownership, encouraged by militia-based armies in the 19<sup>th</sup> century, the side effects of two world wars, and interest in hunting and sport shooting. Although gun ownership is widespread, Germany has relatively little gun crime. Firearm murders amount to 150–300 annually and suicides total some 900 per year (Cukier and Sidel, 2005, p. 35). Gun ownership usually receives little attention, except in the wake of mass shootings. The most serious recent incident occurred in Erfurt in 2003. A similar, but much less deadly, incident occurred on 21 November 2006, when a high school student in Emsdetten, near Münster, shot and wounded five people before killing himself (Jüttner, 2006). Such incidents are instrumental in shaping German public attitudes toward gun ownership.

German gun laws are permissive. Current members of shooting and hunting clubs, the country's most visible, but a minority of all, owners number 1.6 million and 340,000, respectively (Graff, 2002). Sport shooters are allowed to own up to four handguns, three semi-automatic rifles or shotguns, and 'any reasonable number' of single-shot firearms. Hunters are limited to 'two handguns for final shots of wounded animals', but 'any reasonable number' of rifles and shotguns (IMC, 2006, p. 2). In practice, this allows the accumulation of large collections, illustrated in 2005 by the revelation of 120 unregistered firearms belonging to a collector in the Black Forest. He was prosecuted, but only for insecure storage (*Der Enztäler*, 2005, p. 6).

There are no reliable totals for German gun ownership. The country has no central registry. Records are maintained by the state (*Land*) or county (*Landkreis*). Even when made available, moreover, registration statistics appear highly incomplete. There is no agreement on when to include particular categories such as starter pistols or black-powder weapons, both of which are common. Confusion is most extreme in the five eastern states that made up the former East Germany—home to one-third Germany's population—where there has been little reporting on gun ownership.

The most comprehensive estimates come from police spokespersons and firearms specialists. Speaking immediately after the incident in Emsdetten (see above), Rainer Wendt, an official of the Germany police union (Gewerkschaft der Polizei, or GdP), said that the country has about 45 million civilian guns: about 10 million registered firearms; 20 million that should be registered, but apparently are not; and 15 million firearms—such as antiques, starter pistols, air guns, and black-powder weapons like those used at Emsdetten—that do not have to be registered (DDP, 2006; ZDF, 2006). Usually—but misleadingly—simplified to 30 million, this estimate has been repeated by police spokespersons since 1996 (Becker, 2001, p. 4; Hickisch, 2000).

A more detailed estimate comes from a report on the introduction of comprehensive registration in 1972, when the nation's civilian holdings reportedly totalled 17–20 million firearms, of which only 3.2 million were registered (Dobler, 1994, p. 27). The same data was used by the German Foreign Ministry to conclude that '[e]stimates in 1972 ranged from 15,000,000 to 25,000,000 firearms held among the civilian population of the old FRG [Federal Republic of Germany]' (UN, 1999). In the 35 years since then, roughly 8 million additional firearms were legally acquired, accounting for the rest of the *registered* guns thought to exist today; legal purchases of newly manufactured guns amount to 200,000–250,000 annually (Statistisches Bundesamt, 2003). This excludes the former East Germany before reunification and illegally acquired weapons.

Similar totals come from scaling up regional estimates. According to a Bavarian police spokesperson, the region, with a population of 11 million, has some 1.5 million legal and 3 million unregistered firearms (ČTK, 2002). Extrapolated to a nation of 82 million, this would equal 32 million total civilian firearms.

The Small Arms Survey concludes that German civilian holdings are probably more than 20 million and probably less than 30 million (see Table 2.5). The lowest estimates are based on a low figure of 15 million in 1972, plus subsequent purchases of about 8 million new guns. It assumes minimal foreign smuggling and very low ownership in the former East Germany. The high estimate assumes that there were 20 million total firearms in 1972, plus 8 million new guns, higher foreign smuggling, and growing ownership in the area of the former East Germany. Neither parameter includes air guns, black-powder weapons, etc.

**Table 2.5 Estimates of German civilian firearm ownership (millions)**

Registered	Unregistered	National total	Year(s)	Sources
3.2	14.0-17.0	17.0-20.0	1972	Dobler (1994); UN (1999)
		15.0-25.0	1972	UN (1999)
1.5	3.0	32.0	2002	ČTK (2002)*
10.0	20.0-35.0	30.0-45.0	1996-2006	Becker (2001); Wendt (see Box 2.4); DDP (2006); ZDF (2006)
		20.0-30.0	2007	<i>Small Arms Survey</i>

\*The ČTK estimate refers to Bavaria only. The national figure of 32 million is based on multiplying the estimate for Bavaria by 7.1 to match the national population.

More fundamentally, registration data cannot capture every civilian gun. Registration schemes miss firearms already in civilian hands before registration came into effect, weapons left over from wars, weapons smuggled into the country and acquired through informal markets, the trade in stolen weapons, and unregulated craft production. Firearm registration with owner licensing, if robustly enacted and enforced, will capture many of these weapons over the long term. But many of the world's registration schemes have been introduced or improved only recently.

Firearms pre-date the creation of the registration systems, which in most countries started in the 1930s or later. The creation of registration systems, mostly in Europe and European colonies, was a response to rapid increases in civilian firearm acquisition after the First World War. As has become commonplace elsewhere since, civilian ownership grew largely because of the effects of warfare, which acquainted a large swath of the population with gun handling and made firearms easier to acquire (Herman, 2001). Combined with the crime waves and political chaos that affected many countries during the inter-war years, concern over growing gun violence led to many responses, including gun licensing and registration reforms.

Although longitudinal data is lacking, this increase appears to have been fuelled by the combination of declining absolute prices after the First World War and rising personal incomes after the Great Depression. An unintended consequence of the First World War was industrial overcapacity in all areas of war production in Europe and North America, including small arms production (Cooling, 1981; Pearton, 1982). While other sectors of military industry struggled, small arms makers faced few additional costs in adapting production to civilian markets. Guns purchased in the early phases of this boom largely escaped subsequent registration. Surpluses from the Second World War also appear to have been largely unrecorded. Additional sources of unregistered firearms include failure to register purchases, a form of law evasion that was relatively easy even in countries with ostensibly mandatory registration requirements, before legal reform in the 1970s made evasion harder. Since then, the rise of informal markets—black markets, leakage from military stockpiles, smuggling, and small-scale private transactions—has become a problem virtually everywhere.

An alternative source of information is production and import–export data. After registration, such data is one of the most reliable indicators of the scale of civilian gun ownership in the United States, for example. This too, though, appears to be significantly incomplete. In the best-understood example, US international trade statistics usually do not include weapons imported as components for reassembling in the United States. The total scale of US imports of parts for reassembling is unknown, but may amount to hundreds of thousands of guns annually.

In countries where craft production is largely unregulated, small-scale manufacturers contribute directly to the total of unregistered and often unknown weapons. In countries such as China, Colombia, Ghana, Pakistan, and the Philippines, illicit or unregulated craft production is a major supplier to the informal gun market (Xiao, 2006; Small Arms Survey, 2003, pp. 26–35). Little, if any, of this production shows up in official data.

