The Role of Gun Supply in 1980s and 1990s Youth Violence*

Wm. Alan Bartley & Geoffrey Fain Williams

Transylvania University

This Draft: November 23, 2016

PRELIMINARY AND INCOMPLETE

Abstract

Youth violence, particularly among young black males, particularly in urban areas, increased radically in the late 1980s and early 1990s and then began to fall. One explanation for this has been the expansion of crack markets in the 1980s; to the degree that increased gun access among young black males was believed to play a role, the implicit assumption was there was a demand shock in gun markets. Using a novel data set of handgun prices for 1980-2000, combined with ATF data on US firearm production quantities, we document that in fact the prices for cheaper "entry-level" guns fell in this period, suggesting a positive supply shock for the bottom end of the market. We argue that in substantial part this was due to a major reduction in the resources and activities of the Bureau of Alcohol, Tobacco and Firearms (BATF) in the 1980s. This allowed substantially greater freedom among licensed gun dealers, a pattern which was reversed in the early 1990s (changes in manufacturing also appear to have played a role in the initial expansion). We document that the positive supply shock increased the availability of guns to criminally active youth and led to higher rates of gun access for young black men, particularly

*We would like to thank Anne Morrison Piehl, Phil Cook, Jurgen Brauer, Chris Bollinger, Will Gerken and Joel Wallman for helpful comments and assistance, Joshua Buckman, Ethan Campbell, Chase Coleman, Jordan Haven, Katina Marchione, Alexander Melnykovych, Savanna Norrod, Travis Rose for excellent research assistance, and Phil Walker of Transylvania Library for assistance with resources on ATF and firearms markets. We would both like to thank the Jones Fund for faculty research grants.

for 25 ACP, 380 ACP and 9mm autoloaders. The increase and decrease in gun violence among young black men can be matched to changes along this causal chain. JEL Classifications: K42

Keywords: Illegal Behavior, Murder

1 Introduction

It was only a matter of time before we started posing for album covers. Not one from innocent '85, but one from a few years later, after the music had changed from this:

Rhymes so def
Rhymes rhymes galore
Rhymes that you've never even heard before
Now if you say you heard my rhyme
We gonna have to fight
'Cause I just made the motherfuckers up last night

to this:

"Hey yo, Cube, there go that motherfucker right there."
"No shit. Watch this . . . Hey, what's up, man?"
"Not too much."
"You know you won, G."
"Won what?"
"The wet T-shirt contest, motherfucker!"
*[*sounds of gunfire*]*

*Lyrics from the aforementioned "Here We Go" and "Now I Gotta Wet 'Cha," copyright 1992, by Ice Cube, born the same year as me, who grew up on Run-D.M.C. just like we all did. "Wet 'cha," as in "wet your shirt with blood." Something happened in those nine years. Something happened that changed the terms, and we went from fighting (*I'll knock that grin off your face*) to annihilation (*I will wipe you from this earth*). How we got from here to there is a key passage in the history of young black men that no one cares to write.*

- Colson Whitehead, "The Gangsters"

The passage by novelist Colson Whitehead powerfully conveys the sea change in violence between the mid-1980s and 1993. Gun homicide rates for young black men doubled in a very short period, a radical shift. We estimate that 10,000 more young black men were killed between 1986 and 2000 than would have been had the (already extremely high) gun homicide rates of 1980-1985 prevailed. The surge in violence had powerful impacts across the breadth of American society. The story is still only poorly understood.

Whitehead's concluding thought seems too pessimistic, however. The radical increase in gun violence in American cities in the late 1980s and early 1990s has been the subject of numerous inquiries, beginning with discussions at the time, and continuing with scholarly articles[1].

In this paper we combine a number of data sources to argue that the epidemic of youth violence was caused by an increase in gun supply, which in turn seems to have been substantially

[1]A few examples of analysis of the issues include Goldstein et al. (1989); Blumstein (1995); Wintemute (1994); Blumstein and Cork (1996); Cook and Laub (1998) while the epidemic was in full flow, Grogger and Willis (2000); Blumstein (2002); Cook and Laub (2002) after the decline and Fryer et al. (2013), Evans et al. (2012) more recently.

a result of a fall in resources and reduction in firearms regulatory and law enforcement activities at the US Bureau of Alcohol Tobacco and Firearms (BATF) in the 1980s, combined with changes in gun manufacturing. The change in BATF resources led to an increase in the number of firearms dealers, and reduced oversight. By the mid-1980s several calibers of autoloaders were not only being produced in larger numbers, but in particular were being produced at lower and lower prices. We document that low cost 22 LR, 25 ACP, 380 ACP and 9mm autoloaders were offered in increasing quantities in the late 1980s and early 1990s. The production of autoloaders, both in general and in particular at the low end of the market, was very large relative to estimates of the existing stock of guns. Between the early 1980s and early 1990s the availability of handguns to criminally active young men, particularly young black men, had surged. This was coincident with an increase in proxies for gun access and ownership among young black men and with increasing gun homicides among young black men. From 1993 onwards the process reversed itself: the ATF regained previous levels of resources and undertook greater oversight activities, there was a substantial reduction in firearms dealers, domestic production quantities and imports of cheap handguns fell while prices stabilized. Proxies for gun access and ownership among young black men fell, and gun homicides fell; however, gun production, gun access and gun homicides all remained above their 1980-1985 average.

In contrast, one of the most popular explanations for the epidemic, the spread of crack cocaine and crack markets, shows two problems: (a) gun violence falls rapidly after 1993, while all measures of crack use show stable or increasing patterns; and (b) while Canada in the late 1980s and early 1990s had roughly 30-40% of the US crack problem, it had effectively 0% of our increase in youth violence.

This paper makes a number of original contributions.

First, it develops and analyzes price and quantity data in the market for U.S. handguns in much greater detail than any other source we are aware of. It shows several patterns in production and price distribution not previously noted.

Second, it shows that, separate from changes in the legal framework of gun control that occurred between 1980 and 2000, there were very substantial changes in the resources and activities of the BATF which can be clearly related to changes in gun prices and gun access. We use the phrase "regulatory posture" to refer to shifts in the BATF that are separate from any changes

in the codified law of the United States.

Third, it shows a robust relationship between the gun homicide rate of young black men in a particular state or MSA, and the gun suicide rate. Our preferred specifications suggest that one more gun suicide among young black men led to at least 1.8 additional gun homicides.

We begin by reviewing the general understanding of the causes and nature of youth violence in the 1980s and 1990s. In section 3 we review in more detail summary data on homicides, crack markets, gun markets and gun regulation over the 1980-2000 period. In section 4 we present our core data, reviewing sources and methodological issues. In section 5 we run a series of regressions which substantiate the key relationship between gun access and gun homicides among young black men. We close by discussing major outstanding issues and further areas for investigation.

2 Background

There has been extensive discussion of the epidemic of violence among young men in the United States in the late 1980s and early 1990s. It is established that gun homicides for young males increased rapidly from 1985 to 1993 and then decreased, and that the epidemic was largely among young black or Hispanic men. There are a number of open questions and theories regarding the epidemic.

One of the more important questions is that of period vs cohort issues; that is to say, to what degree was the epidemic a result of the specific time period (say, 1985 to 2000) and to what degree was the epidemic the result of specific attributes of the cohorts of males who were entering adolescence and then young adulthood at the time. Cohort explanations include the legalization of abortion and the removal of lead from gasoline; period explanations are largely focused on crack markets but some look at gun availability issues as well. Cook and Laub (2002) argue persuasively that with regard to the 1985-1995 epidemic the period explanations are more likely. Both before and after the epidemic the specific age cohorts showed much lower levels of violence. This is not to say that cohort explanations do not help to explain overall shifts in violence from the 1970s to the present day, simply that they are not helpful in explaining the 1993-2000 fall. Figure 1 summarizes the more detailed arguments of Cook and Laub (2002), showing that the

1994 period seems much more distinctive than any age cohort that was active in 1984, 1994 or 2004.

The most popular period explanation is the spread of crack markets. This runs roughly as follows (Fryer et al., 2013; Evans et al., 2012): the development of crack cocaine processing and sale in the Caribbean quickly led to its distribution in the coastal cities (Los Angeles, Miami and New York in particular) in the early 1980s. By the late 1980s it could be seen in virtually all US metro areas (Grogger and Willis (2000)). Crack was different from previous drugs in that it was (a) popular among a wide class of users (b) fairly expensive but (c) affordable on a "per-hit" basis. For the first time, this meant there was a drug with a substantial "retail presence" requiring large open-air drug markets. Because dealing crack was a low-skill job that offered reasonable payment in urban areas (Levitt and Venkatesh (2000), Reuter et al. (1990),MacCoun and Reuter (1992)) young black men were drawn into crack dealing early on. Being able to sell in a particular area became worth a significant amount of money, and so pushing for territory became important. More generally, by increasing the amount and size of illegal transactions in an area, crack led to an increase in the frequency of extralegal resolution of commercial conflict. All of this led a significant minority of young black men to buy guns and increased the overall rate of violence. It is important to note that only a minority of young black men participated in these illegal markets or violence; our estimates suggest that at the most extreme point, circa 1993, only 20% of all young urban black men had access to guns or at-risk of engaging in violence and many of these may have been acting purely defensively.

Within the crack epidemic framework, there are two potential explanations for how crack markets led to increased gun violence. The one that seems most popular, the **increased conflict** version, would suggest that there was an increase in conflict over illegal transactions, thus increasing levels of violence and homicide for any given level of gun ownership, leading dealers to purchase guns for defense. Alternatively, the **increased income** version would suggest that crack dealing increased the income of individual dealers and they therefore spent money on various accessories, including handguns, and this then led to higher violence.

It is important to note that both of these explanations are demand shock explanations, with regard to gun markets; they posit a demand increase in the purchase of guns. Such an increase in demand would most likely lead to an increase in both the quantity of guns sold and the average

purchase price.

Another note is that the crack markets explanation for the violence epidemic depends on an assumption that illegal markets are inherently violent; while there is a great deal of support for this idea, there are also some substantive critiques. One of the most recent is Owens (2011).

3 Overall Patterns in Homicide, Crack Markets and Gun Markets

The core pattern examined by this paper is summarized in Figure 2 (for the 59 MSAs looked at by Evans et al. (2012)). While the rate of gun homicides among young black males and the total count of cocaine overdoses for all populations[2] both escalate rapidly from 1985 to 1993, the relationship falls apart from then on. However, the relationship between gun homicides and gun suicides remains strong throughout the period.

As discussed above, the surge and then fall in gun homicides among young black men appears to be almost entirely a period effect (Cook and Laub, 2002); the cohorts involved show "normal" behavior patterns before and after the 1985-1995 period.

3.1 Crack and Crack Market Developments

One explanation which previous researchers have investigated is that the development of crack and urban crack markets in the 1980s explain this increase in violence. This has the advantage of being a "period" explanation - the development of crack markets occurred across the United States at roughly the same time, and there was an increase of popularity in the 1985-1993 period. A number of researchers have found support for the theory (Grogger and Willis, 2000; Evans et al., 2012; Fryer et al., 2013).

There are several ways in which the crack epidemic explanation for violence is incomplete: (a) gun violence falls rapidly after 1993, while all measures of crack use show stable or increasing patterns; and (b) during the late 1980s to early 90s, Canada saw a significant increase in crack usage and crack markets, but showed no change in gun violence among 15-24 year-old males.

[2]Cocaine overdoses are a reasonable proxy for crack use, as powder cocaine rarely triggers overdoses Evans et al. (2012).

3.1.1 The Decoupling after 1993

From 1993 onwards there is a substantial reduction in violence generally and gun violence in particular even as measure of crack use are constant or growing.

Figure 2 shows the general pattern; while cocaine overdoses continue to increase throughout the 1990s, gun homicide falls from 1993 onwards. Similar graphs can be constructed for general indices of crack use, such as the Fryer et al. (2013) indices.

While initially there was some belief the decoupling was due to a reduction in crack dealing, this turned out not to be the case. Three general explanations have been advanced since then. First, that crack dealers aged significantly, and became less likely to use violence. Second, there was a general change in the crack market, perhaps due to change in prices or alternatively because crack distribution networks developed informal "property rights" in specific markets or areas, leading to a reduction in violence (Fryer et al., 2013). Finally, some have proposed that interventions to reduce the availability of guns successfully eliminated them (Blumstein, 1995; 2002; Blumstein and Cork, 1996). We strongly believe it is the last explanation, that interventions reduced gun ownership.

Reviewing each in turn:

[We are working on measures of age of crack dealers.] While there is a definite aging of the crack user base and most likely of crack dealers, it follows the same progression as the change in prices - a slow shift from the late 1980s onwards.

Regarding the second, there is no clear sign of a change in the market that would explain the fall. Figure 3 from the Office of National Drug Control Policy (Price & Purity 2004) shows that crack prices had generally fallen 30-50% by 1989, and fell fairly steadily at about 5% per year after that date. While it is clear that crack profits fell further after 1993, it is unclear why the fall from 1992 or 1993 was so much more likely to reduce conflict than the fall in prices up to 1989 or from 1989 to 1992.

Similarly, there is no evidence of improvements in conflict resolution systems on the ground. Systemic conflicts between dealers were clearly established as part of the gun violence in the late 1980s (Goldstein et al., 1989). However, to our knowledge no researchers have provided evidence that systemic conflicts were substantially reduced after 1993, or that a consciously improved approach to handling systemic conflicts was developed. Key evidence against the "conflict reso-

lution" hypothesis comes from work by criminologists at the University of Missouri - St. Louis. Between 1990 and 2010 a group of about five or six researchers, working in different combinations, published a series of ethnographies of crime in St. Louis (Decker, 1996; Jacobs, 2000; 1999; Jacobs and Wright, 2006). Throughout most of these ethnographies there is substantial evidence of crack dealing and violence, frequently gun violence. In the early 1990s the death rate among their respondents on one study (Decker, 1996: page 173) *during the period of the study itself* was 11%. However, a study less than 10 years later (Jacobs, 1999) does not report a single death among its study population. There is no sign of improved property rights or conflict adjudication at the corner level - conflicts over customers appears to occur constantly (Jacobs, 1999: pages 46-56). But these conflicts do not lead to gun shots.

3.1.2 Crack Cocaine and Gun Violence in Canada

A second issue with the crack epidemic explanation of gun violence is the example of Canada. Briefly, in the period from 1985 to 2000, Canada appears to have had about 30-40% of the US crack problem, and about 0% of its change in youth violence.

Crack arrived in Canada a few years after its arrival in the United States. The first reports of crack use (in newspaper accounts) dates to 1986, and the first police seizure dates to July of that year (Smart, 1988; Cheung and Erickson, 1997). In the late 1980s, Canadian surveys of high school students in Ontario and British Columbia showed about 1.5% reporting crack use, while roughly comparable surveys (i.e., usage in past year, asked of students in 1987) of United States high school students showed usage by about 3-4% (Smart, 1991). By the mid-1990s, 4 percent of Vancouver adolescents and 2 percent of Toronto adolescents had reported using crack in the previous year (Poulin et al., 1998: Table 1, page 235). This can be compared with 1.9-3.9% of *all* American high-school seniors reporting crack use in the previous year in the late 1980s (*The crack cocaine epidemic: Health consequences and treatment.*, 1991: Page 12).

Deaths in Canada due to cocaine dependence (ICD-9 code 304.2) and cocaine abuse (ICD-9 code 305.6) were averaging about 0.020-0.021 per 100,000 people by the early 1990s, roughly 1/3 the US rate of 0.06-0.07 in the same period. The increase in cocaine deaths is shown in Figure 4.

Combining these data points it seems likely that crack was roughly 1/3rd as popular in

Canada as in the United States in the 1990-1995 period.

Despite the presence of a significant crack problem, Canadian gun homicide among young males ages 15-24 shows no change at all, even as the rate for the United States more than doubles, as can be seen in Figure 5.

3.2 Gun Markets

Garen Wintemute and Alfred Blumstein have each done enormous amounts of work investigating the development of gun markets, gun manufacture and gun supply (Wintemute, 2000; 1994; Blumstein, 1995; 2002; Blumstein and Cork, 1996), particularly focused on the "Ring of Fire" manufacturers in Southern California. In this subsection we attempt to augment their work by (a) looking in detail at ATF resources and activities, (b) comparing 1985-1995 production with existing gun stocks, (c) with a novel data set of gun prices, we show that prices for cheaper handguns were in fact falling during this period, and (d) analyzing existing data on gun access, showing that criminally active young black men had radically expanded access to guns by the early 1990s.

3.2.1 ATF Resources and Activities

Vizzard (1997) claims that under the Reagan administration generally, but particularly after the Firearms Owner's Protection Act (FOPA) of 1986, the ATF was strongly encouraged to moderate its regulation of gun dealers. Working with data from the ATF directly and budget and activity measures from US budget appendices, this claim looks generally plausible, with the caveat that some of the drop in ATF activity and funding occurred under Carter, and the FOPA impact was less important changes in ATF resources and activities in the 1978-1983 period.

Looking at Table 1 and Figure 6. The ATF showed a 25% fall in headcount overall, and 30-40% fall in firearms law enforcement budget between 1978 and 1983, and stayed at a reduced level for most of the 1980s. Looking at Table 2 and Figure 7 we see that activities show a similar fall, with investigations, arrests, gun traces and other measures substantially reduced. The number of licensed firearms dealers increased by 50% by 1985, even as compliance inspections fell.

3.3 Gun Production over 1980-2000

Just as the oversight of marginal gun dealers increased, the supply of guns expanded. From 1980 to 1990, the major autoloader calibers (22 LR, 25 ACP, 380 ACP and 9mm) all show an increase in production and more importantly, a rapid fall in prices in the lower half of the market. The combination of an increase in quantity and a fall in price in this part of the market is a classic MICRO 101 supply shock.[3]

The increase in supply is large in both absolute terms and also relative to the already large stock of guns in the United States. We find that total US autoloader production from 1985 to 1994 was equivalent in size to half the estimated stock of autoloaders in 1994. Moreover, a small group of manufacturers in Southern California specializing in particularly cheap guns with a close association with crime, sometimes termed the "Ring of Fire" (Wintemute, 1994), produced a quantity of autoloaders from 1985 to 1994 equivalent to 34% of the estimated 1994 stock of autoloaders, and nearly 7% of the total stock of handguns in the United States.

Figure 8 shows the radical shift in American production from revolvers to autoloaders. It is important to note that the surge in autoloader production is not just significant in terms of gun flows, but also in terms of gun stocks. Using data from Zawitz (1995) and Cook and Ludwig (1996) combined with AFMER data from 1975 to 1994, we estimate domestic United States gun production flows 1975-1984 and 1985-1994, and combine them with estimates of the existing gun stock in 1994. The results are in Figures 9 and 10.

