

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

Wm. Alan Bartley & Geoffrey Fain Williams

Transylvania University

This Draft: December 31, 2015

PRELIMINARY AND INCOMPLETE

Abstract

Gun homicides in urban areas, particularly among young black males, increased radically in the late 1980s and early 1990s and then began to fall. The standard 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. We examine the gun homicide rate increase/decrease among urban young black males of this period using the NBER vital statistics datasets, indices of crack use, data on arrests and incarceration and a novel data set looking at gun prices and quantities sold during this period. We find four facts that complicate the standard model: First, the prices of cheaper “entry-level” guns fall during the late 1980s and 1990s, even as quantities sold increase, fitting the MICRO 101 signature of a positive **supply** shock in the market for guns; second, gun violence falls rapidly after 1993, while all measures of crack use show stable or increasing patterns; third, local measures of crack use generally have a 25-50% lower correlation with local gun homicides than a global measure of crack use, suggesting a spurious relationship; fourth, gun homicides stay very closely correlated with gun suicides, a standard proxy for gun ownership,

*Practice Thanks: We would like to thank Anne Morrison Piehl, Phil Cook, and Jurgen Brauer for helpful comments and assistance, Joshua Buckman, Ethan Campbell, Chase Coleman, Jordan Haven, Katina Marchione, Alexander Melnykovich, 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.

suggesting that conditional on gun ownership, violence levels remained fairly constant. We argue that improvements in manufacturing technology and changes in the regulatory posture of the BATF played a substantial role in increasing availability of guns, in particular low cost 25 ACP, 380 ACP and 9mm autoloaders in the late 1980s and early 1990s. We believe it was this increase in gun availability that drove the rapid increase in gun violence.

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 (see Fryer et al. (2013), Evans et al. (2012) for recent summaries of the crack epidemic, violence during the same period, and discussion of impact).

A standard explanation for the increase in gun violence runs roughly as follows (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 (we 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, no more than 30% of all young urban black men had access to guns or were actively engaged in violence and many of these may have been acting purely defensively).

Within this 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.

We find four facts that complicate the standard model: First, there is strong evidence of a MICRO 101 positive supply shock, in particular the prices of cheaper “entry-level” guns fall during the late 1980s and 1990s, even as quantities sold increase. In particular, production of

25 ACP, 380 ACP and 9mm caliber autoloaders expands rapidly and particularly at the low end of the market. Then there are three weaknesses with the standard demand argument: (a) gun violence falls rapidly after 1993, while all measures of crack use show stable or increasing patterns; (b) local measures of crack use have 25-50% lower correlation with local gun homicides than a global measure of crack use, suggesting that trends may be driving results; (c) gun homicides stay very closely correlated with gun suicides, a standard proxy for gun ownership, suggesting that conditional on gun ownership, violence levels remained fairly constant.

We argue instead that the increase in gun violence was driven by a supply shock whereby cheap guns became more available to young black men, due to some combination of improvement in manufacturing and reduced oversight of marginal gun dealers under the Carter and Reagan administrations and in the wake of the Firearm Owners Protection Act of 1986.

The core of our argument can be seen in Figure 1, looking at 59 MSAs with substantial populations of young black males. While the rate of gun homicides among young black males and the total count of cocaine overdoses for all populations¹ both escalate rapidly from 1985 to 1993, the relationship falls apart from then on (similar graphs can be generated using a range of measures of crack usage). However, the relationship between gun homicides and gun suicides remains strong throughout the period.

We begin with a brief overview of our data sources, then look at the evidence of a supply-side shock, in substantial part based on new data sources we have not seen utilized in other studies of the issue. We then review the three issues we believe complicate the “crack” market argument. We show some preliminary regressions attempting to trace out the different effects of gun availability and crack market activity. We close by discussing major outstanding issues and further areas for investigation.

2 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

¹Cocaine overdoses are a reasonable proxy for crack use, as powder cocaine rarely triggers overdoses Evans et al. (2012)

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.

For gun production we make use of the ATF AFMER data from 1984 to 2000, using the Violence Policy Center summaries for before 1984.

For gun prices we use Gun Digests from 1980 to 2000.

3 Evidence in Favor of a Supply Shock

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.

We are developing a (we believe) novel data set, using the listing of guns and prices in the annual Gun Digests from 1980 to 2000, combined with ATF data on gun manufacture (AFMER) and available international trade data to develop price and quantity measures at a relatively, if imperfectly, disaggregated level during this period. We do so because we believe the supply shock of gun availability is a key component of this crack epidemic story heretofore not studied adequately.