In sum, registration data is the best place to start an assessment of a country's civilian firearms holdings, but it also inherently incomplete. Under no circumstances should it be treated as the whole story.

## INDEPENDENT ESTIMATES: ADDING AVAILABLE FIGURES

Because official data never tells the whole story and other techniques are unreliable or simply unavailable, comprehensive gun ownership figures routinely rely on estimation. Estimation techniques embrace everything from *coup d'oeil* guesses to peer-reviewed monographs, from informal expert opinions to systematic research. The best are studies appearing as published monographs, such as the series produced by Saferworld, the South Eastern and Eastern Europe Clearinghouse for the Control of Small Arms and Light Weapons (SEESAC), and the Small Arms Survey. Others are based on locally produced reports. Several are statements from local experts, often appearing in press reports, that have gained some acceptance. In two notable cases—India and Indonesia—estimates for the entire country were scaled up from estimates originally articulated for major cities.

Reliance on any estimates involves an element of trust. Expert estimates are not without hidden bias; they must be used carefully (see Box 2.5). In lieu of an independent technique to measure civilian holdings, only the most patently absurd examples can be dismissed. Among the most egregious are claims that Switzerland has 12 million civilian guns (which would equal 1.5 guns for every Swiss man, woman, and child) or that Yemen has 60 or even 80 million (roughly 3–4 guns for every Yemeni). This leaves a total of 77 countries with usable, independent estimates of total civilian firearm ownership. Since there is no way to test their credibility, rival estimates have been averaged for each country to achieve a consensus (see Annexe 1).

Because these are estimates, cautious application is the rule. In this review, estimates have been used to establish likely ranges of civilian gun ownership, i.e. credible low and high boundaries. Where one extreme is more credible than the other, this is acknowledged in composite average data, presented in the annexes. Assembling all of these estimates and registration totals for these countries generates a cumulative total of 554–644 million civilian firearms. With a total of 3.7 billion people, these countries are home to roughly half the world's population. Among the countries not included here for lack of useful estimates are China, much of East Asia, and the Middle East.

Over time, additional countries will join the list of those with comprehensive estimates, and quality will improve, assuring greater statistical importance as progressively more monographic studies are completed. The most promising scientific tool for estimating civilian small arms ownership is surveys through polling and focus groups, which are sources of comprehensive and comparable data for every country where this is permitted. National surveys have been undertaken repeatedly in the United States, and intermittently in other countries such as the Russian Federation (NORC, 1999; Romir Monitoring, 2003). The technique has been used most extensively in South-East Europe, in a series of reports sponsored by SEESAC. Applications in sub-Saharan Africa show that firearm polling can be used in any circumstance, although not with equal reliability (Muchai and Jefferson, 2002).

Polls and focus groups surveys are the most promising tools for estimating civilian gun ownership.



To be sure, polling on civilian firearm ownership and its effects is an imprecise tool. A major problem is the typical confusion over a household's guns. Respondents often may not know whether there are guns in the household or how many there actually are. More fundamentally, there are often concerns that lead respondents to lie or refuse to cooperate (Kellermann et al., 1990; Wellford et al., 2005, pp. 35–36). In countries with mandatory registration, for example, there is an obvious incentive to avoid reporting unregistered guns, even in an anonymous survey. In legally unregulated environments, respondents still can feel inhibited about being forthright. And even in regions where armed violence is rare, asking about access to firearms is not a neutral act.

For want of comprehensive polling, research on gun ownership often relies on proxy indices. Firearm suicide has emerged as the most accepted of these substitute measures of gun ownership, but this tends to work best in circumstances where other data is already available. It is especially weak in societies where suicide is anathema and routinely concealed, disguised as a natural death or an accident, or just not reported at all (Wellford et al., 2005, ch. 7).

### Box 2.5 Switzerland: public uncertainty and expert biases

Despite their cultural importance, the number of privately held Swiss firearms is extremely elusive. A recent survey found that 26 per cent (1.95 million) of Swiss own at least one firearm (Gasser, 2006; also see Becker, 2001, p. 14). Published estimates of total firearm ownership vary extraordinarily, ranging from 1.2 million to 12 million (see Table 2.6).

There is less room for disagreement over the nature of Swiss gun problems. This was poignantly demonstrated by the Zug massacre of 2001, and in 2006 by the murder of former Swiss ski champion Corinne Rey-Bellet (Foulkes, 2006). Firearm murders are only somewhat more common in Switzerland than most other European countries, but firearm suicide is significantly more prevalent (Ajdacic-Gross et al., 2006). Recent research concluded that greater availability of firearms has increased suicides by roughly 25 per cent in the last 20 years. Army-issued weapons are a major element in Switzerland's suicides. Although 60 per cent of Swiss firearm *murderers* use privately acquired weapons, 68 per cent of successful *suicides* use army-issued guns (Ajdacic-Gross et al., 2006). As a proxy variable for firearm accessibility, Swiss suicide data supports higher estimates of civilian ownership (Killias, 1993; Killias, Kesteren, and Rindlisbacher, 2001).

Traditionally, Swiss army reservists store their service weapons and sealed ammunition at home. The weapons can be kept after their service obligation ends, an option chosen by 57–75 per cent of former soldiers, after paying a fee (Papacella, 2004; Vonarburg, 2006). This process accelerated in 2004, when the army began reducing its ranks by over 300,000 reservists, a measure expected to release several hundred thousand additional high-powered rifles and pistols (Papacella, 2004).

One major area of disagreement is the number of modern military rifles in the hands of former reservists, their heirs, and clients. According to Peter Hug, roughly 100,000 Sturmgewehr 57 and Sturmgewehr 90 automatic and semi-automatic rifles have been released this way (Hug, 2006). Contrasting reports suggest that many more were released in 2004–06 alone (Mutter, 2006; Papacella, 2004). Even greater uncertainty surrounds privately purchased firearms. Hug (2006) estimates this category at some 450,000. Other estimates can be explained only by assuming that there are between one and three million privately acquired guns.

The lowest total estimates of 1.2–1.3 million private Swiss guns (Bachmann, 2002; SwissInfo, 2005) overlook major categories. The highest estimates of 5–12 million are hard to justify without a clear breakdown. The Small Arms Survey presents Swiss ownership at 2.3–4.5 million firearms, or 31–60 for every 100 residents.

The broad range of Swiss firearm estimates illuminates common biases of expert estimates. The perceptions of gun policy experts anywhere, regardless of their convictions, are vulnerable to classic problems of cognitive screening and selective attention, leading them to see what they expect to see (Bruner, 1957; Egeth, 1967). Higher numbers typically—but not always—come from gun owners and police; lower numbers usually are from gun control advocates. Whether they devote more time to shooting sports or responding to gun pathologies, owners tend to see more guns than non-owners. Because of their greater proximity to firearms, the estimates of law enforcement officials and gun advocates must be taken seriously. The perspectives of more distant observers can be equally valuable. Without comprehensive records or careful public polling, neither perspective is sufficient. Whenever possible, both methods must be applied together.