While flows in previous decades do not necessarily translate to a one-for-one expansion in stocks, the production of autoloaders from 1985-1994 is striking in three ways. First, of the four gun types of autoloaders, revolvers, rifles and shotguns, autoloaders show the largest levels of US production in that period by a substantial margin. Second, the total quantity of autoloader production from 1985-1994 is approximately half of the estimated stock in 1994; for no other gun type is new production more than 20% of the 1994 stock. Third, out of the 12.7 million autoloaders produced from 1985-1994, 4.3 million, or 34%, were produced by the six firms identified by Wintemute as the "Ring of Fire" producers: AMT, Bryco, Davis, Lorcin, Phoenix, and Sundance (as with Wintemute, we include related FFLs, in our case Jennings and Calwestco) .

[3]While it is not a focus of this analysis, it should be said that sales of autoloaders increased at the high end of the market as well. The late 1980s and early 1990s were the time of the "Glock Revolution", when the high end Austrian-manufactured 9mm became very popular.

That is to say, a small group of manufacturers in Southern California, specializing in a class of extremely cheap handguns, highly involved with crime (Wintemute, 1994: page 12 and passim), had a total production from 1985-1994 equivalent to 6.6% of the total US stock of handguns, and 16.5% of the total stock of autoloading handguns.

3.3.1 Handgun Price Development, 1980-2000

We now look at the development of the bottom half of the market in the most popular autoloader and revolver categories. Beginning with the cheapest and lower caliber autoloader categories, we see a substantial "race to the bottom" in price, beginning in the early 1980s for the 22 LR autoloaders, as seen in Figure 11. Next, the 25 ACP autoloaders show a fall in price in the mid-1980s in Figure 12. After that the larger calibers, particularly 380 ACP and 9mm, show a substantial fall in price around 1990, as can be seen in Figures 13 and 14.

For the last three of these types of handguns there is an explosive increase in production from 1984 through 1993-94 and then a subsequent substantial decline in production through 2000, especially for the 380 ACP and 25 ACP calibers. What is important for our supply-side argument is a decrease in real price through the 1984-1993 time period in absolute terms and more so in percentage terms for all three types of handguns. This is particularly true for the 380 ACP type of handgun. This dovetails with others' research from a supply perspective.

It is informative to compare the radical drop in prices at the bottom end of the market for autoloaders with the much more muted effect for the two most popular revolver categories in Figures 15 and 16. In contrast to the move downwards in prices that is clearly visible among the autoloaders, there is some movement of the minimum price, but little to no movement across the rest of the price range. The median is steady or even increasing.

3.3.2 Gun Access Among Young Black Men

Table 3 is derived from Kennedy et al. (1996) and shows the caliber of firearms recovered from suspects 21 and under in age from Boston during the early 1990s. At least for this particular city during the crack epidemic, approximately 70% of the new (less than two years old) firearms retrieved were of the 9mm, 25 ACP and 380 ACP calibers. These same calibers comprised only 40% of the total firearms collected within Boston during this same timeframe. This is evidence

that particular calibers (and perhaps brand manufacturers) were increasing supply to interested "consumers" during the early 1990s.

The increase in the production of cheap guns radically changed gun availability for at-risk young men, including young black men. We can see this in Figure 17, which compares reported access to guns among black male inmates ages 15-22. The two surveys carried out in 1983 and 1991 show a radical shift in access to guns in a mere eight years. In 1983, the majority of inmates surveyed reported never owning a handgun before incarceration, and of those who had owned one, most had stolen it. By 1991, only 16% of inmates reported never owning a handgun and of those who had owned one, nearly 50% had purchased it for cash.

While there is not cleanly comparable data on prices within the two surveys, lining up the data that is available supports the gun supply story. Figure 18 shows reported prices of guns for those black male inmates ages 15-22 reporting having purchased a handgun. For 1991, this is the cost to the inmate, while in 1983 it is the general value, what the gun would have cost if purchased in a store. The direction and magnitude of change is very consistent with an increase in supply.

It should be pointed out that many of the purchases by the inmates in these studies were presumably in illegal markets (Cook et al., 2007), not so much from FFLs. Additionally, the original source may have been theft from households. However, the huge increase in availability and collapse in price seems hard to explain from some other source than from the legal markets. Data from the FBI National Crime Information Center shows no significant pattern in reported thefts after 1975, with fluctuations between about 250,000 reported thefts to 310,000 to 1995 (Zawitz, 1995: page 3). The actual production from 1985-1994 for handguns in total, and autoloaders in particular, is very large in relation to the existing stock; it is hard to tell a story about the increase that does not track back to AFMER data.

Data on gun suicides support this pattern of a major increase in gun ownership and access. Figure 19 shows the standard proxy for gun ownership - the ratio of gun suicides to all suicides - for black men ages 15-24 in 59 MSAs with substantial populations of young black males. It also shows the disaggregation into gun suicides and non-gun suicides for the same population. As can be seen, the rate of non-gun suicides was stable (although slightly declining) during this period. The rate of gun suicides surged upwards to 1993 and then falls after that.

Putting this all together, the gun supply argument shows a great deal of explanatory power. We now make use of data on gun homicides and gun suicides, as well as other covariates, to test this further.

4 Data and Empirical Approach

4.1 Data

We use a number of data sources to explore this issue. The data appendix lists and describes all relevant sources; here we summarize the most important sources.

For crack use, we use several measures, focusing in particular on the crack index developed by Fryer et al. (2013), but also using the measures of cocaine deaths used by (Evans et al., 2012).

For gun homicide and gun suicide rates we make use of the NBER Vital Statistics Multiple Causes of Death data, combined with US Census Bureau population estimates.

We run panel regressions using both states and MSAs as the unit of observation;

4.2 Gun Suicides and Measurement Error

Figure 2 shows the strong link between the gun homicide rate and the gun suicide rate among young black men. Gun suicides are a standard proxy for gun ownership in a population (Cook and Goss, 2014; Blumstein, 2002).

The gun suicide rate per gun owner (computed from Cook and Ludwig (1996) gun ownership rates and gun suicide rates for specific populations) for 18-24 year-olds appears to be roughly one suicide per 1,500 gun owners. Since blacks and whites show similar gun suicide rates at the aggregate level, this can be applied to blacks age 18-24.[4]

The change in gun suicide rates over this period suggests a doubling of gun ownership (or access) rates among young black males, most likely from about 10-15% to about 25-30% in 1993. Within this there is substantial variation; for example, Delaware has an average annual gun suicide rate between 1980-1985 of 0.0000168, which would imply only 2.5% of young black males

[4]Women are a relatively small percent of gun owners, about 20%, and an even smaller percent of gun suicides; adjustments for gender change the underlying rate a small amount while adding considerable potential for modeling problems, and we avoid this adjustment.

had access to a gun. For MSAs, both Monmouth-Ocean PMSA in New Jersey and Seattle-Bellevue-Everett PMSA in Washington have zero gun suicides between 1980 and 1985, each with populations of about 6,000 young black men, implying that at most only a few percent of young black males had access to firearms during this period.

We thus find ourselves between a very strong time trend on the one hand and serious measurement error on the other. The measurement error comes from two issues. The first is that the average of one suicide for every 1,500 gun owners is not 100% constant across all regions and time periods. But there is some structure to its fluctuation, which seem to behave like sampling error; an MSA with 50,000 young black men will have twice the standard deviation of annual gun suicide rates as an MSA with 200,000 young black men. The second issue that leads to measurement error is particularly important when we use first differences. Small populations will tend to have zero gun suicides, even when they have high gun access rates. When using period-over-period change in the gun suicide rate, there is thus a great deal of noise.

We resolve these problems with a two-part strategy: First, we drop observations for regions with particularly small populations of young black men (fewer than roughly 10,000 for MSAs, fewer than 20,000 for states). Second, we aggregate regional observations across multiple years - 2-, 3- and 4-year groupings, to reduce the overall number of zero-rate observations. In this way it becomes possible to move the gun suicide counts and rates away from zero, creating a strong and more stable variable. Table 4 shows the relationship between "person-years" observed, gun ownership/gun access rates, and observed gun suicides.

4.3 Specifications

In order to test the link between gun supply and gun homicides, we run a series of regressions. The central specification we use is

$$ghr_{it} = \alpha_1 gsr_{it} + otherfactors$$

where ghr_{it} is the gun homicide rate for black males ages 15-24 in region i in period t, and gsr_{it} is the corresponding gun suicide rate.

As discussed above, we are between a time trend and a measurement error; by dropping

regions with low populations of young black men and grouping by multi-year periods, we believe we successfully mitigate measurement error. We must then handle the time trend issue, as well as regional effects. We run regressions with both regional and time fixed effects, with our preferred specification also being first-differences of the key variables, to eliminate both national and regional time trends.

Because it is significant in many specifications (but not, generally, in our preferred specifications) we include the crack index from Fryer et al. (2013), as well as a number of controls, including average personal income, employment rates, and measures of how high a percentage of the population is 15-24 year-old-males.

We thus use the following two specifications, with regional fixed effects, as our major workhorse models, alternating between MSA and state as the regional grouping, and alternating between 1-year, 2-year, 3-year and 4-year clustering for the time grouping.

$$ghr_{it} = \alpha_1 gsr_{it} + \beta_1 crack_{it} + \beta_2 controls_{it} + \sum_{t=2}^{T} \gamma_t D_t + u_{it}$$

$$\Delta ghr_{it} = \alpha_1 \Delta gsr_{it} + \beta_1 \Delta crack_{it} + \beta_2 \Delta controls_{it} + \sum_{t=2}^{T} \gamma_t D_t + u_{it}$$

5 Results

As a general benchmark of the maximum possible effect of gun access on gun homicides, we run a series of extremely naive regressions: literally regressing the average gun homicide rate across all regions (first states, then MSAs).

$$ghr_t = \alpha_1 gsr_t + \beta_1 crack_t + u_{it}$$

We then add a time trend in linear, quadratic and cubic forms:

$$ghr_t = \alpha_1 gsr_t + \beta_1 crack_t + \gamma_1 t + \gamma_2 t^2 + \gamma_3 t^3 + u_{it}$$

The results can be seen in Tables 5 and 6. Run in levels, these reinforce the simple pattern of Figure 2. Every additional gun suicide is associated with about 11-13 more gun homicides.

Rerunning these regressions in first differences dims the effect considerably; without a time trend the predicted relationship is 5 homicides for every gun suicide, the addition of a cubic time trend removes significance.

In addition to giving specific numbers for the intuition of Figure 2, it also shows how sensitive our results are to attempts to control for trends. Both adding cubic trends and differencing variables reduce the effect size substantially. This reinforces the need to deal with both measurement error (discussed above) and period effects.

We then run a quartet of regression series, which look first at states in levels and differences, then MSAs in levels and differences.

Table 7 shows the regression using state data in levels, with both state and period fixed effects. As discussed, we drop states with fewer than 20,000 young black men. We run four regressions, first using annual data, then two-year averages, then three-year averages, then four-year averages. The effect of the gun suicide rate is much smaller than in the national average regressions, fluctuating between 0.5 and 2.3, and only significant in the two-year clusters and the four-year. Other controls show greater significance. The crack index of Fryer et al. (2013) shows statistical and practical significance; a movement of one standard deviation (about 1.7) would lead to an increase in gun homicides of about 14 to 21 per 100,000.

In Table 8 we see regression using state data in first differences. In combination with time and region fixed effects, we believe this specification removes a number of potential problems, including constant omitted variable bias and region-specific trends. With the exception of the crack index for three-year groupings, the controls are no longer significant. Gun suicides become significant in the four-year groupings. The effect size is similar to that found in levels as well as to the effect we will see in MSAs, at 1.92.

The effects in states are uneven with time fixed effects included, but consistent (in the four-year groupings) with the MSA regressions.

In Tables 9 and 10 we see the regressions for MSA, first in levels and then in first differences. All include both regional and time fixed effects. At the MSA level the role of gun suicide comes through more consistently and strongly than at the state level, suggesting that the role of city-wide variables (law enforcement, culture, etc) are very important in a way that statewide culture is not - it is not hard to think of reasons why the duos of Pittsburgh and Philadelphia, Los

Angeles and San Francisco, New York and Rochester, etc., are only partially similar, despite being located in the same state.

The regressions in levels show strongly significant effects that are very consistent with the earlier regressions, and with the idea that multi-year averages are significantly reducing measurement error. The effect increases very steadily from 0.86 to 3.0 as we aggregate over multiple years. Working in differences, as seen in Table 10, we get results almost identical to the final state specification, and very consistent with the MSA regressions in levels. As with the state regressions, all the controls wash out when we work in differences.

Putting the results together, an effect size in the range of 1.0 to 2.5 seems reasonable. What would this coefficient size mean in terms of change in gun access in a particular city or state? As one gun suicide per year is associated with a pool of roughly 1,500 young male gun owners, the effect size in the 1.0 to 2.5 range suggests that in addition to a probable single suicide, 1,500 young males with gun access would lead to another 1.0 to 2.5 deaths per year via homicide. Put differently, if 1,000 guns were distributed randomly among at-risk young males ages 15-24, the regressions suggest there would likely be 1.3 to 2.1 additional death each year (simply within that population) from a mixture of suicide and homicide. Assuming that this risk had an average life of about 5 years as the ten years of the cohort aged and matured, the 1,000 additional guns would lead to 6.5 to 10.5 additional deaths within the population.

6 Discussion

We have shown that there is strong evidence of a positive supply shock in gun markets in the 1985-1993 period, with an increase in quantity and fall in price, in particular for 25 ACP, 380 ACP and 9mm autoloaders. This increase in supply seems to have substantially increased gun availability among at-risk young black men, as measured in several ways: self-reported gun access among imprisoned young black men, breakdown of traced crime guns from Boston, and gun suicide rates across the country.

Some back of the envelope calculations give some sense of the changes in gun access among young black males during this period.

In the MSAs we focus on there were about 1.5 million young black men on average during

this period. Gun suicide rates doubled among this population from 0.00008 in 1980 to 0.00016 in 1993 (a total of 220 in 1993). This is consistent with an increase of 165,000 additional individuals gaining access to guns, mainly between 1985 and 1993, about 20,000 net increase every year.

The rapid fall in gun homicides and suicides after 1993, at the same time that ATF and other agencies expanded efforts to reduce gun sales and gun access, adds additional insight. The gun suicide rate fell by 0.00006 by 1998, to 0.0001. This would suggest in five years the number of young black men with access to guns fell 120,000, still 45,000 more than in the early 1980s. A combination of a fall in sales, efforts to reduce gun access among at-risk young males, and more natural processes of maturing of the men and breakage and loss of the guns meant that the number of young black men with guns fell about 24,000 every year in those five years.

At the same time, the link between guns and gun violence on one hand, and crack markets and dealing on the other, are uneven. The US-wide pattern of the gun homicide rate for young black men from 1980 to 2000 follows the gun suicide rate very closely. As discussed above, the homicide rate is close to measures of crack use up to 1993, but then diverges significantly.

References

Blumstein, Alfred, "Youth violence, guns, and the illicit-drug industry," *Journal of criminal law and criminology*, 1995, pp. 10–36.

_ , "Youth, guns, and violent crime," *The future of children*, 2002, pp. 39–53.

_ **and Daniel Cork**, "Linking gun availability to youth gun violence," *Law and contemporary problems*, 1996, pp. 5–24.

Cheung, Yuet W. and Patricia G. Erickson, "Crack Use in Canada," *Crack in America: Demon Drugs and Social Justice*, 1997, p. 175.

Cook, Philip J. and Jens Ludwig, *Guns in America: results of a comprehensive national survey on firearms ownership and use*, Police Foundation Washington, DC, 1996.

_ **and John H. Laub**, "Unprecedented Epidemic in Youth Violence, The," *Crime Just.*, 1998, *24*, 27.

_ **and** _ , "After the epidemic: Recent trends in youth violence in the United States," *Crime and justice*, 2002, pp. 1–37.

_ **and Kristin A. Goss**, *The Gun Debate: What Everyone Needs to KnowRG*, Oxford University Press, 2014.

_ **, Jens Ludwig, Sudhir Venkatesh, and Anthony A. Braga**, "Underground Gun Markets*," *The Economic Journal*, 2007, *117* (524), F588–F618.

Decker, Scott H., *Life in the gang: Family, friends, and violence*, Cambridge University Press, 1996.

Evans, William N., Craig Garthwaite, and Timothy J. Moore, *The white/black educational gap, stalled progress, and the long term consequences of the emergence of crack cocaine markets*, 2012.

Fryer, Roland G., Paul S. Heaton, Steven D. Levitt, and Kevin M. Murphy, "Measuring crack cocaine and its impact," *Economic inquiry*, 2013, *51* (3), 1651–1681.

Goldstein, Paul J., Henry H. Brownstein, Patrick J. Ryan, and Patricia A. Bellucci, "Crack and homicide in New York City, 1988: A conceptually based event analysis," *Contemp.Drug Probs.*, 1989, *16*, 651.

Grogger, Jeff and Michael Willis, "The emergence of crack cocaine and the rise in urban crime rates," *Review of Economics and Statistics*, 2000, *82* (4), 519–529.

Humphreys, Keith, "Dont blame kids these days: Violent crime rises and falls with outside forces," September 26 2016.

Jacobs, Bruce A., *Dealing crack: The social world of streetcorner selling*, UPNE, 1999.

_ , *Robbing drug dealers: Violence beyond the law*, Transaction Publishers, 2000.

_ **and Richard Wright**, *Street justice: Retaliation in the criminal underworld*, Cambridge University Press, 2006.

Kennedy, David M., Anne M. Piehl, and Anthony A. Braga, "Youth violence in Boston: Gun markets, serious youth offenders, and a use-reduction strategy," *Law and contemporary problems*, 1996, pp. 147–196.

Levitt, S. D. and S. A. Venkatesh, "An Economic Analysis of a Drug-Selling Gang's Finances," *Quarterly Journal of Economics*, 2000, *115* (3), 755–789.

MacCoun, R. and P. Reuter, "Are the Wages of Sin $30 an Hour? Economic Aspects of Street-Level Drug Dealing," *Crime Delinquency*, 1992, *38* (4), 477.

Owens, Emily Greene, "Are underground markets really more violent? Evidence from early 20th century America," *American Law and Economics Review*, 2011, p. ahq017.

Poulin, Christiane, Pamela Fralick, Elizabeth M. Whynot, and Nady el Guebaly, "The epidemiology of cocaine and opiate abuse in urban Canada," *Canadian Journal of Public Health*, 1998, *89* (4), 234.

Reuter, P., R. MacCoun, P. Murphy, A. Abrahamse, and B. Simon, *Money from Crime: A Study of the Economics of Drug Dealing in Washington, DC*, Santa Monica, CA: RAND, 1990.

Sheley, Joseph F., James D. Wright, and M. Dwayne Smith, "Firearms, Violence, and Youth in California, Illinois, Louisiana, and New Jersey, 1991," Technical Report 6484, Tulane University, Department of Sociology 1991.

Smart, R. G., ""Crack" cocaine use in Canada: a new epidemic?," *American Journal of Epidemiology*, Jun 1988, *127* (6), 1315–1317. LR: 20131121; JID: 7910653; I5Y540LHVR (Cocaine); ppublish.

Smart, Reginald G., "Crack cocaine use: a review of prevalence and adverse effects," *The American Journal of Drug and Alcohol Abuse*, 1991, *17* (1), 13–26.

Snyder, H and J Mulako-Wangota, "Arrest Data Analysis Tool."

The crack cocaine epidemic: Health consequences and treatment.

The crack cocaine epidemic: Health consequences and treatment., *Technical Report GAO/HRD-91-55FS, United States General Accounting Office 1991.*

Vizzard, William J., *In the cross fire: a political history of the Bureau of Alcohol, Tobacco, and Firearms, Lynne Rienner Publishers, 1997.*

Wintemute, Garen, *Ring of Fire–The Handgun Makers of Southern California: A Report From the Violence Prevention Research Program, The Program (Sacramento, CA), 1994.*

_ , *"Guns and gun violence," The crime drop in America, 2000, pp. 45–96.*

Wright, James D. and Peter Rossi, *"Armed Criminals in America: A Survey of Incarcerated Felons, 1983," Technical Report 8357 1983.*

Zawitz, Marianne W., *"Guns used in crime," Washington, DC: US Department of Justice: Bureau of Justice Statistics Selected Findings, publication NCJ-148201, 1995.*

Data on ATF from US Budgets

Year	Direct Programs for Firearms (in 000's of 2009 Dollars) Actual Expenditure (from Budget 2 Years Later)		Law Enforcement Activity, Firearms					Permanent Positions (FTE, all ATF)
	Regulatory	Law Enforcement	Investigations	Arrests	Cases	Suspects Rec'd For Prosecution	Gun traces	
1973	$7,837	$116,002		2,258	2,840		12,700	4,181
1974	$9,353	$129,709		3,123	3,518		30,995	4,015
1975	$13,134	$131,802	18,997	3,616	3,913		34,622	4,123
1976	$15,073	$126,497	13,756	3,117	3,469		39,761	4,401
1977	$19,737	$156,099	19,169	3,108	4,344		63,183	4,376
1978	$22,062	$171,507	20,825	2,345	3,595		55,050	4,140
1979	$13,390	$131,767	9,959	840	8,747		60,000	4,068
1980	$14,868	$129,422	10,432	838	8,960		40,158	3,900
1981	$16,574	$140,340						3,671
1982	$9,728	$126,996						3,671
1983	$14,133	$87,430	8,215	1,083	9,364		33,000	2,950
1984	$16,320	$100,319	7,568			2,293	37,322	3,022
1985	$18,665	$101,392	9,187			3,137	44,943	3,043
1986	$19,323	$95,017	7,567			3,839	38,624	3,043
1987	$19,989	$114,693	7,358			4,151	34,527	3,459
1988	$22,122	$136,114	7,517			4,877	34,686	3,700
1989	$22,678	$164,451	8,286			6,669	41,807	3,981
1990	$29,795	$175,853	9,725			6,550	44,272	3,731
1991	$33,045	$227,110	10,568			10,079	51,351	4,000
1992	$39,428	$258,555	12,314			11,406	51,420	4,111
1993	$44,243	$290,799	10,148			9,709	53,729	4,230
1994	$46,657	$309,746		8,391			79,191	4,128
1995	$61,072	$285,445					79,777	3,959
1996	$65,193	$256,862					116,674	3,784
1997	$65,377	$287,146					191,378	3,818
1998							189,483	3,741
1999							209,126	3,969
2000							209,369	4,219

Table 1
Data from US Budgets (1975 to 2002) using actual figures (i.e., from 2 fiscal years previous) for expenditures on Firearms regulation and law enforcement, on firearms investigations, and on total ATF FTEs. Because of changes in reporting, only some series are complete. Deflated by GDP Deflator series. Note the large fall in ATF firearms budget from 1978 to 1983 and 25% fall in total headcount, with recovery by the very early 1990s.

Year	Inspections	% of FFL
1975	10,944	6.7
1976	15,171	9.1
1977	19,741	11.3
1978	22,130	13.1
1979	14,744	8.6
1980	11,515	6.5
1981	11,035	5.7
1982	1,829	0.8
1983	2,662	1.1
1984	8,861	3.9
1985	9,527	3.8
1986	8,605	3.2
1987	8,049	3.1
1988	9,283	3.4
1989	7,142	2.7
1990	8,471	3.1
1991	8,258	3.0
1992	16,328	5.7
1993	22,330	7.9
1994	20,067	8.0
1995	13,141	7.0
1996	10,051	7.4
1997	5,925	5.5
1998	5,043	4.8
1999	9,004	8.7
2000	3,640	3.5

Table 2
Data on ATF FFL compliance inspections from 1975 to 2000. Note the fall in inspections rate in the early 1980s and the substantial increase in 1992 and 1993. From Exhibit 13, ATF Firearms Commerce in the United States 2011.

CALIBER OR GAUGE OF FIREARMS RECOVERED FROM SUSPECTS 21 AND UNDER				
	All Firearms *(N=1,550)*		Firearms Less than 2 Years Old *(N=215)*	
Caliber	N	Percent	N	Percent
.22	276	17.8	19	8.8
.25	227	14.6	39	18.1
9mm	215	13.9	58	27.0
.38	198	12.8	4	1.9
.380	180	11.6	52	24.2
.32	133	8.6	11	5.1
12 gauge	102	6.6	12	5.6
.357	73	4.7	3	1.4
.45	52	3.4	6	2.8
.30	23	1.5	0	0.0
20 gauge	19	1.2	1	0.5
.44	15	1.0	2	1.0
.40	6	0.4	5	2.3
All Other Calibers	31	2.0	3	1.4

Table 3
A reconstruction of Table 7, page 194 from Kennedy et al. (1996). The population of guns is "every gun coming into police hands" in Boston from 1991 to 1995 where the suspect was under 21. Note that 25 ACP, 380 ACP and 9mm guns represent roughly 70% of guns that were less than 2 years old. Note that only 809 guns in this category could be traced and a date of manufacture assigned. In Table 6 on the same page it is shown that more than 50% of these guns recovered were semiautomatic pistols (autoloaders).

Relationship Between "Person-Years" of Data, Gun Ownership, and Observed Suicides

	Gun Ownership Rates								
	2.50%			5.00%			10.00%		
Number of "person-yrs"	Number "gun owner yrs"	Exp'd gun suicides	Prob. of zero gun suicides	Number "gun owner yrs"	Exp'd gun suicides	Prob. of zero gun suicides	Number "gun owner yrs"	Exp'd gun suicides	Prob. of zero gun suicides
10,000	250	0.17	0.846	500	0.33	0.716	1,000	0.67	0.513
20,000	500	0.33	0.716	1,000	0.67	0.513	2,000	1.33	0.263
30,000	750	0.50	0.606	1,500	1.00	0.368	3,000	2.00	0.135
40,000	1,000	0.67	0.513	2,000	1.33	0.263	4,000	2.67	0.069
50,000	1,250	0.83	0.434	2,500	1.67	0.189	5,000	3.33	0.036
60,000	1,500	1.00	0.368	3,000	2.00	0.135	6,000	4.00	0.018
70,000	1,750	1.17	0.311	3,500	2.33	0.097	7,000	4.67	0.009
80,000	2,000	1.33	0.263	4,000	2.67	0.069	8,000	5.33	0.005

Table 4
Simple computations of the link between the number of "people-years" observed in data, the underlying gun ownership/gun access rate (unobserved), and the number of "gun owner years", expected gun suicides, and the probability of observing no gun suicides. As can be seen, for what appears to be the average rate of gun ownership among young black American males in 1980s, roughly 10%, observing roughly 40,000 person-years leads to less than 10% chance of a zero gun suicide rate. For even lower rates (as appears to have been the case in several MSAs and states), observing 80,000 "person-years" leads to about a 10-25% chance of no gun suicides. These computations support the regression strategy of (a) grouping MSA and state observations in 2-, 3- and 4-year groups and (b) dropping regions with fewer than 10,000 or 20,000 young black men. Probability of zero gun suicides is computed using a binomial distribution with an underlying success probability of 0.000669.

Overall annual averages, in levels, for EGM states				
Dependent variable: Gun homicide rate, young black men				
	(A)	(B)	(C)	(D)
Gun suicide rate, YBM	12.574***	12.662***		
	(1.567)	(1.665)		
Adjusted crack index, average	69.701	476.027		
	(132.973)	(299.123)		
Year		-0.004		0.007
		(0.006)		(0.006)
Year (quad)		0.000		-0.000
		(0.000)		(0.000)
Year (cubic)		0.000		0.000
		(.)		(.)
D.gsrBYM			4.928**	3.731
			(1.362)	(1.855)
D.avgadjcrack			421.560	181.313
			(269.328)	(349.237)
Constant	-0.000	3.808	-0.000	-6.573
	(0.000)	(5.948)	(0.000)	(5.631)
N	21	21	20	20
R-squared	0.87	0.91	0.40	0.51
Log-likelihood	154.86	158.58	153.44	155.43
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$				
Robust standard errors in parentheses				

Table 5
Values for all states aggregated by year in levels. Note that estimated impact of one additional gun suicide is 12 additional gun homicides among young black men

Overall annual averages, in levels, for EGM 55 FHLM MSAs				
Dependent variable: Gun homicide rate, young black men				
	(A)	(B)	(A)	(D)
Gun suicide rate, YBM	11.070***	10.587***		
	(0.752)	(1.015)		
Adjusted crack index, average	-305.002	-449.037		
	(149.977)	(422.944)		
Year		0.007		0.007
		(0.007)		(0.004)
Year (quad)		-0.000		-0.000
		(0.000)		(0.000)
Year (cubic)		0.000		0.000
		(.)		(.)
D.gsrBYM			5.156*	2.842
			(1.844)	(2.838)
D.avgadjcrack			-261.893	-716.684
			(564.240)	(405.410)
Constant	-0.000*	-6.619	0.000	-7.292
	(0.000)	(6.538)	(0.000)	(3.519)
N	21	21	20	20
R-squared	0.88	0.90	0.30	0.51
Log-likelihood	161.68	163.56	155.85	159.34
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$				
Robust standard errors in parentheses				

Table 6
Values for all 55 MSAs aggregated by year in levels. Note that estimated impact of one additional gun suicide is 12 additional gun homicides among young black men

1-, 2-, 3-, and 4-year averages, levels , for EGM states
Dependent variable: Gun homicide rate, young black men
Only states with more than 20,000 young black men

	1-year periods	2-year periods	3-year periods	4-year periods
Avg gun suicide rate, YBM	0.563	1.035*	1.422	2.309*
	(0.289)	(0.449)	(0.817)	(0.842)
Avg unadj crack index/10,000	0.850**	0.923*	1.244***	1.059*
	(0.274)	(0.354)	(0.296)	(0.460)
Per capita personal income, $000s	-0.000**	-0.000*	-0.000***	-0.000*
	(0.000)	(0.000)	(0.000)	(0.000)
Per capita employment rate	0.006***	0.006***	0.006***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)
% of pop 15-24 yrs old male	-0.023	-0.023	-0.023	-0.018
	(0.012)	(0.012)	(0.012)	(0.013)
% of black pop is 15-24 yrs old male	0.007	0.008	0.008	0.007
	(0.010)	(0.010)	(0.009)	(0.010)
Fraction of pop black	0.001	0.002	0.000	0.003
	(0.004)	(0.004)	(0.004)	(0.004)
Constant	-0.000	-0.000	0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Number of period dummies	21	10	7	5
Constant	-0.00	-0.00	0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)
N of obs	525	250	175	125
N of groups	25	25	25	25
F-statistic	.	25.16	31.30	37.97
Log-likelihood	3627.14	1750.92	1238.73	890.28
Log-likelihood, constant only	3337.05	1595.03	1123.52	806.61

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Clustered standard errors in parentheses

Table 7
Multi-year grouped values in levels, only MSA with more than ≈ 10,000 young black men

Averages for 1-year, 2-year, 3-year and 4-year periods, differenced, for EGM states
Dependent variable: Change in gun homicide rate, young black men
Only states with more than 20,000 young black men

	1-year periods	2-year periods	3-year periods	4-year periods
Chg, avg gun suicide rate, YBM	0.067	-0.345	-0.493	1.916*
	(0.196)	(0.240)	(0.933)	(0.875)
Chg, avg unadj crack index/10,000	0.212	0.302	1.454**	0.969
	(0.272)	(0.464)	(0.464)	(0.873)
Chg in personal income, $000s	0.000	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Chg in employment rate	-0.000	0.001	0.000	-0.002
	(0.002)	(0.002)	(0.002)	(0.003)
Chg in % of pop 15-24 year-old-male	-0.018	-0.028	-0.008	-0.031
	(0.027)	(0.032)	(0.027)	(0.037)
Chg in % of black pop is 15-24 year-old-male	0.017	0.028	0.032	0.033
	(0.020)	(0.023)	(0.022)	(0.029)
Chg in black % of pop	-0.018	-0.035	-0.026	-0.013
	(0.014)	(0.018)	(0.015)	(0.017)
Constant	-0.000	-0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Number of period dummies	20	9	6	4
Constant	-0.00	-0.00	0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)
N of obs	500	225	150	100
N of groups	25	25	25	25
F-statistic	.	18.34	13.47	18.74
Log-likelihood	3548.73	1580.69	1039.44	681.75
Log-likelihood, constant only	3475.90	1504.22	968.28	632.42

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Clustered standard errors in parentheses

Table 8
1-4 year grouped values in differences, only states with more than 20,000 young black men

1-, 2-, 3-, and 4-year averages, levels , for EGM 55 FHLM MSAss Dependent variable: Gun homicide rate, young black men Only MSAs with more than ≈ 10,000 young black men				
	1-year periods	2-year periods	3-year periods	4-year periods
Avg gun suicide rate, YBM	0.855***	1.656***	2.350***	3.016**
	(0.218)	(0.433)	(0.532)	(0.864)
Avg unadj crack index/10,000	0.696*	0.784*	0.978*	1.097*
	(0.343)	(0.385)	(0.403)	(0.456)
Per capita personal income, $000s	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Per capita employment rate	0.005**	0.005**	0.005**	0.005**
	(0.002)	(0.002)	(0.002)	(0.002)
% of pop 15-24 yrs old male	-0.030*	-0.029*	-0.032*	-0.029*
	(0.013)	(0.013)	(0.013)	(0.014)
% of black pop is 15-24 yrs old male	0.008	0.009	0.010	0.009
	(0.010)	(0.010)	(0.011)	(0.011)
Fraction of pop black	-0.007	-0.008	-0.008	-0.007
	(0.005)	(0.006)	(0.005)	(0.006)
Number of period dummies	21	10	7	5
Constant	0.002	0.001	0.002	0.001
	(0.001)	(0.002)	(0.001)	(0.002)
N of obs	798	380	266	190
N of groups	38	38	38	38
F-statistic	26.89	14.97	20.12	15.87
Log-likelihood	5106.16	2468.51	1751.09	1261.15
Log-likelihood, constant only	4827.89	2314.35	1631.00	1171.97
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ Clustered standard errors in parentheses				

Table 9
Multi-year grouped values in levels, only MSA with more than ≈ 10,000 young black men

Averages for 1-year, 2-year, 3-year and 4-year periods, differenced, for EGM 55 FHLM MSAs
Dependent variable: Gun homicide rate, young black men
Only MSAs with more than ≈10,000 young black men

	1-year periods	2-year periods	3-year periods	4-year periods
Chg, avg gun suicide rate, YBM	0.068	0.288	0.585	1.797*
	(0.137)	(0.319)	(0.381)	(0.759)
Chg, avg unadj crack index/10,000	0.120	-0.029	0.671	0.463
	(0.334)	(0.402)	(0.554)	(0.808)
Chg in personal income, $000s	0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Chg in employment rate	0.002	0.000	0.003	0.004
	(0.002)	(0.003)	(0.003)	(0.003)
Chg in % of pop 15-24 year-old-male	0.015	0.033	0.031	0.023
	(0.026)	(0.028)	(0.027)	(0.033)
Chg in % of black pop is 15-24 year-old-male	-0.001	-0.011	-0.013	-0.022
	(0.015)	(0.017)	(0.016)	(0.021)
Chg in black % of pop	-0.000	-0.012	-0.006	0.005
	(0.007)	(0.010)	(0.009)	(0.011)
Number of period dummies	20	9	6	4
Constant	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
N of obs	760	342	228	152
N of groups	38	38	38	38
F-statistic	15.69	11.20	17.34	10.65
Log-likelihood	4992.97	2234.08	1471.96	973.45
Log-likelihood, constant only	4938.07	2167.16	1402.12	917.75

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Clustered standard errors in parentheses

Table 10
1-4 year grouped values in differences, only MSAs with more than ≈ 10,000 young black men

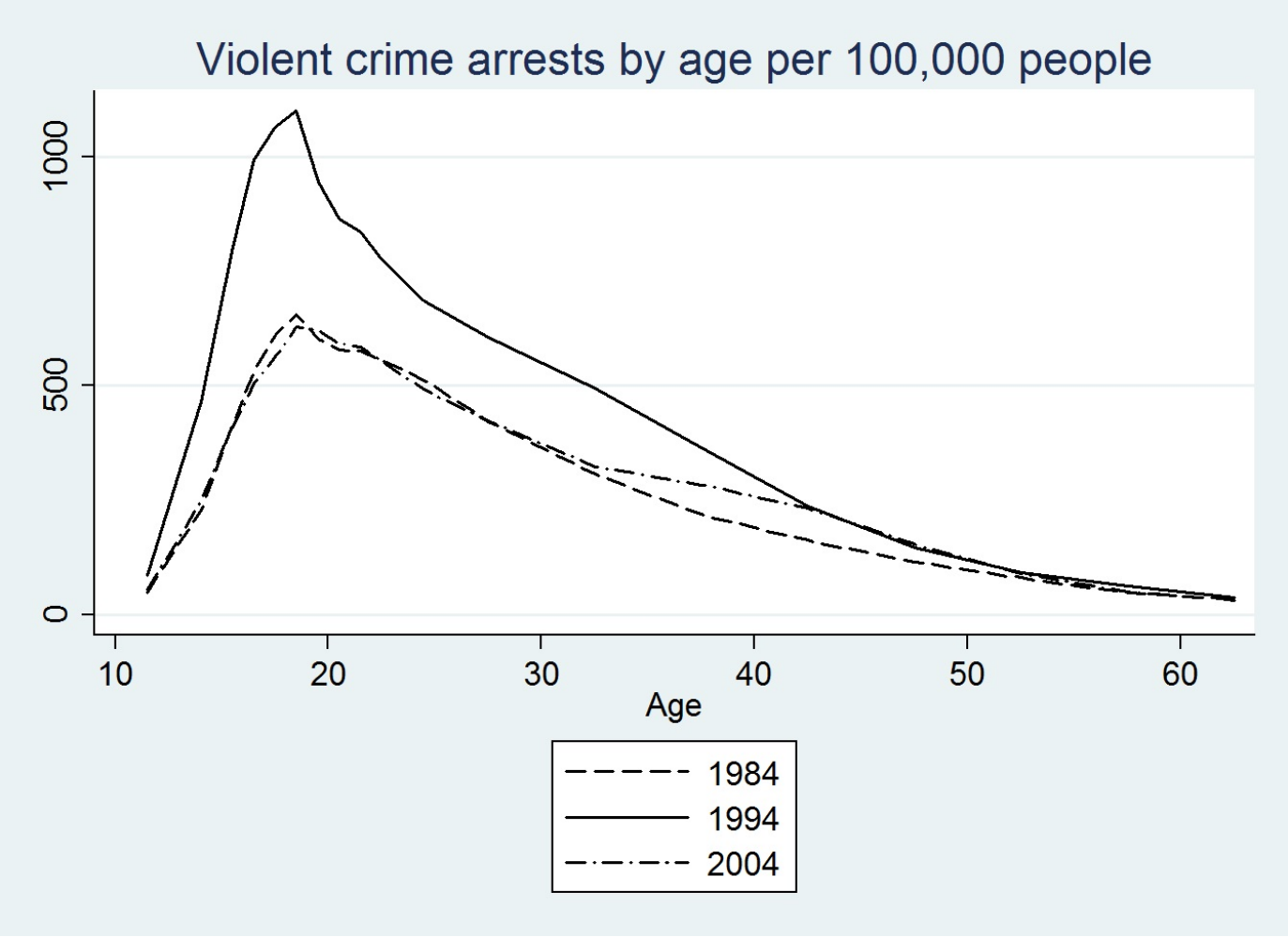

Figure 1.
The increase in violence from 1984 to 1994, and the decline to 2004, using violent crime arrest rates. Note that the epidemic of the early 1990s appears to be completely a period effect, with no general cohort effect. Following the analysis in Cook and Laub (2002) and Humphreys (2016), using data from Snyder and Mulako-Wangota (n.d.).