**Table 2.6 Estimates of civilian firearms ownership in Switzerland**

Estimate	Source
1.2	SwissInfo (2005)
1.3	Bachmann (2002)
1.0-3.0	Pescia (2006)
2.36	Hug (2006)
2.83-4.56	ProTell (2004)
5.0	Munday (1996, p. 12)
3.0-12.0	Hess (1995)
2.3-4.5	2007 Small Arms Survey estimate

## EXTRAPOLATION FROM REGISTRATION DATA

When total civilian ownership cannot be calculated simply by adding together and evaluating official and published reports, statistical methods offer the most reliable method of estimation. The strongest basis for systematic estimation of civilian firearm ownership starts with official registration figures. There are 52 countries where both officially registered civilian firearms and independent estimates of unregistered civilian firearms are available. Used together, they form the strongest basis available for statistical modelling based on simple regression analysis of least squares trend line.<sup>2</sup> The registration figure offers certainty, while independent assessments give a sense of comprehensiveness. The sample is economically diverse, although it is skewed geographically by examples from the Caribbean, Latin America, and Europe. Asian and Middle Eastern examples are largely absent.<sup>3</sup>

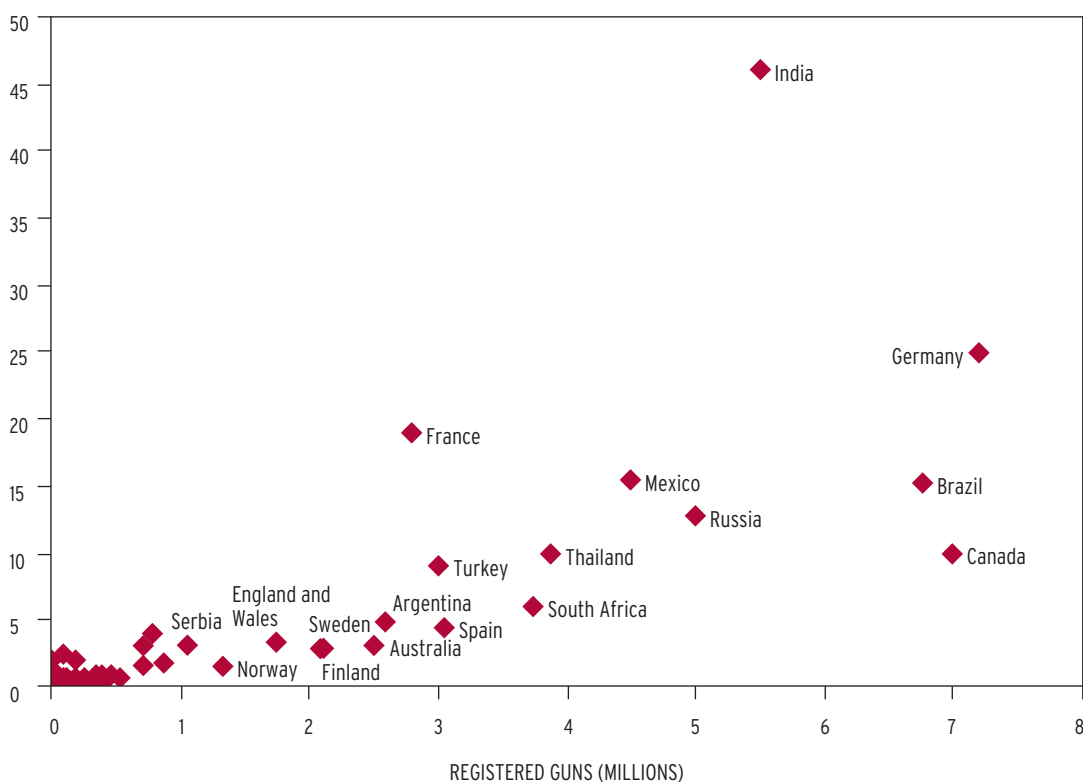
This method is especially helpful when registration data is available, but not a comprehensive independent estimate. In these cases, registration data, in combination with per capita gross domestic product (GDP) and population, offers a basis for reliable correlation.<sup>4</sup> The resulting correlation,  $R + \beta(\text{registered total}) = R^2$ , is extremely useful for estimating total unregistered civilian holdings in countries where the total number of registered weapons is known. Using the 52 cases with both reliable registration data and complete national estimates leads to an  $R^2$  of 0.512. In other words, this coefficient of determination alone explains over half the variance among these countries.

In addition to these 52 cases, there are 25 countries that have released registration data, but lack a credible total country estimate that includes unregistered weapons. None are large countries, although they include several middle-sized states such as Belarus, the Czech Republic, and Venezuela (see Annex 2). Averaging shows that unregistered holdings typically are 2.6 times larger than registered holdings, although the actual correlation appears to vary in relation to per capita GDP. The implication is that these 25 countries, with a known total of 4.2 million registered civilian firearms, also have a total of approximately 9.1 million unregistered civilian guns, averaging 350,000 guns for each society.<sup>5</sup> The sample subsumes several distinctive cases with notable divergence among them: it works better for a *set* of countries than any one in particular. In some cases, to be sure, there is no evidence of massive illegal parallel holdings. For example, in geographically or politically isolated countries such as Israel and Japan, unregistered holdings appear to be only one-quarter to one-half as large as registered holdings, and their entries have been adjusted.

Less credible are claims from countries with permeable borders and substantial internal trade that they too have minimal illegal accumulations. Officials in Finland, for example, state that unregistered weapons amount to two per cent of the country's total civilian holdings (50,000 unregistered compared to 2.1 million registered firearms), a claim that is suspiciously low compared to correlative expectations (Biting the Bullet, 2006, p. 94; Annexe 3). Balanced estimates must account for the rise of routine smuggling since 1989. Often, the qualitative changes are easier to spot. In Sweden, for example, a police spokesperson acknowledged that '[b]efore, there were a lot of shotguns—now it's all automatic weapons' (Tidningarnas Telegrambyrå, 2005). In recent decades this process appears to have inflated unregistered holdings on a scale comparable to other European countries.

Figure 2.2 **Correlation of registered to unregistered firearms in 52 countries**

EXPERT AVERAGE (MILLIONS)



Note: To make the figure legible, only the correlates for selected countries are labelled. The full list of 52 countries, including those for which the correlates are labelled, is: Albania, Argentina, Australia, Bangladesh, Belgium, Bosnia and Herzegovina, Brazil, Bulgaria, Canada, Chile, Colombia, Croatia, Ecuador, El Salvador, England and Wales, Finland, France, Germany, Greece, Guatemala, Haiti, Honduras, India, Indonesia, Israel, Jamaica, Jordan, Kyrgyzstan, Macedonia, Mexico, Montenegro, the Netherlands, New Zealand, Nicaragua, Norway, Panama, Paraguay, Peru, the Philippines, Poland, the Russian Federation, Serbia, South Africa, Spain, Sri Lanka, Sudan, Sweden, Tajikistan, Tanzania, Thailand, Turkey, and Uruguay.

Table 2.7 **Summary of registered to unregistered firearms correlation**

Model	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Standard error of the estimate
1	0.716 <sup>a</sup>	0.512	0.502	3865058.943

a: Predictors: (Constant), registered guns

## CORRELATING CIVILIAN GUN OWNERSHIP FROM BASIC NATIONAL INDICATORS

For countries where there is simply no suitable data on civilian gun ownership—either complete estimates or registration data—alternative indicators must be used instead. The model applied here is based on a hypothetical relationship between per capita GDP and civilian gun ownership. This model is refined by applying possession estimates from previously analysed countries to illuminate conditions in countries lacking comparable data. The approach is based on the theoretical assumption that civilian demand—a complex and varied phenomenon—is heavily influenced by macroeconomic forces, above all by a country’s wealth and population figures. The approach treats firearms as an ordinary consumer good, ignoring distinctive factors such as personal insecurity or local gun culture.

Although actual country ownership will be strongly influenced by such vicissitudes as anxiety, law, institutions, and culture, this model permits crude prediction. The model relies on data from countries with complete civilian estimates, which are correlated with GDP and population figures to predict ownership elsewhere. From the sample of countries with comprehensive national estimates, the resulting correlation can be applied to most other countries for which we have only general indicators such as population and wealth data. This method has been applied here to 76 countries for which both complete estimates and registration totals are lacking. To enhance accuracy, regional correlations have been used when possible, and the global correlation when necessary.

This approach establishes the existence of approximately 76 million civilian-owned firearms, mostly in smaller countries, but with a few exceptions. More than 50 per cent of these guns are believed to be in China, which is estimated to have at least 40 million civilian firearms. The next largest to be estimated exclusively on the basis of regional or global correlations are Saudi Arabia, with an estimated 6 million civilian guns; Iran, with approximately 3.5 million; and Ukraine, with roughly 3.1 million. The remaining estimated 24 million firearms are distributed among 72 countries, suggesting an average civilian inventory among them of approximately 300,000 firearms each (see Annexe 4).

With its  $R^2$  of 0.287 for all countries, the model explains one-quarter of divergence from correlative expectations. The approach generates an estimated total civilian holding for any country when multiplied by per capita GDP and population. Although this is inferior to statistical predictions based on registration data, it still explains a major part of variance. The global correlation is especially robust. Eliminating extreme outliers—highest-ownership countries such as the United States and Yemen, and lowest-ownership countries such as Kyrgyzstan or the Solomon Islands—has a minimal effect on  $R^2$ , although such steps enhance statistical significance (gun possession in these last two countries is reviewed in MacFarlane and Torjesen [2004], and Muggah and Alpers [2003], respectively).

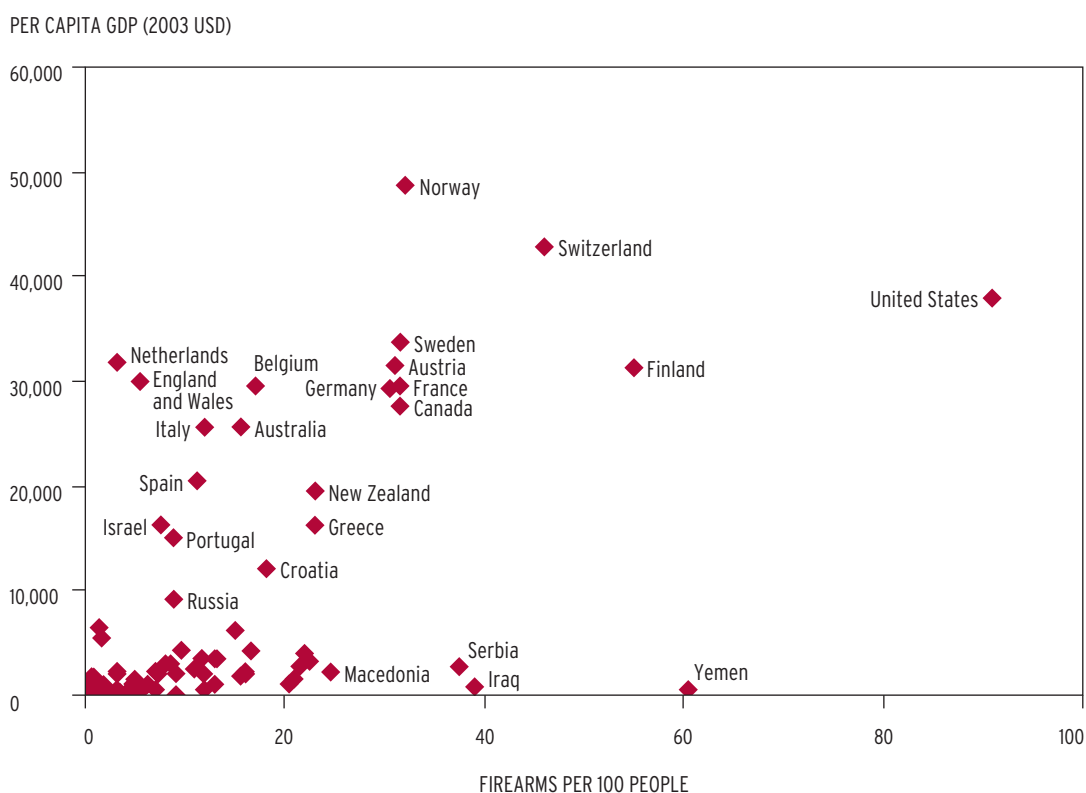
The one variant that produced better results was regional correlation, especially for sub-Saharan Africa, and Latin America and the Caribbean. Africa produced an  $R^2$  of 0.359. Dropping Angola as a statistical outlier—probably the most heavily armed country on the continent in per capita terms—improved this to an impressive 0.838. For Latin America and the Caribbean, the comparable statistic was 0.436, still quite strong. Consequently, these regional correlations have been used preferentially where appropriate in Annexes 3 and 4.

This approach shows strengths and weaknesses (see Box 2.6). Tested against Brazil, for example, per capita GDP/population correlation suggests there are 14.4 million civilian small arms in that country, compared to expert estimates averaging 15 million (Fernandes et al., 2005, p. 120). Not all regions show consistent results. East Asia offers an especially weak statistical base, the result of poor information and limited official cooperation, as well as great national distinctiveness, which undermines estimates.<sup>6</sup>

Alternative indicators must be used to estimate civilian gun ownership for countries that lack suitable data.

No correlation coefficient fits all cases. The method used here is weakest at the highest levels of per capita GDP. For countries with annual per capita GDP of more than USD 20,000, this model tends to predict levels of civilian gun ownership higher than what is actually known or from independent estimates. The model expects countries such as England and Wales, Germany, and Japan to have much higher civilian holdings than they actually do. It appears that the continuous relationship between rising per capita GDP and rising gun ownership tapers off for high-income countries. Other factors outside the simple model used here, such as national laws and gun culture, become more influential than they were at lower income levels. Repeating the analysis using logarithmic transformation for wealth might reduce this distortion. The United States remains an exception, one of the few wealthy countries to follow the

Figure 2.3 **Correlation of per capita GDP to civilian gun ownership in 76 countries**



Note: To make the figure legible, only the correlates for selected countries are labelled. The full list of 76 countries, including those for which the correlates are labelled, is: Afghanistan, Albania, Angola, Argentina, Australia, Austria, Bangladesh, Belgium, Bosnia and Herzegovina, Brazil, Bulgaria, Burundi, Cambodia, Canada, Chile, Colombia, Croatia, Ecuador, El Salvador, England and Wales, Finland, France, Germany, Ghana, Greece, Guatemala, Guinea-Bissau, Haiti, Honduras, India, Indonesia, Iraq, Israel, Italy, Jamaica, Jordan, Kenya, Kazakhstan, Kosovo, Kyrgyzstan, Lebanon, Macedonia, Mexico, Montenegro, Morocco, Mozambique, the Netherlands, New Zealand, Nicaragua, Nigeria, Norway, Pakistan, Panama, Paraguay, Peru, the Philippines, Poland, Portugal, Russian Federation, Serbia, the Solomon Islands, Somalia, South Africa, Spain, Sri Lanka, Sudan, Sweden, Tajikistan, Tanzania, Thailand, Turkey, Uganda, the United States, Uruguay, Yemen, and Zimbabwe.