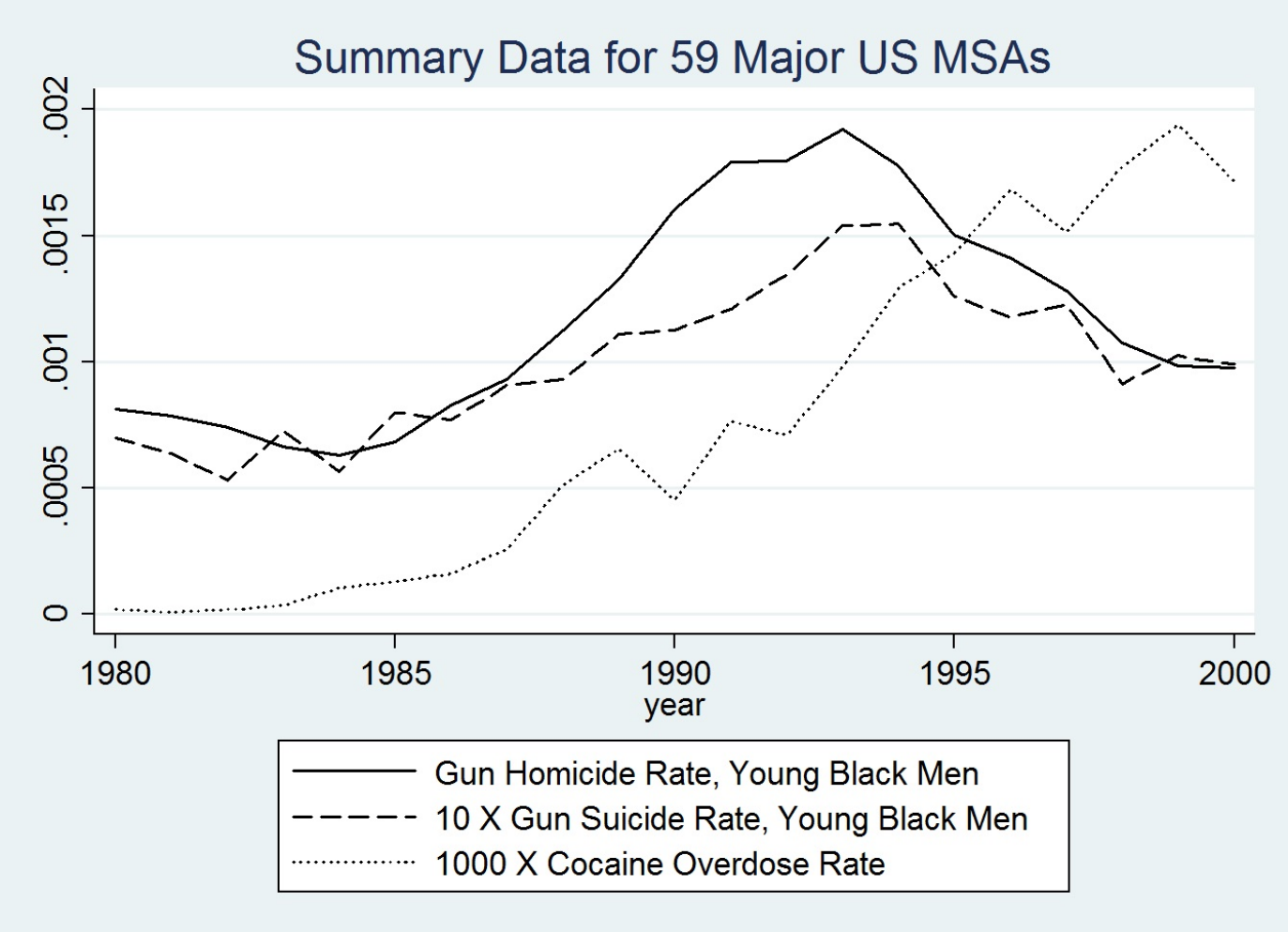

Figure 2.
Summary numbers for 59 MSAs (the same as used by Evans et al. (2012)) for gun homicides among young black men, gun suicides among young black men, and deaths due to cocaine for the same period.

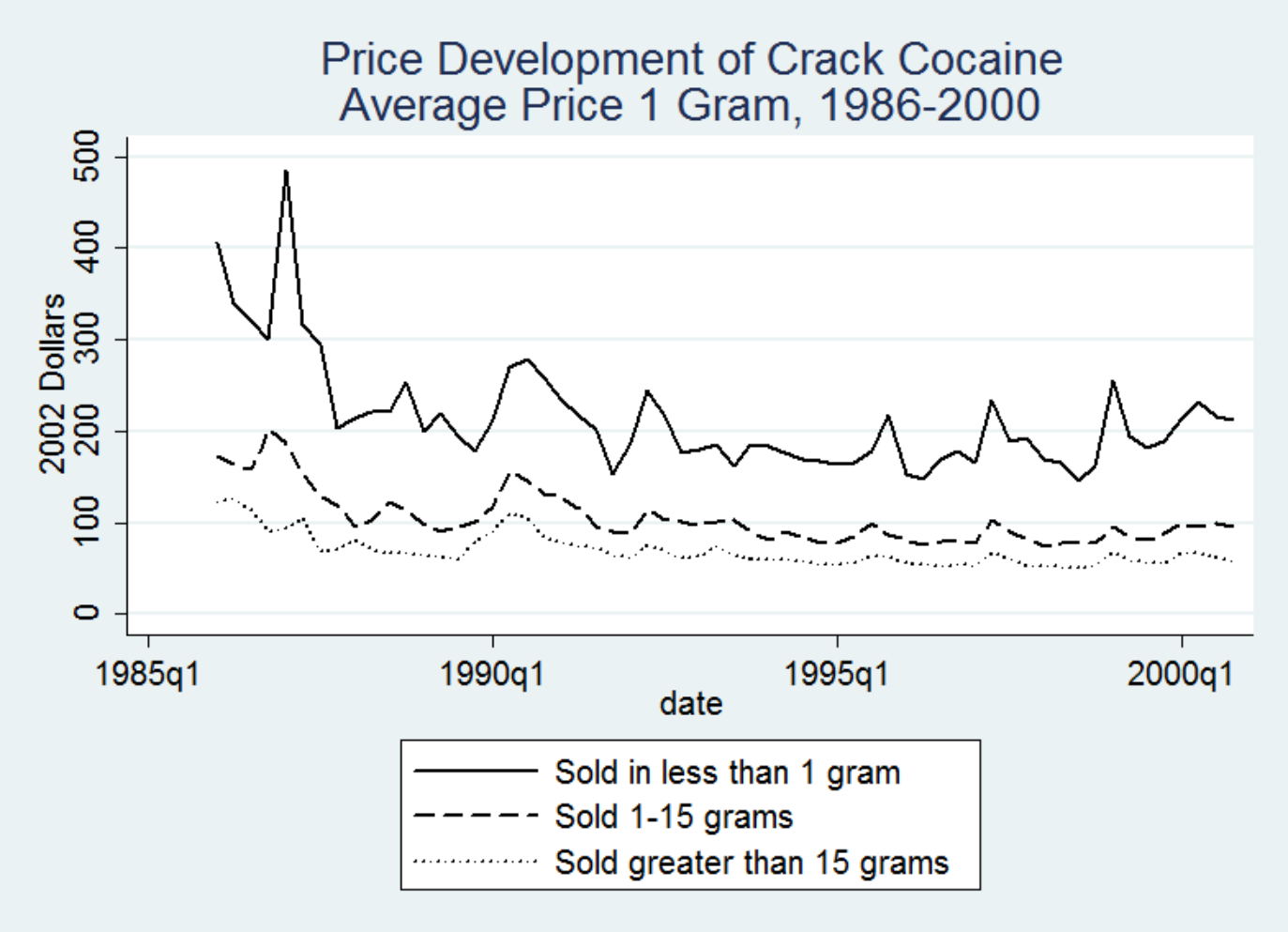

Figure 3.
Data on crack prices in major cities from the Office of National Drug Control Policy. While prices continue to shift over the 1990s, there is no clear shift in pricing between 1988 and 2000 that can help to explain the peak in violence in 1993 and the following decline.

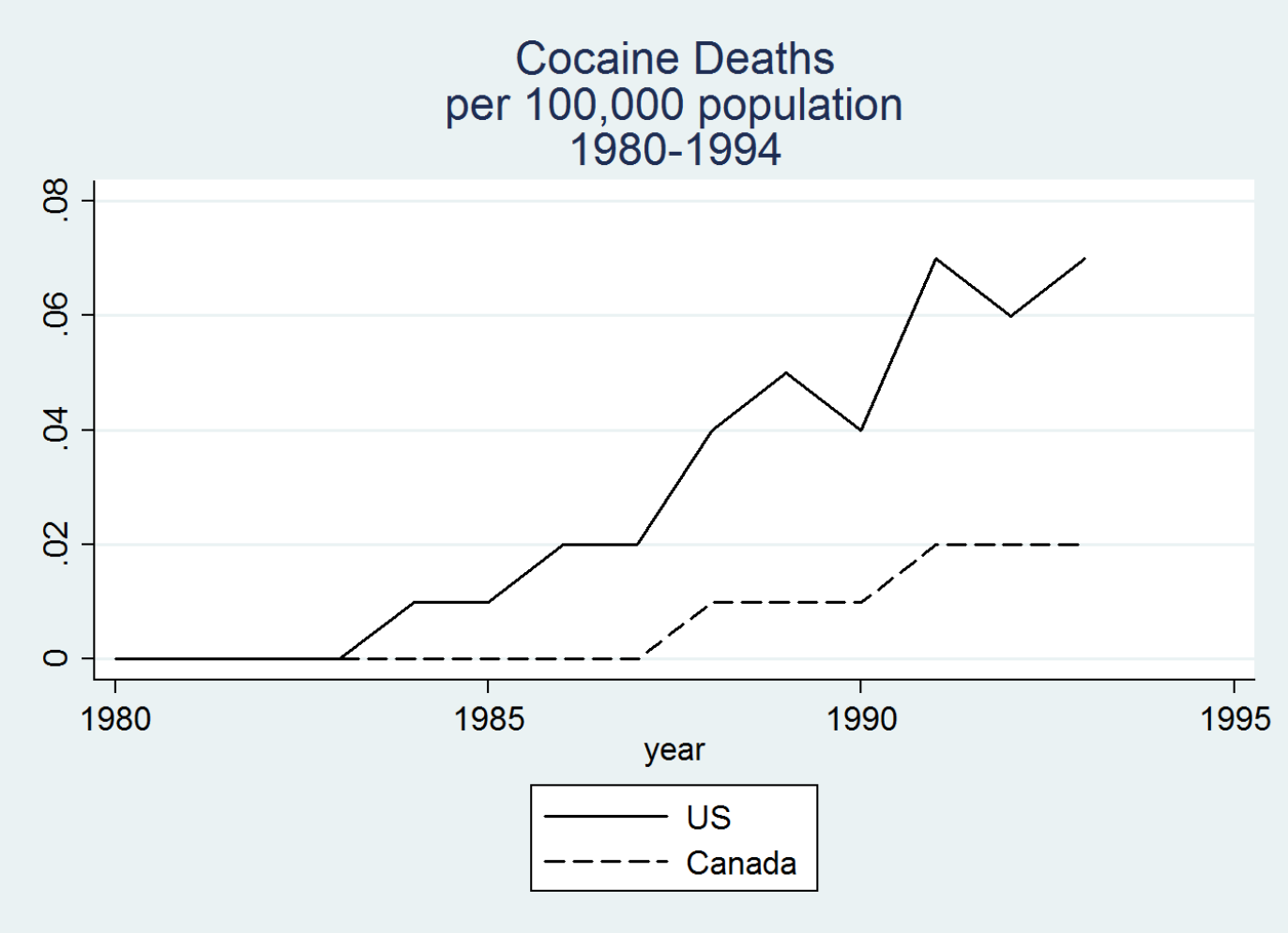

Figure 4.
Rate of mortality per 100,000 population for ICD-9 codes 304.2 and 305.6 (closely related with crack cocaine usage) for the United States and Canada. Notice that given the pattern of crack-related deaths, Canada probably had a per capita level of crack usage about 1/3rd that the of the United States by 1994. United States rates based on Vital Statistics of the United States for 1980-1993, Volume II-A Mortality, and NBER public-use MCOD data for 1994-2000, divided by US Census population counts and estimates for July 1, 1980-2000. Canadian data provided by StatCan (StatCan data has random "jitter" to protect individuals in annual counts; rate used here is trailing 5-year average of anonymized data).

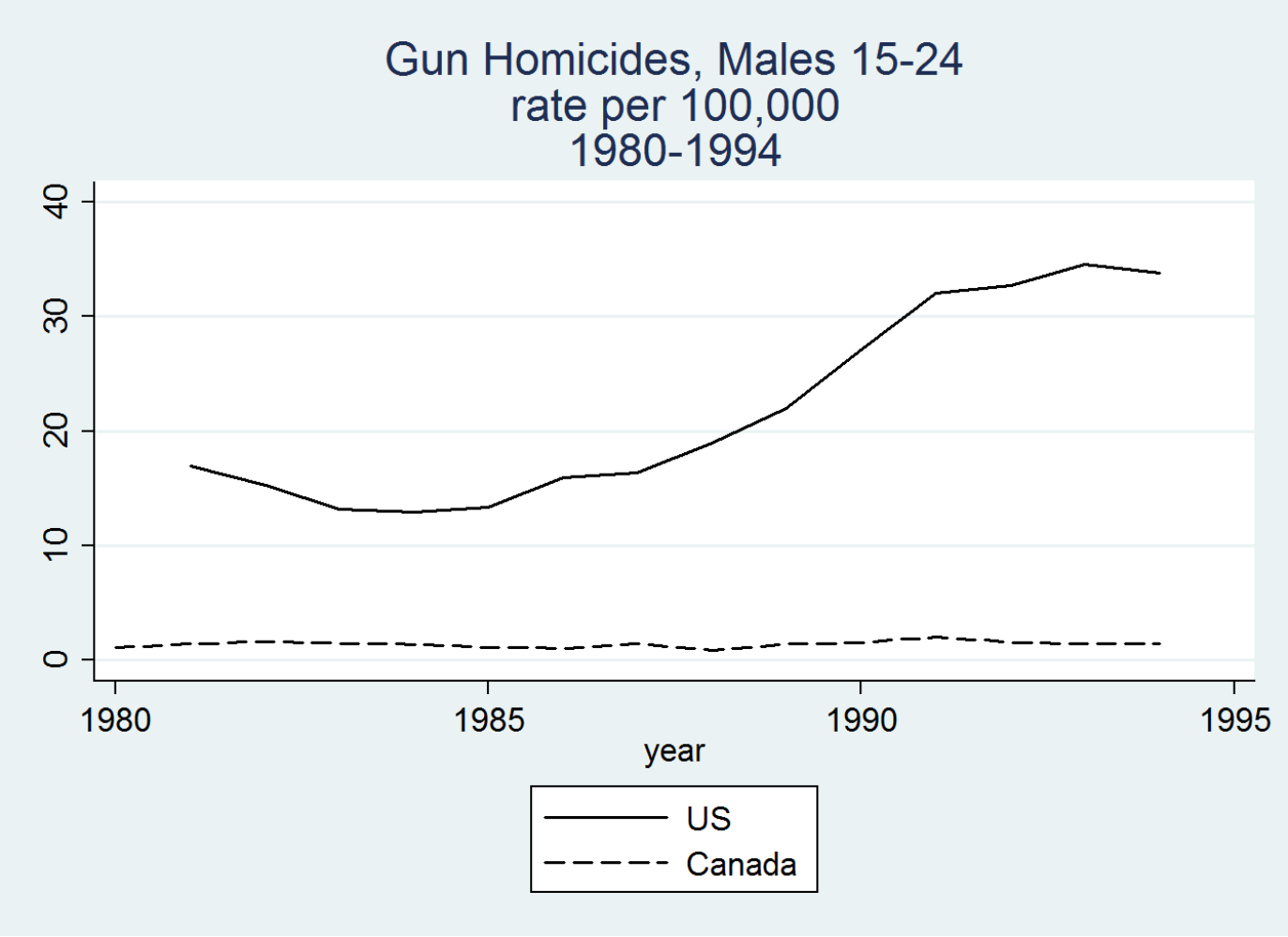

Figure 5.
Gun homicide rates for males ages 15-24 for the United States and Canada from 1980 to 1994. Notice that the US rate goes from 14 per 100,000 in the early 1980s to 34.6 per 100,000 by 1993, while the Canadian rate fluctuates randomly between 0.91 to 2.05 per 100,000 the entire period (the two highest death rates for Canada are 1982 and 1991, and the two lowest are 1998 and 1988).