Table 2.8 **Summary of per capita GDP to firearms correlation**

Model	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Standard error of the estimate
1	0.536 <sup>a</sup>	0.287	0.277	12.88236

a: Predictors: (Constant), GNP

### Box 2.6 Testing the correlative civilian firearm ownership model

As this chapter notes, data for the global distribution of civilian-owned firearms is already available for a large number of countries. Comprehensive estimates were found for 81 countries. Another 25 countries supplied registration data, which provides a relatively high-confidence basis for estimating their total civilian ownership. GDP/population correlation is used for the remaining countries.

Although the latter is used as a residual technique to account for the final 10–16 per cent of civilian-owned firearms, it still must be evaluated for verisimilitude. Because all complete examples were used to construct the model, no truly independent test of its accuracy is possible. But comparing the results of this estimating method to a few relatively well-understood middle-income countries shows results close to low expert estimates (see Table 2.9). The low correlative results show that the approach must be used cautiously, since it tends to underestimate, reinforcing conservative conclusions.

The tendency for the model to underestimate does not apply everywhere. The extreme example is England and Wales, where it predicts much more than independent estimates show. This reflects a basic problem with applying the approach to high-income societies. When correlating civilian gun ownership primarily with national wealth, the model generates spurious results for high-income countries by failing to account for factors that suppress public access and demand, such as laws, regulations, and national gun culture.

In England and Wales, a strong anti-gun culture suppresses demand and regulative barriers inhibit buying, keeping ownership far below the levels that wealth alone would anticipate. The major exception to this trend for the wealthiest countries is the United States, where the model anticipates levels of civilian gun ownership slightly above the most widely accepted estimates, a match facilitated by the notoriously permissive gun laws and a generally positive gun culture.

Table 2.9 Comparing estimated and correlated civilian gun ownership

Country	Per capita GDP (USD)	Population	Low est. of total firearms	High est. of total firearms	Correlative total firearms estimate
Brazil	2,900	175,000,000	15,300,000	15,300,000	14,500,000
Colombia	1,900	43,000,000	2,300,000	3,900,000	2,300,000
England and Wales	29,900	60,400,000	2,000,000	5,700,000	50,600,000
Morocco	1,500	30,000,000	1,500,000	1,500,000	1,300,000
Turkey	3,400	71,000,000	7,000,000	11,000,000	6,800,000
United States	37,800	300,000,000	250,000,000	290,000,000	317,000,000

Sources: Brazil: Fernandes et al. (2005, p. 120); Colombia: Aguirre et al. (2006) and Small Arms Survey (2006); England and Wales: UK (2005), low est. from Cramb (2006), and high est. from Goodchild and Lashmar (2005); Morocco: Small Arms Survey (2005, pp. 87, 89); Turkey: UN (1998), BBC (2003), Braiden (2003), and Chiesa (2003); United States: based on Small Arms Survey (2003, p. 61) and US ATFE (2003; 2004; 2005), but the latter do not include military weapons sold to civilians or weapons imported as parts

model. The model predicts 317 million civilian firearms, whereas reliable estimates from other sources place the actual number at about 290 million (see Box 2.6). The absence of strong civilian gun laws—especially national registration—is the notable and relevant difference between the United States and other high-income countries, for which the model consistently under-predicts ownership.

The per capita GDP/population model is also weak in its predictions of ownership levels in the very poorest countries. As income declines, individual countries diverge from expectations. The problem is clearest as per capita GDP drops below USD 1,000 per person:  $R^2$  drops to 0.081. For such poor countries, the model explains less than 10 per cent of the difference in civilian ownership; the rest (over 90 per cent) is explained by other factors.

Essentially, the model expects some poor countries, such as Ethiopia, Liberia, and Somalia, to have smaller holdings than appears to be the case. This probably reflects the role of armed conflict in inflating gun ownership.

The correlation also breaks down for the very smallest countries, with populations under 250,000. Most of the world's smallest countries are islands. With distinctive trading patterns, some can maintain very low gun ownership cultures, while others are vulnerable to rapid transformation with just a few shipments—sometimes just one such shipment (Alpers and Twyford, 2003, p. 8). With these problems in mind, this chapter estimates gun ownership only in countries with a population of at least 250,000.

## THE CROSS-OVER EFFECT: THE MOVEMENT OF MILITARY FIREARMS TO CIVILIANS AND CIVILIAN FIREARMS TO COMBATANTS

Civilian holdings already far outnumber military small arms stocks. While military arms have historically differed significantly from civilian guns in terms of sophistication, this may be changing as well. There is widespread cross-over of military-style firearms into the civilian market. To a far lesser degree, civilian guns are also winding up in the hands of combatants.

The world's armed forces acquire no more than about one million *new* firearms annually, possibly considerably less. Although the number of military weapons in circulation in any year is much greater, most of these are second-hand. The number of newly manufactured military firearms is much smaller (Bevan, 2006). Civilians acquire approximately 7–8 million new small arms annually (Batchelor, 2002, pp. 9, 54), though, as noted above, the rate of attrition



A police chief holds a confiscated semi-automatic weapon at a police station in Montgomery, Alabama, in June 2004. The rifle is believed to have been used in the fatal shootings of three Birmingham police officers. © Haraz Ghanbari/AP Photo

is unknown (see Box 2.1). More fundamentally, the division between ‘military’ and ‘civilian’ weapons is no longer so clear cut.

In the first instance, the transfer of weapons from the armed forces to civilians is now common, as military weapons are given away, stolen, and sold. In some cases, the process is part of routine demobilization, as in Switzerland, where former reservists traditionally keep their military-issued weapons (see Box 2.5). Other countries sell surplus military weapons to civilian owners. In the United States, this takes the form of the Civilian Marksmanship Programme. Surplus military rifles can also be exported to private customers, as in 2006, when a Serbian firm transferred several thousand such rifles to private buyers in the United States (*VIP/Politika*, 2006). Elsewhere, the process is illegal, as weapons are stolen or illegally sold onto the civilian market. Iraq is the most extreme example of this.

There is movement from civilian to military holdings as well, as non-state guerrillas, insurgents, and terrorists initially arm themselves with any available weapons. In scale, though, this is relatively small—non-state actors are not that big as a portion of the global total of firearm owners, totalling fewer than a quarter of a million people in the late 1990s, and probably far fewer today (Small Arms Survey, 2001, p. 79).