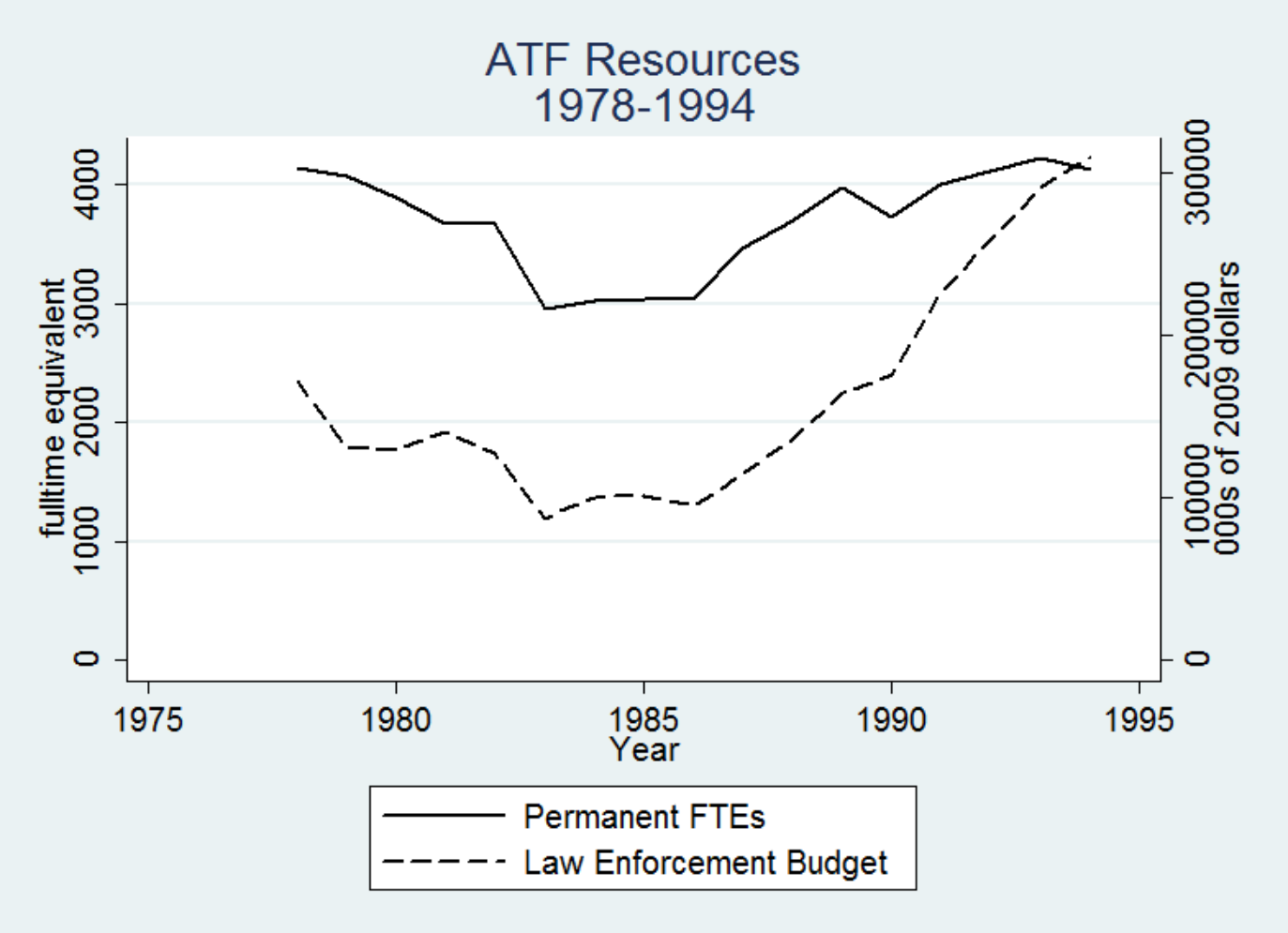

Figure 6.
ATF resources in personnel and budget for law enforcement from 1973 to the late 1990s. Notice that the overall ATF headcount falls by 25% from 1979 to 1983, while the spending on firearms law enforcement falls in real terms by 34% from $132 million in 1979 to $87 million in 1983. Source: Federal Budgets for 1975 to 2002. Real dollar computations using GDP Deflator series (GDPDEF) from FRED2.

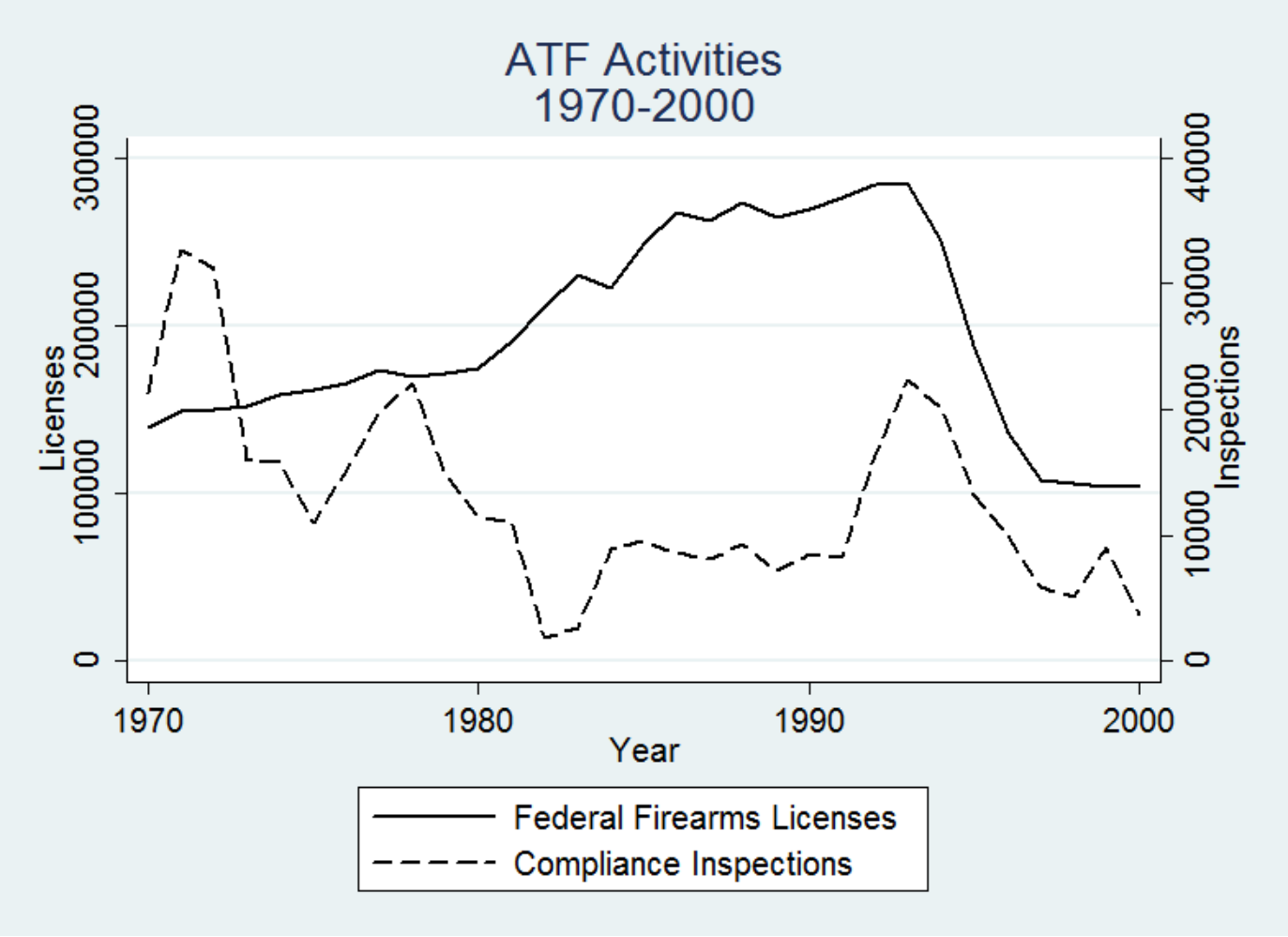

Figure 7.
ATF FFL and compliance inspections from 1980 to 2000. Notice that the number of licenses surges from 171,000 in 1979 to 284,000 in 1993, while the number of inspections falls from 8.6% of the licensees to 0.8% in 1982 and a running average of 3.5% over the 1980s. Source: 2011 Report on Firearms Commerce, ATF

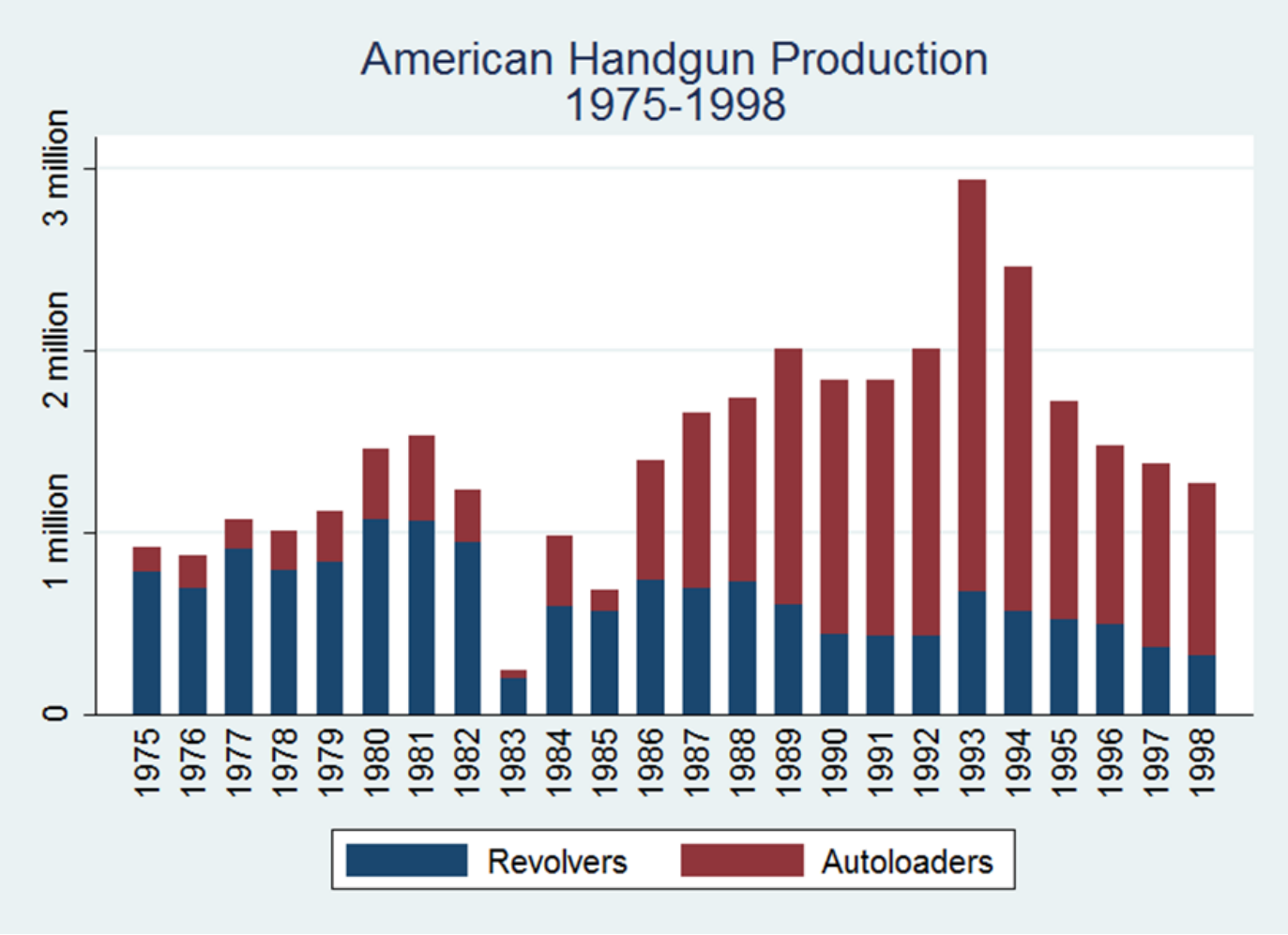

Figure 8.
US-based production of handguns from 1975 to 1998, by caliber. Note the steady fall in production as purchases shift to autoloaders.

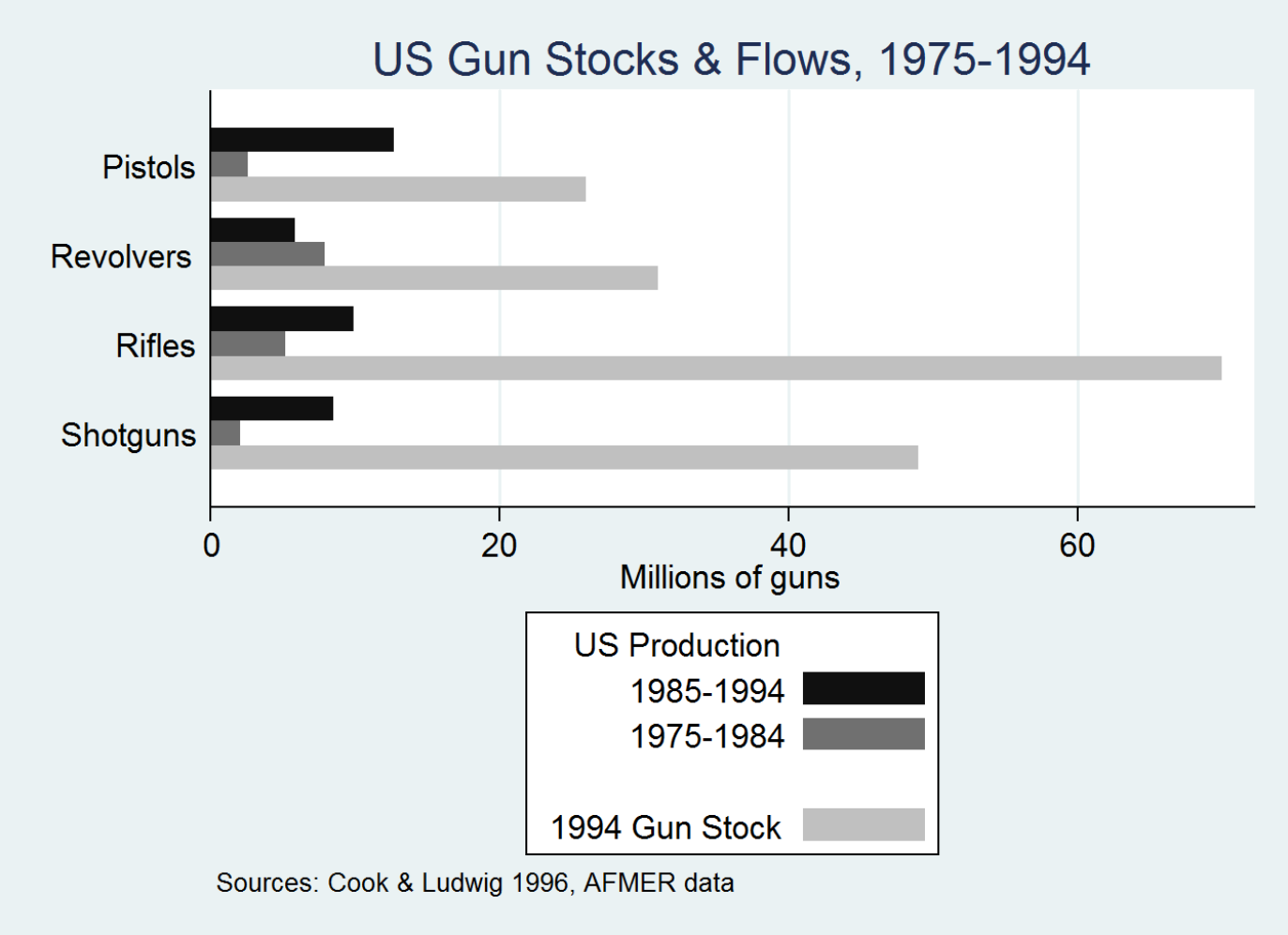

Figure 9.
US-based gun production for 1975-1984 and 1985-1994 compared to the estimated stocks in 1994. Notice that the AFMER count for US autoloader production from 1985-1994 is slightly under 13 million, compared with the estimated stock of autoloaders of 26 million (Cook and Ludwig, 1996: Table 3.1).

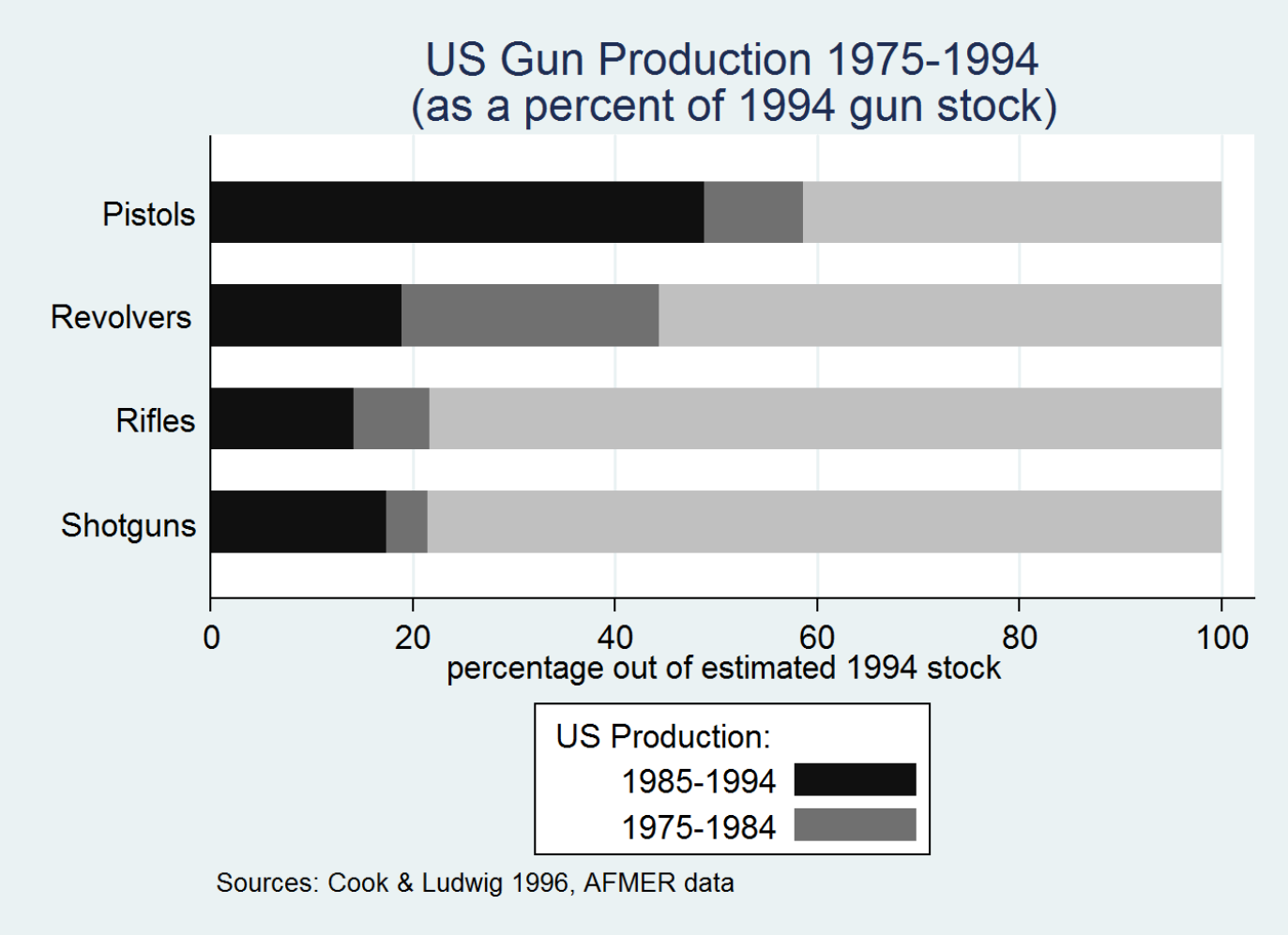

Figure 10.
US-based gun production for 1975-1984 and 1985-1994 as percentage of the estimated stocks in 1994. Notice that US autoloader production from 1985-1994 is roughly 50% of the estimated 1994 stock (Cook and Ludwig, 1996: Table 3.1); no other gun type shows a remotely comparable change in production in the previous decade.

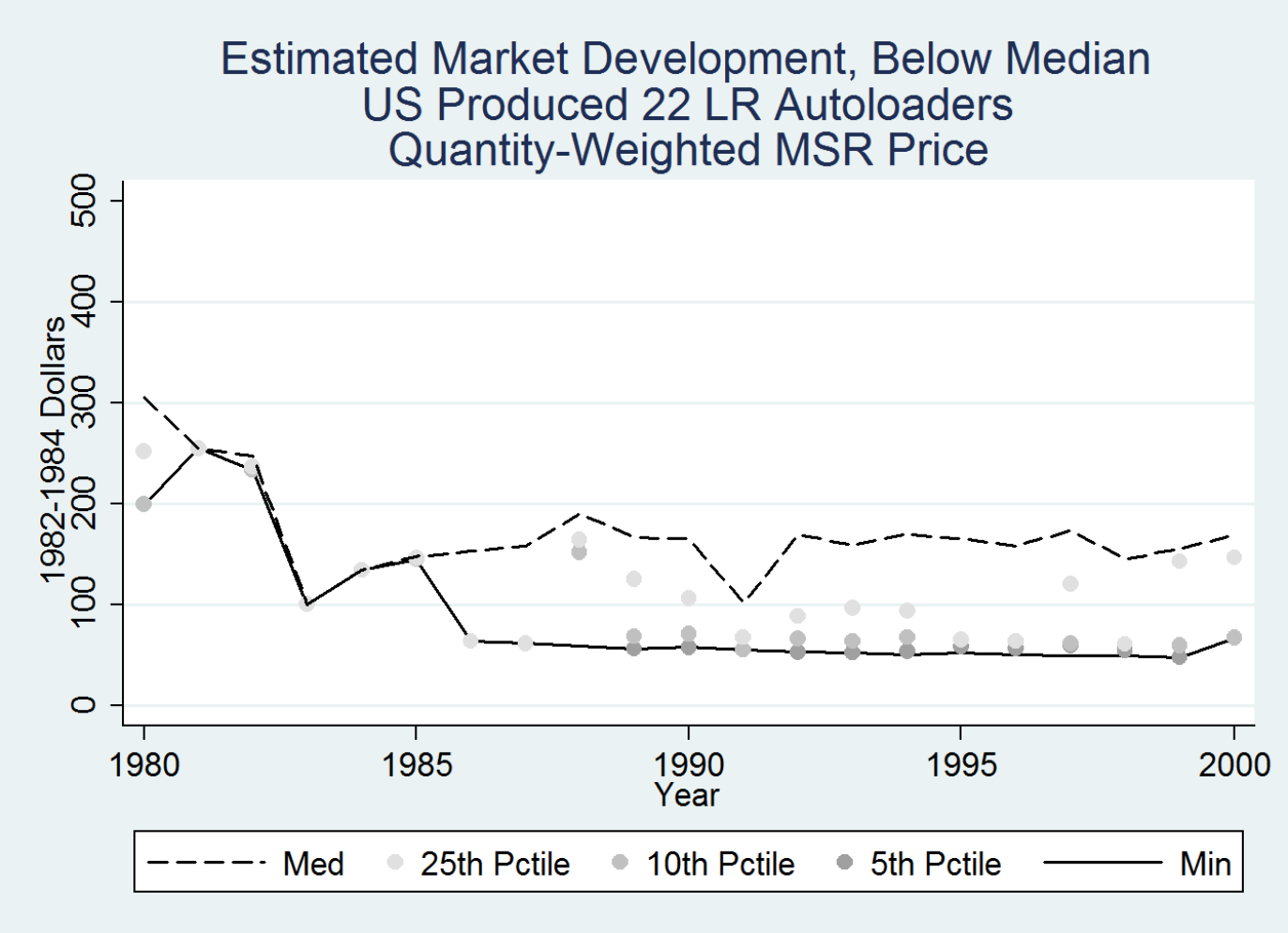

Figure 11.
Estimated movements of real prices (1982-1984 dollars) in the bottom half of the market for 22 LR autoloaders from 1980 to 2000. Note that the minimum price falls by about 60% from 1980 to 1986 then stays roughly stable. Source: Authors calculations, based on Gun Digest Gundex 1980-2000 and ATF AFMER reports. Median manufacturer prices for a specific caliber (by model) are averaged across reported manufacturing levels.

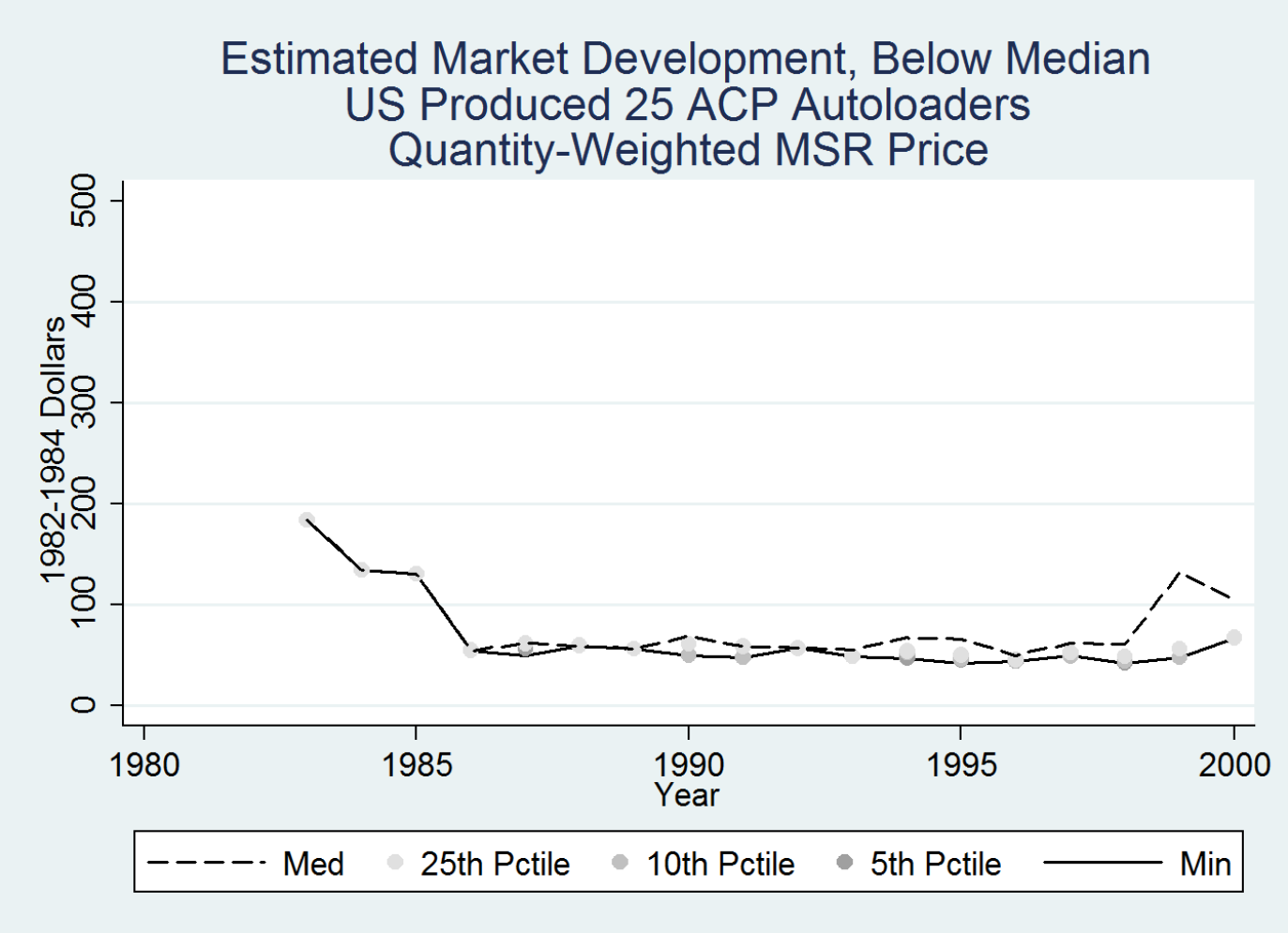

Figure 12.
Estimated movements of real prices (1982-1984 dollars) in the bottom half of the market for 25 ACP autoloaders from 1980 to 2000. Note that the minimum price falls rapidly to 1986 then stays roughly stable. Source: Authors calculations, based on Gun Digest Gundex 1980-2000 and ATF AFMER reports. Median manufacturer prices for a specific caliber (by model) are averaged across reported manufacturing levels.

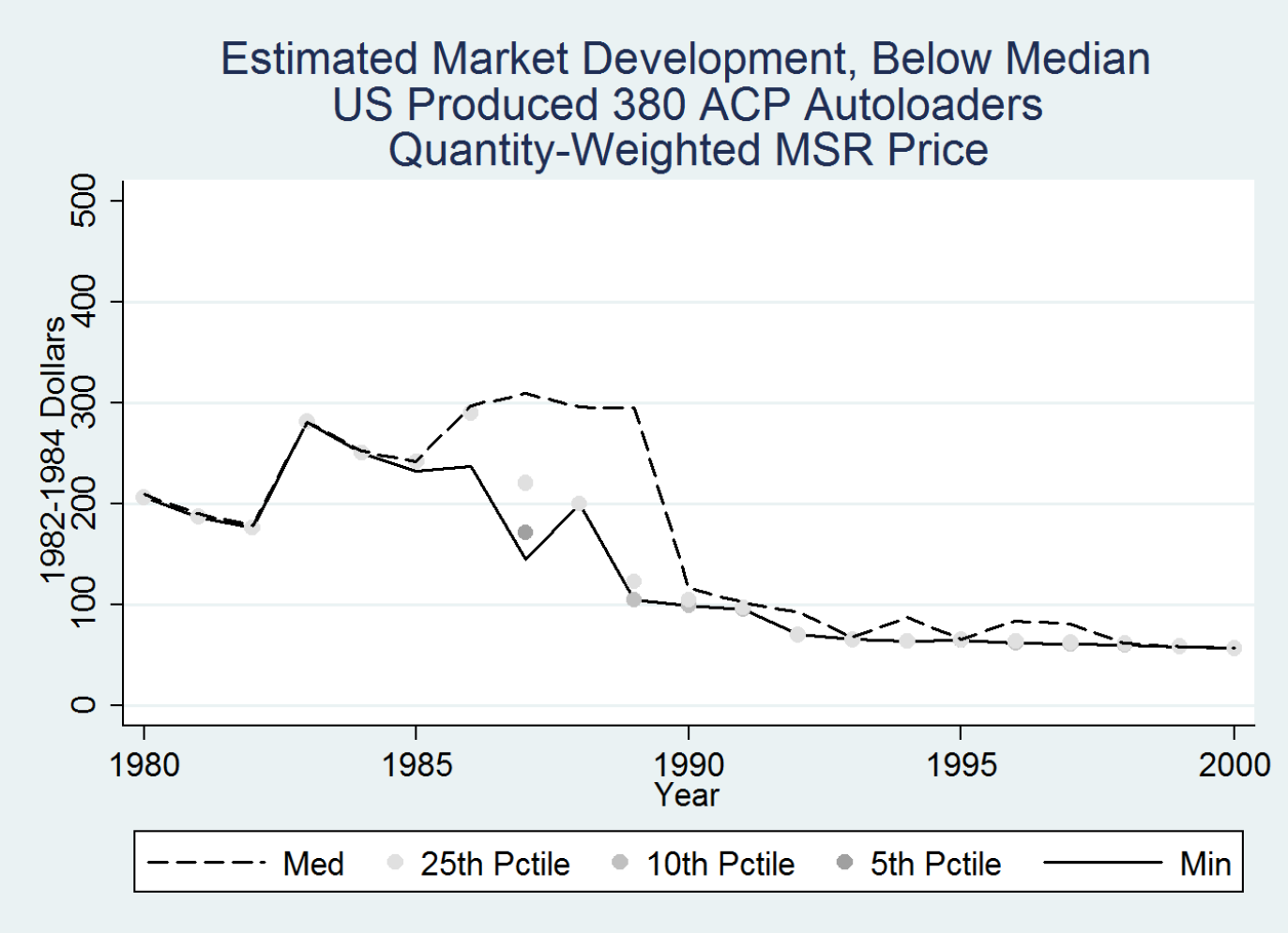

Figure 13.
Estimated movements of real prices (1982-1984 dollars) in the bottom half of the market for 380 ACP autoloaders from 1980 to 2000. Note that the minimum price moves down until roughly 1990 then stays stable. Source: Authors calculations, based on Gun Digest Gundex 1980-2000 and ATF AFMER reports. Median manufacturer prices for a specific caliber (by model) are averaged across reported manufacturing levels.

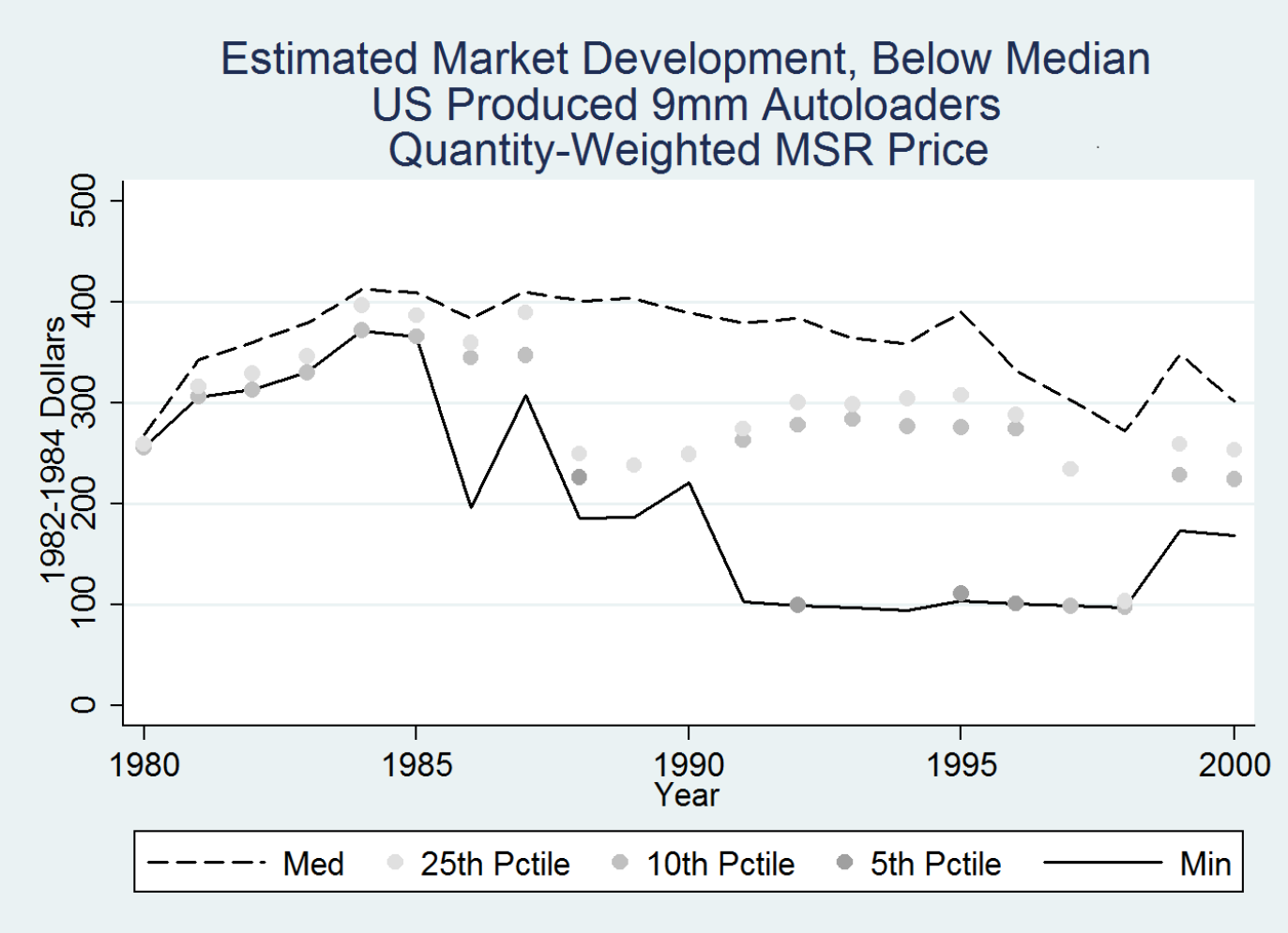

Figure 14.
Estimated movements of real prices (1982-1984 dollars) in the bottom half of the market for 9mm autoloaders from 1980 to 2000. Note that the minimum price moves up in the very early 1980s, then down until roughly 1991 then stays stable. Source: Authors calculations, based on Gun Digest Gundex 1980-2000 and ATF AFMER reports. Median manufacturer prices for a specific caliber (by model) are averaged across reported manufacturing levels.