Other indicators suggest that differences between military and civilian equipment may be declining. Civilians are gradually catching up with some of the technical developments armed services completed in the 1960s and 1970s (Kahaner, 2006). The steady transfer of automatic weapons from military arsenals into civilian hands, plus increasing legal sales of automatic weapons to civilians, means that they are drawing progressively closer in terms of firepower. In the United States alone, private ownership of automatic and semi-automatic rifles was estimated at four million in 1989 (IRSAS, 1989). Another million have subsequently been bought by American consumers (VPC, 2004). The total is almost four times the number owned by the US Army (Small Arms Survey, 2006, p. 53). Throughout much of Africa and the Middle East, civilian ownership of automatic rifles—typically AK-47s—is increasingly commonplace (Kahaner, 2006, chs. 8–9). Revolvers are rapidly becoming antiquated among civilians, who are replacing them with semi-automatic pistols.

The consequences of increasing civilian firepower are not hard to find. Already, civilians kill and maim many more of each other than do the armed forces. *Direct* combat fatalities were estimated at approximately 80,000–108,000 in 2003, of which 60–90 per cent were attributable to small arms and light weapons (Wille and Krause, 2005, pp. 230, 257). Non-conflict civilian violence appears to be far more destructive. As one analyst notes, ‘while precise data are not available, murders, suicides, and accidents with firearms in areas not at war exceed 200,000 per year’ (Cukier and Sidel, 2005, pp. 4, 14; also see Florquin and Wille, 2004, p. 174).

**The transfer of weapons from the armed forces to civilians is now common.**

## THE POST-MODERN ARMS RACE

For much of the 19<sup>th</sup> and 20<sup>th</sup> centuries, states competed in arms races for the largest, most destructive arsenals. In the post-modern world, though, conventional arms races have become increasingly rare (Mack, 2005). The term *arms race* is used today mostly as a metaphor for declining control over security (Tertrais, 2001; Sloss, 2001). Where it is gaining greater meaning, instead, is among individual civilians, for whom the see-saw pattern of self-conscious arming and counter-arming is becoming more and more real.

As described in the statistical model developed here, there is a strong connection among *per capita wealth*, *population*, and *guns*. In general, greater per capita wealth and population are positively associated with more civilian



firearms. As per capita income rises, so does civilian gun ownership, unless there are strong legal barriers to public gun ownership and a cultural predisposition to view gun ownership negatively, as in Japan and Poland. Of course, further research is needed to disaggregate which segments of the civilian population are responsible for acquisition, and whether cross-national patterns can be identified.

Although the evidence is not conclusive, it appears that both restrictive national firearms laws and civilian gun culture inhibit normal trends. In countries with strong legal systems but weak cultural barriers, gun ownership can rapidly expand as income rises. China and India offer the clearest evidence of this tendency for wealth to outweigh law in countries with weak cultural barriers. All such countries show evidence of significant increases in civilian ownership, even though the legal regime remained unchanged or has even been tightened. The Russian Federation displays a more complicated picture. Estimated civilian ownership there increased from no more than 500,000 in 1989 to roughly 6–14 million today, based on household ownership rates (Keller, 1990, p. 1; Romir Monitoring, 2003). Greater gun ownership in the Russian Federation came despite falling incomes, helped instead by the erosion of legal barriers, loss of control over military stockpiles, and mounting personal insecurity. In England and Wales, restrictive ownership laws have also been overcome through higher illegal ownership (Hales, Lewis, and Silverstone, 2006, ch. 4).

Stronger correlations require longitudinal data, plotting changes in gun ownership over time from country to country. Currently, such data is available for only a handful of states, most notably the United States. Other countries, such as the Czech Republic and the United Kingdom, make time-series gun data available, but only for legally registered firearms.

Population size and national wealth are also basic forces shaping overall ownership. Regions with a permissive gun culture and rapidly rising income and population tend to witness sharp increases in civilian possession. Previous research has already substantiated the importance of greater wealth in small arms acquisition, noting, for example, that '[a]n important element of small arms demand . . . is the relative monetary value of firearms' (Glatz and Muggah, 2006, p. 153). But there are important exceptions, since 'low earned income does not prevent arms acquisition and possession if other demand factors are strong' (Glatz and Muggah, 2006, p. 158). A related consideration is the significance of gun ownership as a symbol of wealth in many societies (Bevan and Florquin, 2006, p. 306).

**As wealth and population grow, civilian gun ownership tends to rise as well.**

One region almost certain to be affected by these trends is the Middle East. Although several North African countries have restrictive gun laws, the legal environment is relatively permissive on the Arabian Peninsula. Independently of other forces such as the consequences of war in Lebanon in the 1970s and 1980s, the conflict in Iraq today, or sectarian violence in Gaza, gun buying is already common. In a permissive environment where firearm ownership is widely seen as a masculine necessity, population and wealth are key determinants of the growth of civilian ownership. The population of the Middle East doubled between 1970 and 2000. It is expected to increase at a slightly slower rate in the coming decades (PRC, 2004). In Arabic-speaking countries, population growth is even faster, and is predicted to grow by about 60 per cent between 2000 and 2020 (UNDP, 2002, pp. 35–38). Independent of changing security concerns and wealth, such trends seem likely to increase overall demand for firearms throughout the region (Bevan and Florquin, 2006).

These associations also illuminate the ongoing debate over small arms demand. A complicated phenomenon, gun demand can rarely be reduced to a single explanation. The connection here reinforces the conclusions of previous research emphasizing the role of non-security motives in acquiring small arms (Atwood, Muggah, and Widmer, 2005).

## FROM HUNTING TO SECURITY: THE CHANGING NATURE OF CIVILIAN GUN OWNERSHIP

Crucial aspects of firearm ownership among civilians have been the urbanization of gun ownership and the switch to deadlier technologies.

Although exact data is lacking, there appears to be a steady increase in the number of civilian firearms in cities. This reflects the well-known global shift of populations from the countryside and villages to cities. Patterns of firearm ownership continue to change today, leading to a steady increase not only in the scale of civilian-owned weapons, but also their typical firepower.

Civilian firearm ownership used to be associated mostly with rural life. Through the 19<sup>th</sup> and early 20<sup>th</sup> centuries, the predominant firearms in civilian society were long guns—rifles and shotguns—for hunting or self-defence. This is best documented in the United States. As recently as 1899–1945, 75 per cent of all civilian firearms manufactured in the United States were long guns. Technological changes, especially the development of small and reliable handguns in the later 19<sup>th</sup> century, allowed greater firearm urbanization (US ATF, 2000). By the 1980s handguns averaged about 50 per cent of the American civilian market (US ATF, 2000, p. 7). Other countries witnessed similar trends. An extreme example is the Czech Republic, where the proportion of handguns rose from 3 per cent of all registered guns in 1991 to 37 per cent by 2000, due partially to legal reforms facilitating legal handgun ownership (Czech Republic, 2001, p. 42). The exceptions are countries such as the United Kingdom, where handgun ownership was prohibited in 1997–98 after the Dunblane massacre (Karp, 2003).