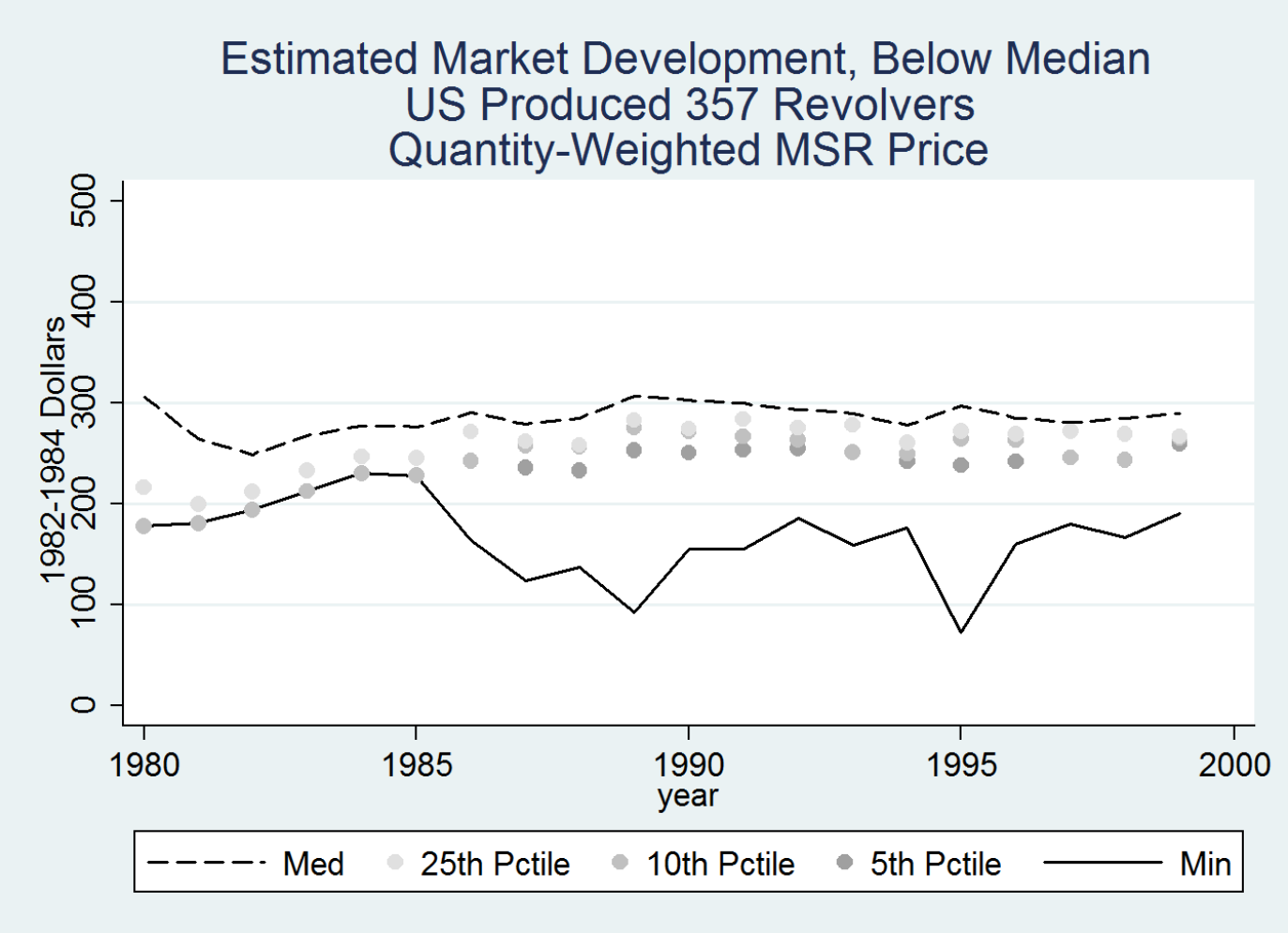

Figure 15.
Estimated movements of real prices (1982-1984 dollars) in the bottom half of the market for 357 caliber revolvers from 1980 to 2000. Note that the minimum price falls in the 1980s, but all other percentiles are stable if not increasing. Source: Authors calculations, based on Gun Digest Gundex 1980-2000 and ATF AFMER reports. Median manufacturer prices for a specific caliber (by model) are averaged across reported manufacturing levels.

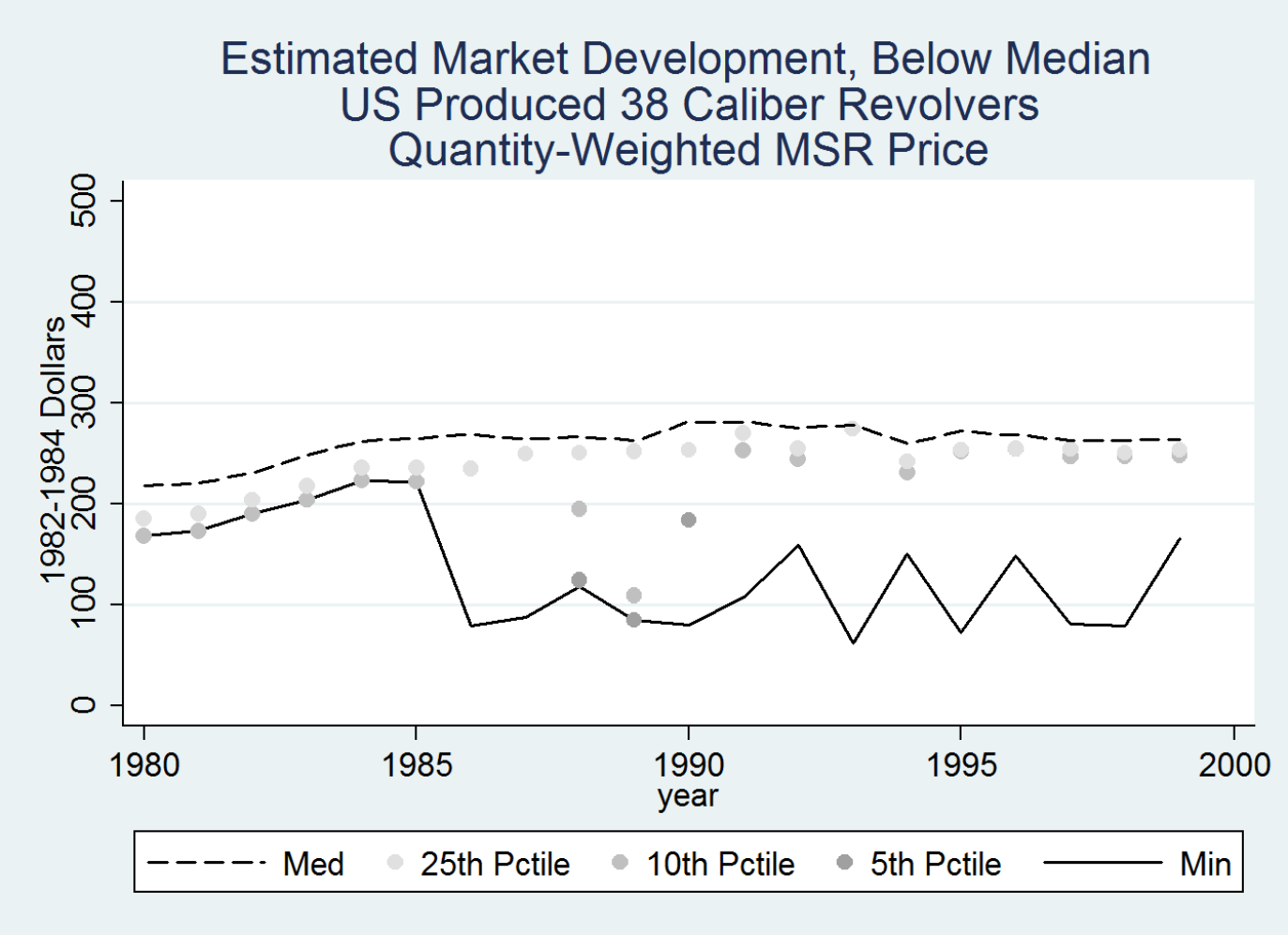

Figure 16.
Estimated movements of real prices (1982-1984 dollars) in the bottom half of the market for 357 caliber revolvers from 1980 to 2000. Note that the minimum price falls in the 1980s, but aside from a small fluctuation in the early 1990s, the other percentiles remain stable. Source: Authors calculations, based on Gun Digest Gundex 1980-2000 and ATF AFMER reports. Median manufacturer prices for a specific caliber (by model) are averaged across reported manufacturing levels.

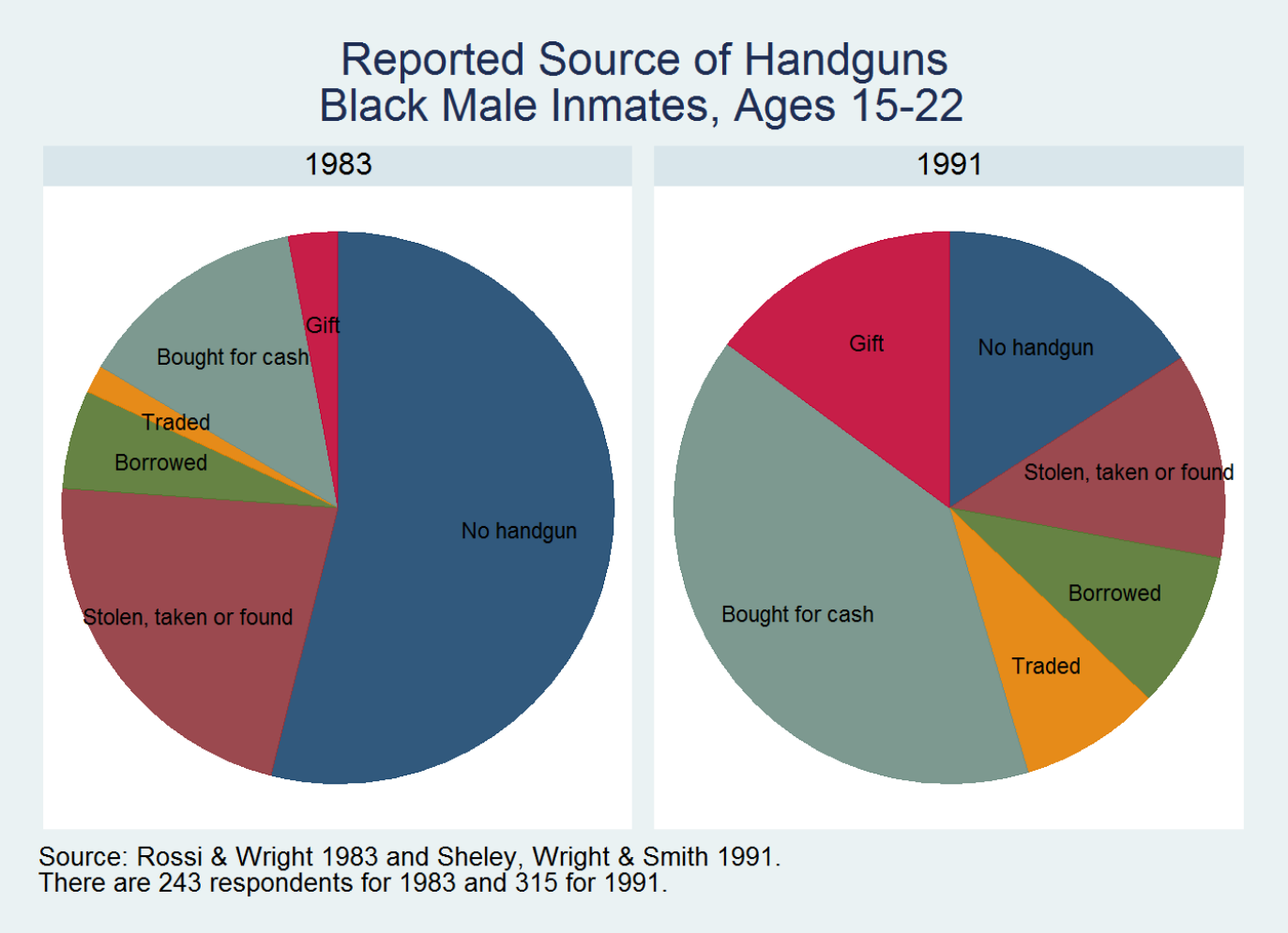

Figure 17.
Summary of surveys of black male inmates, aged 15-22, on handgun ownership and access before imprisonment in 1983 and 1991. Notice that not only does ownership of guns increase, but the ability to purchase a gun (via either formal or informal markets) is the largest component of this. Source: Authors' analysis of the ICPSR datasets of Sheley et al. (1991); Wright and Rossi (1983)

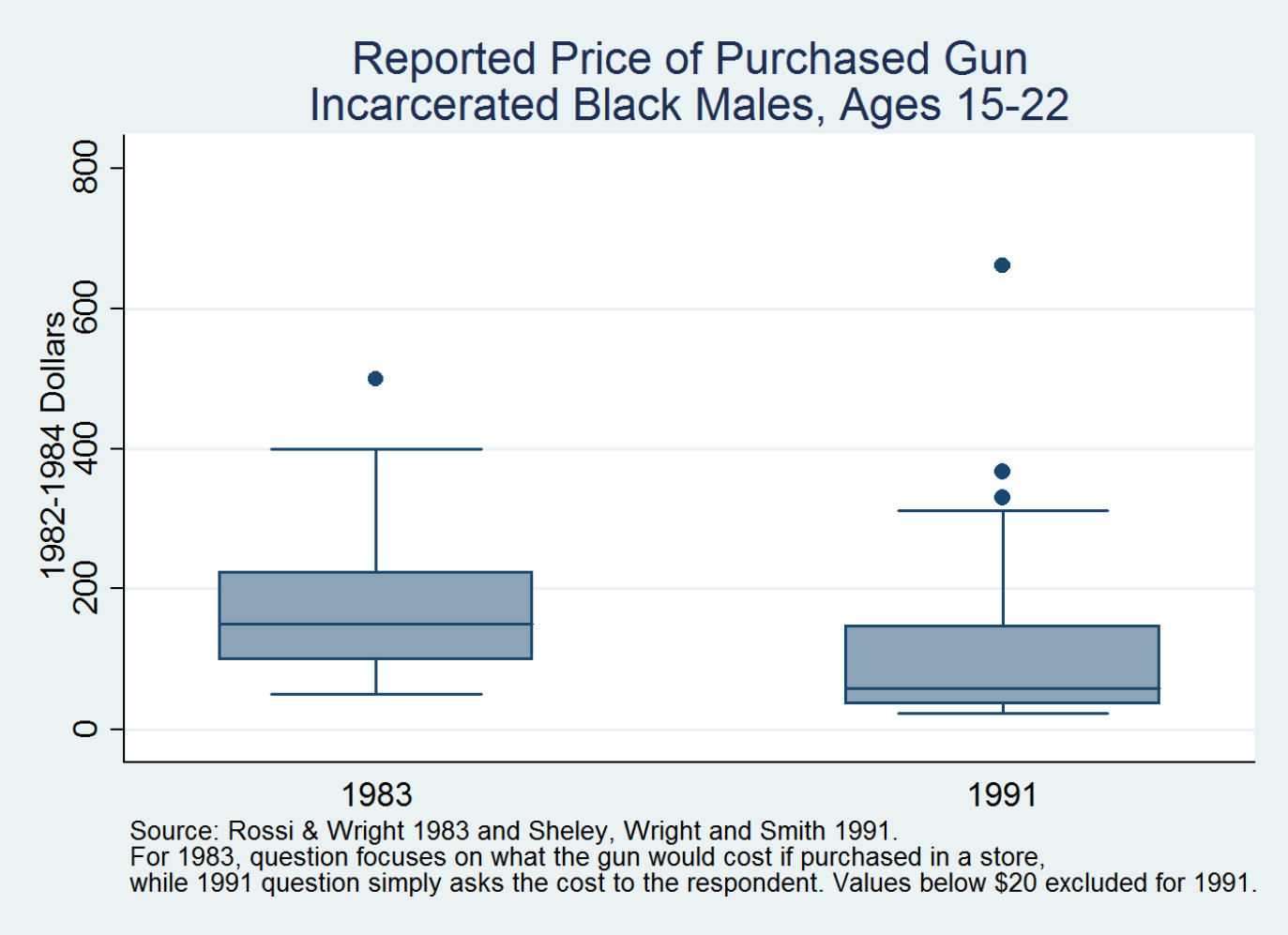

Figure 18.
Summary of surveys of black male inmates, aged 15-22, on handgun costs before imprisonment in 1983 and 1991. The 1983 data asks the value of a gun if purchased in a store, while the 1991 survey simply asks the cost to the respondent, so there are limits to how these can be compared. However, the direction and magnitude of change matches the other data. Source: Authors' analysis of the ICPSR datasets of Sheley et al. (1991); Wright and Rossi (1983). Note that for 1991, 22 observations (out of 125 total) were below $20, potentially in error, and dropped for the above graphic.

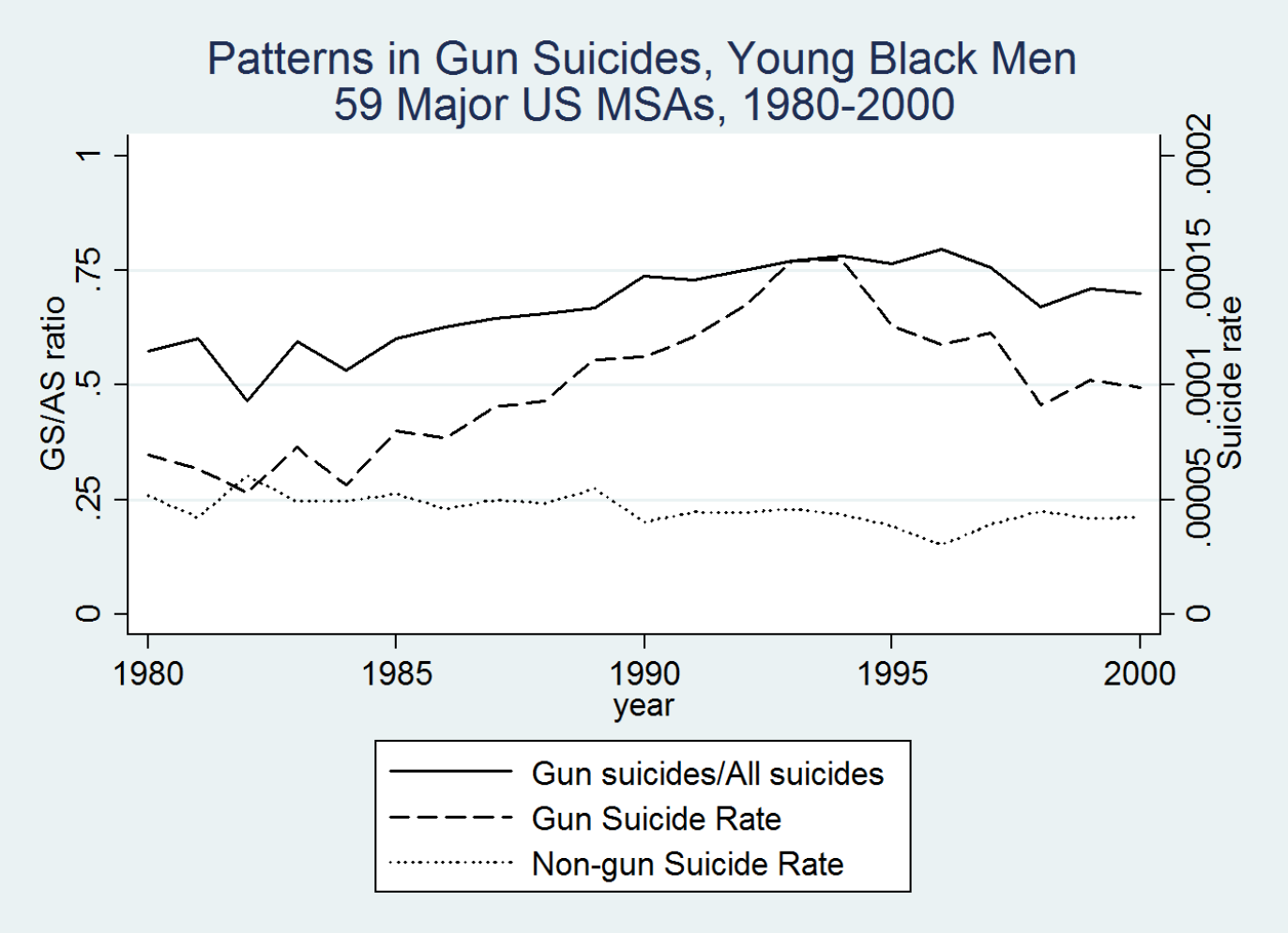

Figure 19.
Data on suicides among young black men in 59 major US MSAs from 1980 to 2000. The ratio of gun suicides to all suicides is a standard proxy of gun ownership and access. As can be seen, among urban young black men this increased from slightly more than 50% of suicides to more than 75% of suicies in the mid-1990s, then fell. Disaggregating gun suicides and non-gun suicides we see that a major driver is a surge in gun suicides from 1985 to 1994.