Long guns are poorly suited to urban environments, where they cannot be carried without attracting alarm. Firearms ceased to be a rarity in the city in the 1920s and 1930s as a result of the increase in the numbers of handguns. Regulation became more widespread or civilian ownership rose in response, leading to many of the pioneering licensing and registration laws of the mid-20<sup>th</sup> century. Pressure for greater gun control continued to grow in countries such as Australia, Canada, Jamaica, and the United Kingdom in direct response to easier civilian access to automatic rifles and, above all, semi-automatic pistols, often after major crimes involving these weapons (Greenwood, 1972; Malcolm, 2002, chs. 5 and 6).

Closely associated with changing patterns of civilian ownership is the decline of hunting. Economic development rapidly reduces the need for hunting, transforming it from a necessity for the poor into a luxury for those who can afford it (Herman, 2001). An increasingly urbanized global population also has few opportunities and less desire to hunt. The change is readily seen in Europe, where the number of licensed hunters shrank from ten million in the 1980s to six million in 2003.<sup>7</sup> In Italy the plunge was especially dramatic, as the total number of registered hunters shrank from 2.3 million in the mid-1970s to somewhat over 700,000 today (Hooper, 2005). By 1945 one-quarter of all American men hunted (Burbick, 2006, pp. 68, 198, fn. 1). By 2002 this had fallen to six per cent of all American adult men (Jonsson, 2003; Gamerman, 2005). Instead of countryside sports, civilian gun buyers are more likely to invest in weapons suited to urban life, especially sidearms (Rodengen, 2002, pp. 147–71).

The counterpart to growing markets for handguns in wealthy urban markets is greater interest in automatic rifles in poorer regions. Like revolvers, the bolt-action rifles that predominated among civilians are increasingly being supplanted with far more lethal semi- and fully automatic alternatives. In the 1980s, owners in Africa, the Middle East, and South Asia replaced their bolt-action rifles with AK-47s (Kahaner, 2006). The result is a poorly acknowledged revolution in civilian firepower. Easier access to high-powered firearms is a concern in a growing number of countries, including places previously all but immune to gun proliferation problems, such as Ireland and New Zealand

A major factor in patterns of civilian gun ownership is the decline of hunting.

(*Dominion Post*, 2006; *Gun Policy News*, 2006). That said, major legal reforms have slowed or even reversed the proliferation of such weapons in Australia and the United Kingdom, accelerating the decline of firearm deaths and mass killings (Chapman et al., 2006).

A sign of the rising lethality of civilian holdings is a rising demand from law enforcement agencies for more potent weapons. Police officers around the world continue to trade revolvers for pistols, and pistols for sub-machine guns and automatic rifles (e.g. see Demarzo, 2005; Jahn, 2005; Murphy, 2006). In England, escalation has fuelled controversial demands to arm more police (BBC, 2006). Where social inhibitions against gun use are weak, the impact has been especially horrible, as illustrated by the waves of murders immediately following sudden access to automatic rifles in Papua New Guinea (Alpers, 2005). Elsewhere, this trend is associated with more civilian mass shootings, a phenomenon that declines when fully automatic and semi-automatic weapons are removed (Chapman et al., 2006).

## FIREARM DESTRUCTION: REINFORCING CIVILIAN DOMINANCE

Although it is much slower than firearm acquisition, destruction continues to shape global holdings. Organized destruction projects have been responsible for the elimination of at least 8.5 million small arms since 1991 (see Annex 5). This equals an average of at least 500,000 firearms annually. This figure only includes totals from projects that eliminated at least 10,000 weapons at a time; it does not include the numerous smaller undertakings. Although total destruction is not inconsequential, it is swamped by the annual production of roughly eight million new firearms annually (Batchelor, 2002, p. 54; Bevan, 2006, p. 26).

Destruction activity is concentrated among countries with the largest holdings. Just three countries—Germany, the Russian Federation, and the United States—were solely responsible for 64 per cent of confirmed military small arms units destroyed (see Table 2.10). Civilian firearm destruction was even more concentrated. Three countries—Australia, Brazil, and the United Kingdom—accounted for over 89 per cent of all known civilian firearm destruction activity.

More than 5.5 million military small arms were destroyed in the period 1991–2006, as were more than two million civilian firearms. The destruction of law enforcement and non-state armed group weapons rarely matches the scale of the most prominent civilian and military undertakings, despite the publicity that often surrounds them.

**A large number of weapons taken by law enforcement authorities are not destroyed.**

The destruction figures here do not include many of the small arms collected around the world through post-conflict disarmament and police seizures. Many highly publicized disarmament programmes, such as those in Mozambique in the early 1990s, or Sierra Leone in 2002, or Afghanistan in 2003–05, are not included (Caramés, Fisas, and Luz, 2006, p. 23), because they often collect the guns, but do not destroy them. Even weapons collected through post-conflict disarmament schemes may be reissued to state agencies or allowed back into black markets.<sup>8</sup> A large number of weapons taken by law enforcement authorities are not destroyed, but kept as criminal evidence and eventually sold. In the most extreme example—China's report of seizing 38 million illegal civilian firearms—their destruction can only be surmised (Xiao, 2006).<sup>9</sup>

Other important destruction programmes have not been listed here for want of actual destruction. In countries such as Kazakhstan and Ukraine, commitments have been finalized to eliminate large numbers of weapons, but none have actually been destroyed as of the time of writing. Nor do destruction programmes always end as planned. A prominent example was efforts by the Organization for Security and Co-operation in Europe (OSCE) to eliminate 300,000 surplus small arms in Belarus, which collapsed after all the preliminary studies had been completed.<sup>10</sup>

A side effect of destruction trends is to boost the dominance of civilian holdings. Not only are military-held guns being destroyed faster, there are fewer to begin with and they are not replaced as quickly. With an average of some 350,000 military guns destroyed annually, destruction may *surpass* average annual new procurement (Bevan, 2006). But civilian destruction, eliminating an average of 150,000 weapons annually, is offset by the roughly 7–8 million new firearms acquired by civilians every year.

Although local effects will vary widely, the net result of destruction trends is to reinforce civilian preponderance of global firearm possession. A comprehensive assessment of destruction would have to consider the effects of routine attrition on military stockpiles and civilian holdings through loss and breakage. Currently, neither the data nor analytical tools exist for such an assessment. Whether wastage affects civilian or military firearms more can only be guessed (see Box 2.1).