A Data Appendix

We have used or plan to use data from multiple sources for this research.

The process of entering, checking and processing the gun production and price data is ongoing; the following summarizes the status as of the end of March, 2016.

A.1 Gun Quantity Data

A.1.1 Annual Firearms Manufacturing and Export Report (AFMER)

This data is compiled annually by the US Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) for statistical purposes and is obtained by mandatory reporting from US firearms manufacturers. Each manufacturer lists the number of pistols, revolvers, rifles, shotguns and miscellaneous firearms produced each year, including the different calibers of pistols and revolvers.

We have obtained such production data for US firearms manufacturers for the 1990-2013 time period from the ATF website and through a Freedom of Information Act (FOIA) request to the ATF for earlier time periods. This data gives us new handgun production/sales annually for the various firearm quantity measures used within the paper. Most of the data received from the FOIA request (for years 1984 to 2000) was in scanned PDF form, and has been entered

A.1.2 Violence Policy Center Data

We are told by the ATF (and separately, by Jurgen Brauer) that there no extant copies of the AFMER reports for 1980-1983. We use the Violence Policy Center report *Firearms Production in America 2000 Edition* (available at http://www.vpc.org/graphics/prodcov.pdf) for those years.

For price/quantity measurements made within the paper, we use this quantity data combined with price data from the Gun Digest source described below.

A.2 Norwegian Initiative on Small Arms Transfers (NISAT)

This data source provides the annual dollar value of international authorized trade in small arms and light weapons, including handgun firearms imported into the US each year by foreign producers.

We have obtained such dollar values for US imports of handguns for the 1979-2000 time period by country of origin. In the future, we hope to add such import data to our price/quantity measures for a more robust measure of new handgun availability for retail consumers by determining quantity of guns imported by country and matching new handgun brand prices to manufacturers from that country.

A.3 Gun Price Data

A.3.1 Gun Digest

This annual publication (since 1946) provides a manufacturer suggested retail price (MSRP) for current production of different models of handguns (autoloaders and revolvers), rifles, shotguns and miscellaneous firearms. We have obtained physical copies of these publications for the 1980-2000 time period. This data gives us new firearm prices for each year of production for the various price measures used within the paper. Currently, personnel have manually entered all data within an Excel spreadsheet for the autoloader handgun prices for the entire 1980-2000 time period by manufacturer, brand and caliber and are almost complete with 21 years of revolver data. Each unique listing of a caliber/price/magazine size/style is entered as a separate data point. For instance, in the 1983 Gun Digest, the Iver Johnson PP22 Auto Pistol has a 7-shot magazine and a standard style, with a price of $183.24, but can be purchased either 22 LR or 25 ACP. This is two observations in our data set. Work on long guns is underway.

The handgun price data is being manually connected to producers from the AFMER data by manufacturer. Most of the AFMER production data has been directly linked (approximately 75-80%) to specific autoloader prices, although we have not been able to link the remaining production yet due to some manufacturers not selling their production directly through retail outlets. We will attempt within the upcoming months to determine the prices of this remaining production through further research. Much of the price data used to date within the paper is an average or median measure of prices (ex - in 1990, Colt Manufacturing produced over 66,000 45ACP autoloader handguns within multiple brands; we have the price of individual brand units, but not yet how many of each particular brand was produced that year). But we have performed some sensitivity analysis at this point regarding the possible price differentials. We will continue

with that sensitivity analysis and direct production/brand matching in the upcoming months.

A.4 Gun Price-Quantity Mapping Information

A.4.1 Blue Book of Gun Values

Mapping between gun brands (from the Gun Digests) to gun manufacturers (by AFMER identifier or country) is a nontrivial enterprise. To see the preliminary list of brands and AFMER identifiers we have combined, look at Table 11.

We make use of the Blue Book of Gun Values. We use both the online directory and hard copies of 1990 and 2000 directories. To learn more about this resource, go to:

http://bluebookofgunvalues.com/

A.5 Fryer, Heaton, Levitt and Murphy Crack Index

We use the "Crack Index" developed by Roland Fryer, Paul Heaton, Stephen Levitt and Kevin Murphy, accessed via:

http://scholar.harvard.edu/fryer/publications/measuring-crack-cocaine-and-its-impact

For different parts of the analysis we use both state and city data, both adjusted and unadjusted. For the MSA analysis we combine averages for all cities within an MSA, weighted by 1990 city population, using the Census data, Population Estimates for Cities with Populations of 100,000 and Greater, found at:

http://www.census.gov/population/estimates/metro-city/SC100K-T1.txt

A.6 Mortality Data

A.6.1 NBER Vital Statistics Multiple Causes of Death Data

For MSA and state-level firearms suicides, firearms homicides, and cocaine deaths, we use the public use data set on mortality data made available on the NBER website.

http://www.nber.org/data/vital-statistics-mortality-data-multiple-cause-of-death.html

A.6.2 CDC Data Sources

For national analysis we sometimes use CDC data sources, specifically the Web-based Injury Statistics Query and Reporting System (WISQARS) and Vital Statistics Reports

http://www.cdc.gov/injury/wisqars/index.html

http://www.cdc.gov/nchs/products/vsus/vsus_1980_2003.htm

A.6.3 StatCan Data

For the comparison of cocaine-related and gun deaths between the United States and Canada, we relied on a custom report provided for us by Statistics Canada. For more information StatCan the website is:

http://www.statcan.gc.ca/

A.7 Regional Population, Economic Data and Other Controls

A.7.1 BEA Local Area Personal Income and Employment Data

In some regressions we use income and employment data as controls. These are accessed from the BEA at:

http://bea.gov/regional/index.htm

A.7.2 County Population by Population Characteristics

Gun homicide rate, gun suicide rate, and some controls employ county or state population levels by gender, five-year age cohort and ethnicity. These are pulled from the Census website.

Specifically, for 1980-1989 we use Intercensal County Estimates by Age, Sex, Race: 1980-1989, found at:

http://www.census.gov/popest/data/counties/asrh/1980s/PE-02.html

1990-1999 we use the State and County Intercensal Estimates by Demographic Characteristics (1990-1999) found at:

http://www.census.gov/popest/data/intercensal/st-co/characteristics.html

For 2000 we use Intercensal Estimates of the Resident Population by Five-Year Age Groups, Sex, Race, and Hispanic Origin for Counties: April 1, 2000 to July 1, 2010 found at:

http://www.census.gov/popest/data/intercensal/county/CO-EST00INT-alldata.html

A.7.3 Linking County FIPS and MSA

For our work replicating Evans, Garthwaite and Moore we uses a crosswalk between county FIPS and MSAS found at:

http://www.census.gov/population/estimates/metro-city/99mfips.txt

A.8 Corrections Data

To examine the role that incarceration played in reducing violence, we use restricted data from the National Correction Reporting Program (NCRP). Information about this program can be found at: http://www.icpsr.umich.edu/icpsrweb/content/NACJD/guides/ncrp.html

A.9 Federal Court Cases

To examine the role that more aggressive firearms investigations played in reducing gun access, we use data on federal court cases from 1980 to 2000, using the FCC integrated cases data set. Information about this data set can be found at:

http://www.icpsr.umich.edu/icpsrweb/NACJD/series/72

A.10 Price Level Data

To adjust nominal prices to a real basis, we use the Consumer Price Index for All Urban Consumers: All Items, seasonally adjusted, (CPIAUCSL) series, annual average, and the Gross Domestic Product: Implicit Price Deflator (GDPDEF), both accessed via the Federal Reserve Economic Data (FRED2) website:

http://research.stlouisfed.org/fred2/series/CPIAUCSL/

https://research.stlouisfed.org/fred2/series/GDPDEF/

A.11 ATF Resources and Activities

A.11.1 United States Budgets

Our primary resource for data on budgets, headcounts and activities was the archived budgets of the United States of America, for 1975-2002. We used the actual information (for $t-2$, given a budget from year t). Usually these were in the appendix, within the discussion of budgets for the Department of the Treasury.

https://fraser.stlouisfed.org/title/54

We also consulted ATF reports on firearms commerce, particularly the 2011 report:

https://www.atf.gov/file/56646/download

A.12 Gun Access Data, 1983 and 1991

To analyze access to handguns for criminally active young black men we used two studies, one from 1983 and one from 1991. We retrived them from the ICPSR website. The studies, ICPSR 8357 and ICPSR 6484, can be found at:

http://www.icpsr.umich.edu/icpsrweb/NACJD/studies/8357

http://www.icpsr.umich.edu/icpsrweb/NACJD/studies/6484

Mapping from Brands to AFMER Data		
ID/Brand	ID Number	AFMER Entry
AA Arms	1	AA ARMS, INC
American Arms	2	AMERICAN ARMS, INC
American Derringer	3	AMERICAN DERRINGER CORP
AMT	4	AMT (ARCADIA MACHINE & TOOL, INC
AMT	4	ARCADIA MACHINE & TOOL, INC
Auto Ordnance	5	AUTO-ORDNANCE CORP. (NEWMAN'S GUNPARTS)
Beretta	6	BERETTA USA CORP
BryCalJen	7	BRYCO ARMS, INC
BryCalJen	7	CALWESTCO, INC
BryCalJen	7	JENNINGS FIREARMS, INC
Colt	8	COLT
Dakota	9	DAKOTA ARMS INC
Dan Wesson	10	DAN WESSON CORPS
Davis	11	DAVIS INDUSTRIES
Detonics	12	DETONICS MANUFACTURING CORP.
F.I.E.	13	FIREARMS IMPORT & EXPORTS (FIE)
Grendel	14	GRENDEL, INC
Harrington & Richardson	15	HARRINGTON & RICHARDSON (H&R 1871, INC)
Haskell	16	HASKELL MANUFACTURING INC
Heritage	17	HERITAGE MANUFACTURING, INC
High Standard	18	HIGH STANDARD MANUFACTURING CO INC
Hi-Point	19	HI POINT
Hi-Point	19	BEEMILLER INC
Intratec	20	NAVEGAR, INC, DBA INTRATEC
Intratec	20	INTRATEC (NAVEGAR)
Iver Johnson	21	IVER JOHNSON
Kel-Tec	22	KEL TEC, CNC INDUSTRIES
Lorcin	23	LORCIN ENGINEERING CO., INC
Olympic Arms	24	OLYMPIC ARMS, INC
Parker	25	WYOMING ARMS CORPORATION
Phoenix Arms	26	PHOENIX ARMS
QFI	27	QUALITY FIREARMS INC
Ram-Line	28	RAM-LINE, INC (BLOUNT INC., RAM LINE OPERATIONS)
Raven	29	RAVENS ARMS, INC
Ruger	30	STURM, RUGER & COMPANY, INC
Seecamp	31	L W SEECAMP CO INC
Smith & Wesson	32	SMITH & WESSON
Springfield Armory	33	SPRINGFIELD ARMORY, INC
Stallard	34	STALLARD ARMS INC
Sterling	35	PRECISION SMALL PARTS, INC
Sundance	36	SUNDANCE INDUSTRIES, INC
Thompson	37	THOMPSON CENTER ARMS CO INC
Taurus	38	TAURUS INTERNATIONAL MANUFACTURING INC

Table 11
We are in the process of matching Gun Digest brands to ATF AFMER data. The table lists the mappings used in this draft. We believe this covers 75-80% of all US autoloader production during the 1980-2000 period.

MSAs Used For Regressions
(all from Evans et al. (2012)

Name	Total population 1980	Black males ages 15-24 1980
New York, NY PMSA	8,277,064	181,627
Chicago, IL PMSA	7,245,767	142,991
Los Angeles-Long Beach, CA PMSA	7,502,452	95,338
Philadelphia, PA-NJ PMSA	4,784,543	88,390
Washington, DC-MD-VA-WV PMSA	2,642,305	82,310
Detroit, MI PMSA	4,373,147	81,187
Baltimore, MD PMSA	2,202,596	59,159
Houston, TX PMSA	2,785,826	54,608
Atlanta, GA MSA	2,246,335	52,838
New Orleans, LA MSA	1,307,660	43,015
Norfolk-Virginia Beach-Newport News, VA-NC MSA	1,130,039	39,340
St. Louis, MO-IL MSA	2,433,729	39,272
Memphis, TN-AR-MS MSA	937,652	38,999
Newark, NJ PMSA	1,962,750	38,535
Cleveland-Lorain-Elyria, OH PMSA	2,276,422	33,929
Dallas, TX PMSA	2,069,772	33,861
Miami, FL PMSA	1,643,040	27,592
Boston-Worcester-Lawrence-Lowell-Brockton, MA, NECMA	5,348,849	22,971
Birmingham, AL MSA	815,422	22,495
San Diego, CA MSA	1,875,284	20,104
Charlotte-Gastonia-Rock Hill, NC-SC MSA	975,640	20,073
Greensboro–Winston-Salem–High Point, NC MSA	953,363	18,956
Kansas City, MO-KS MSA	1,451,789	18,618
Pittsburgh, PA MSA	2,569,780	17,422
Cincinnati, OH-KY-IN PMSA	1,469,216	17,098
Indianapolis, IN MSA	1,307,337	17,002
Milwaukee-Waukesha, WI PMSA	1,396,799	15,493
Nashville, TN MSA	853,013	15,013
Tampa-St. Petersburg-Clearwater, FL MSA	1,627,499	14,474
Columbus, OH MSA	1,217,995	14,443
Dayton-Springfield, OH MSA	942,293	11,836
Fort Lauderdale, FL PMSA	1,026,241	11,738
Buffalo-Niagara Falls, NY MSA	1,241,652	11,609
Louisville, KY-IN MSA	954,043	11,392
Riverside-San Bernardino, CA PMSA	1,572,726	10,704
Orlando, FL MSA	813,390	10,377
Hartford, CT NECMA	1,543,037	9,673
Bergen-Passaic, NJ PMSA	1,294,606	9,088

MSAs included in summaries but not regressions
(all from Evans et al. (2012)

Name	Total population 1980	Black males ages 15-24 1980
New Haven-Bridgeport-Stamford-Danbury-Water, CT, NECMA*	1,571,184	13,746
San Francisco, CA PMSA	1,490,145	13,251
Oklahoma City, OK MSA	866,369	8,790
San Antonio, TX MSA	1,096,030	8,650
Rochester, NY MSA	1,032,631	8,431
Denver, CO PMSA	1,439,038	8,252
Sacramento, CA PMSA	992,975	6,821
Seattle-Bellevue-Everett, WA PMSA	1,661,289	6,431
Phoenix-Mesa, AZ MSA	1,612,899	6,350
Grand Rapids-Muskegon-Holland, MI MSA	843,381	5,838
Middlesex-Somerset-Hunterdon, NJ PMSA*	888,750	5,658
San Jose, CA PMSA	1,300,884	5,600
Minneapolis-St. Paul, MN-WI MSA	2,207,319	5,309
Monmouth-Ocean, NJ PMSA*	852,344	5,149
Orange County, CA PMSA	1,948,101	3,986
Portland-Vancouver, OR-WA PMSA	1,339,179	3,476
Albany-Schenectady-Troy, NY MSA*	825,673	3,384
Providence-Warwick-Pawtucket, RI NECMA	867,517	3,146
Salt Lake City-Ogden, UT MSA	917,684	1,743

Table 12
A summary list of MSAs used in the study, all from Evans et al. (2012). MSAs in the bottom half, excluded from regressions, were ones with fewer than 10,000 young black males on average, and/or where no successful match to Fryer et al. (2013) cities was possible (marked with *).

List of States

States Used For Regressions
(all from Evans et al. (2012)

Name	Total population 1980	Black males ages 15-24 1980
New York	17,600,000	237,460
California	23,800,000	207,227
Texas	14,300,000	192,394
Illinois	11,400,000	170,817
Georgia	5,484,427	156,597
North Carolina	5,896,178	148,248
Louisiana	4,221,583	131,700
Michigan	9,256,676	115,998
Florida	8,198,119	111,545
Ohio	10,800,000	105,469
South Carolina	3,132,387	104,518
Pennsylvania	11,900,000	103,127
Alabama	3,887,277	102,618
Maryland	4,226,191	99,865
Mississippi	2,524,011	94,238
New Jersey	7,376,972	92,902
Virginia	3,219,763	82,331
Tennessee	4,600,705	77,006
Missouri	4,923,025	53,985
Indiana	5,492,740	42,797
Arkansas	2,288,809	37,694
Kentucky	3,665,364	33,435
Massachussetts	5,748,441	26,852
Oklahoma	3,040,067	25,418
Connecticut	3,114,221	23,419

States included in summaries but not regressions
(all from Evans et al. (2012)

Name	Total population 1980	Black males ages 15-24 1980
Kansas	2,370,088	17,893
Washington	4,155,198	15,917
Colorado	2,909,545	13,593
Delaware	594,936	10,016
Arizona	2,735,840	9,935
West Virginia	1,952,874	6,930
Nevada	810,232	5,999
Minnesota	4,086,746	5,908
Nebraska	1,572,854	5,609
Iowa	2,915,562	5,088
Oregon	2,642,128	4,336
Rhode Island	949,207	3,568
New Mexico	1,309,108	3,302
Utah	1,473,171	1,965

Table 13
A summary list of states used in the study, all from Evans et al. (2012). MSAs in the bottom half, excluded from regressions, were ones with fewer than 20,000 young black males on average.