**Table 2.10 The largest small arms destruction programmes, 1991–2006**

Country	Source of weapons	Quantity destroyed	Years	Sources
Germany	Military	1,781,696	1991–2004	Germany (2005, p. 20)
Russian Federation	Military	1,110,000	1994–2002	Faltas and Chrobok (2004, p. 115)
United States	Military	830,000	1993–96	Small Arms Survey (2002, p. 75)
Australia	Civilian	643,726	1997–98	Small Arms Survey (2002, p. 75)
United Kingdom	Military	540,000	1992–2001	Faltas and Chrobok (2004, pp. 38–39)
Brazil	Civilian	443,719	2004–05	Mota (2006, p. 8)
South Africa	Military	262,667	1998–2001	Gould (2004, p. 155)
Bosnia	Military	250,000	2002–07	UK (2005, p. 15)
Albania	Civilian	222,918	1997–2005	Holtom et al. (2005, p. 7); OSCE (2002)
Cambodia	Military	198,000	1999–2006	EU ASAC (2006)
Romania	Military	195,510	2002–03	Romania (2003, p. 10)
United Kingdom	Civilian	185,000	1997–99	Small Arms Survey (2002, p. 75)
Australia	Civilian	150,000	1995–2004	Philip Alpers (private communication, 2006)
Netherlands	Military	143,632	1994–96	Small Arms Survey (2004, p. 58)
Nicaragua	Civilian	142,000	1991–93	Small Arms Survey (2002, p. 75)
Colombia	Various	141,719	2003–06	Kytömäki and Yankey-Wayne (2006, p. 77–78)
France	Military	140,000	1998–2000	France (2003, pp. 10–11)
Serbia	Military	117,269	2001–03	Small Arms Survey (2004, p. 58)
South Africa	Police	115,711	1999–2001	Small Arms Survey (2002, p. 75)
Brazil	Civilian	100,000	2001	Small Arms Survey (2002, p. 75)

Note: Programmes are ranked by magnitude, but all of them destroyed more than 10,000 small arms and light weapons. They do not include ammunition or planned destruction projects. The complete version of this table can be found in Annexe 5.

## CONCLUSION

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As illustrated here by countries as diverse as Ireland and Yemen, the proliferation of privately owned guns is a widespread, global phenomenon. In a world awash not just in arms, but also in fiery rhetoric, understanding the distribution of small arms and their effects is anything but easy. Confusion over firearm policy has often discouraged careful analysis of preconceived opinions and inhibited any questioning of the conventional wisdom. Yet the amount of information available is not small. As shown here, many countries have excellent statistics on the distribution of firearms within their borders. In other countries, it is possible to draw estimate sufficient to support basic conclusions.

It is increasingly possible to outline how many guns there are in existence, where they are, and who has them. There are approximately 875 million firearms in the world. Of these, the great majority—roughly 650 million—are in civilian hands. These findings support the conclusion of economist Steven Levitt and Stephen Dubner ‘that the modern world, despite a surfeit of obfuscation, complication and downright deceit, is *not* impenetrable, is *not* unknowable, and—if the right questions are asked—is even more intriguing than we think’ (Levitt and Dubner, 2006, p. xi).

The increasing atomization of global society has become something of a cliché; and more and more contemporary issues are too complicated for single solutions by single actors (Matthews, 1997). With the majority of the world’s guns under civilian control, small arms issues are becoming much like everything else, displaying the same complexity affecting so many policy problems. The dominance of civilians as key players in the global small arms phenomena reminds us that there are no panaceas in gun policy: no one actor, no one programme can resolve small arms issues. Solutions to firearm-related problems rest in the hands of numerous actors, ranging from international organizations, to states and civilians themselves in their diverse manifestations.

Fortunately, we are learning more and getting better at managing these problems. As this chapter reveals, we know much more about the global diffusion of firearms than is commonly assumed. Even where official data is scarce, it is possible to make useful estimates of the scale of the distribution of firearms. While enduring solutions to gun problems may seem distant, our insights are improving rapidly. This chapter is not the final word on the subject; it should be seen, rather, as a stepping-stone, facilitating progress toward more effective small arms policy. Better understanding of gun ownership is necessary in every country. Vital steps include:

- many more country reports based on field research;
- time-series data on national small arms production, imports, and exports;
- time-series data on national registration;
- civilian ownership surveys; and
- detailed reports of military and law enforcement small arms inventories.

International small arms policy making is evolving from a broad instrument for raising awareness and dealing with general problems into a mechanism able to deal with more-specific problems. Continued progress will require better understanding of the problems themselves. Through better information, research will be able to better specify where the worst small arms problems are and which policy instruments are most promising. Vital steps toward clear insight, like those listed above, will facilitate sharper priorities and more effective action. ■

## LIST OF ABBREVIATIONS

GDP	gross domestic product	SEESAC	South Eastern and Eastern Europe
IRA	Irish Republican Army		Clearinghouse for the Control of Small
OSCE	Organization for Security and Co-operation in Europe		Arms and Light Weapons

## ANNEXES (ONLINE AT <[HTTP://WWW.SMALLARMSURVEY.ORG/YEARB2007.HTML](http://www.smallarmsurvey.org/yearb2007.html)>)

### **Annexe 1. Seventy-seven countries with comprehensive civilian ownership data**

This lists all countries for which meaningful independent estimates of total civilian gun ownership are available.

### **Annexe 2. Twenty-five countries with firearm registration data only**

This lists countries for which official registration data is available, but not estimated total civilian gun ownership.

### **Annexe 3. Civilian firearm ownership for 178 countries, in alphabetical order**

This shows all data sources used in Annexes 1 and 2, correlative estimates, and other estimates as noted.

### **Annexe 4. Civilian gun ownership for 178 countries, in descending order of averaged civilian firearms**

This is identical to Annexe 3, except that entries are presented in descending order of magnitude of civilian firearm holdings, based on averaged values.

### **Annexe 5. Major small arms and light weapons destruction projects, 1991-2006**

## ENDNOTES

- Owen Greene, private communication to the author, June 2003.
- A correlation adjusted until the sums of the squares of y-axis deviations from the trend line are as small as possible.
- As noted elsewhere, while most registration data is fully credible, four examples appeared suspiciously low and were not included. They were China, with a total of 680,000 registered guns, but there are regular reports of police seizures of millions of unregistered weapons; Mozambique, with 7,000 registered guns; Sudan, where the Ministry of the Interior claims to have registered a total of 6,724 guns in a war-ravaged country of 34 million people; and Tunisia, with 3,408 registered firearms. Otherwise, registration data was accepted as presented. In several cases, such as Ireland and South Korea, registration data came from rounded reports found in news accounts (O'Keeffe and Hogan, 2004; Bae, 2007).
- The same correlation can be calculated on the basis of purchasing power parity (PPP) indexes to capture absolute differences in the buying power. In this case, PPP techniques appear unpromising due to the lack of domestic input into firearm production in many countries and the equalizing effect of widespread international trade.
- For East Asian countries where gun ownership is believed to be exceptionally low, the 2.6 ratio of registered to total civilian guns was replaced by a multiplier of 1.72, based on Japanese data.
- East Asia demonstrates the inability of any statistical model to fit all cases. Complete national civilian gun ownership estimates, the basis for regional correlation, are available for relatively few East Asian countries. The region also contrasts relatively high-ownership countries like Pakistan, the Philippines, and Thailand, and low-ownership countries like Cambodia, Indonesia, and Kyrgyzstan. With an  $R^2$  of just 0.01, the region is simply too diverse and can be estimated only through global correlations.
- Henri Heidebroek, secretary-general, Institut Européen des armes de chasse et de sport (Brussels), private communication to the author, 4 August 2003.
- Well-documented post-conflict destruction efforts, such as those that occurred in Cambodia, are included in this analysis.
- Of course, the number of illegal weapons reportedly seized by Chinese authorities cannot be confirmed or documented.
- Author's conversations with OSCE officials, 2005-06.

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### Principal author

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