It is helpful to begin by reviewing the overall shift in gun production from 1975 to 1998. Figure 4 shows the radical shift in American production from revolvers to autoloaders. Figure 5 shows the overall reduction in revolver production across calibers. Figure 6 shows the development in autoloaders, with increases in all categories to 1993-94. The three categories of 9mm, 25 ACP and 380 ACP increase particularly. After 1993-94 the production of 25 ACP and 380 ACP autoloader handguns is very substantially reduced (especially by percentage change) compared to the previous period.

We believe this shift is driven by changes in autoloader supply. The key to this is prices. While data acquisition and processing is still underway, at this stage we have completed data entry on handgun prices and on ATF (AFMER) production. We have linked data on prices and quantities for roughly 80% of American autoloader production. Figure 2 depicts an agglomeration of annual

price/quantity pairs for “an” autoloader during the 1984-2000 time period. This agglomeration is constructed through an average of median manufacturer handgun prices for five primary caliber types (by brand) weighted by quantity of annual specific caliber production. This graph also shows the increase in handgun production over time through 1993 and the subsequent decline afterwards through 2000. What it also shows is what appears to be a relatively steady real price of an “average” autoloader through a decade of production and then an obvious increase in real price during the 1993-2000 period. This latter period of significantly decreasing production and increasing average price is a textbook example of a negative supply-side shock.

In addition, we also believe the seemingly constant real price of “an” autoloader during the 1984-1993 time period is actually a positive supply-side shock in autoloader availability due to a significant change in the production of specific guns during this period. Three particular calibers of handguns are at the crux of our supply argument: the 25 ACP, the 380 ACP and 9mm. Figure 3 plots a similar “average” annual price/quantity pairing over the 1984-2000 time period as did Figure 2, but with these three specific caliber handguns separated. What we find within all three of these types of handguns 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. Table 1 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.

Figure 2 depicts the negative-supply shock well for autoloaders in general, but not necessarily the positive supply-side shock described above for three important handgun calibers. In the 1980s production of autoloaders was expanding at both the high and low end of the market. At the high end (around \$500 and above in 1990 dollars) is the impact of the Glock 17 pistol and the efforts

of other gun makers to duplicate its success (Barrett, 2012). At the low end is the development of the “Ring of Fire” manufacturers and other low-priced guns (Wintemute, 1994). Production quantities at both the high and low end were going up radically in the 1985-1993 period. It is important to note that it was cheap guns that were generally implicated in gun violence in the 1980s and 1990s and are generally associated with young black men in urban areas during this period (Wintemute (1994); Kennedy et al. (1996), Barrett (2012: pages 77-78, 113)). Thus, price and quantity changes at the low end of the market are the key to understanding the change in gun ownership (reflected in the increase in gun suicides) among young black men.

We argue that in the three calibers of 25 ACP, 380 ACP and 9mm, the low end of the market was not just strong, but expanding rapidly. We review each in turn with Figures 7-12.

Figure 7 shows the development of real prices of different 25 ACP handguns during the 1980-2000 time period for the manufacturers described above. As can be seen, 25 ACP handguns were not even produced by the Ring of Fire manufacturers until the late 1980s (thus a specific supply shock) and decreased in real price through the mid-1990s (if not beyond). Smith & Wesson and Ruger chose not to even compete for such specific handgun consumers.

Figure 8 depicts a different, but related price measurement tool, specifically an estimated distribution of US 25 ACP autoloader production over time by real MSRP. This figure includes all our data domestic 25 ACP production (i.e., roughly 75% of US production) and not just that of the specific manufacturers described above. To compute these values, we take total listed prices for each US manufacturer for each caliber in the Gun Digest and generate a five-number summary (min, Q1, median, Q3, max). The AFMER quantity of production for that manufacturer for that caliber for that year is divided into four equal blocks, each of which is assigned a summary price, which is one of four points between the five numbers of the five number summary (i.e., summary price 1 is the midpoint between the minimum and the first quartile of listed prices, summary price 2 is the midpoint between Q1 and the median, etc.). What is apparent is a great deal of production at low price points. This fact, combined with the substantial increase in the early 1990s production of 25 ACP handguns (seen in Figure 6), exhibits how a substantial supply effect could be occurring within the distribution of total handgun production during the crack epidemic.

Similarly, we examine the real price development of specific 380 ACP handgun manufacturers

within Figure 9. Here, we see a significant decrease in overall real 380 ACP pricing by the Ring of Fire manufacturers, at least through 1993. In addition, Smith & Wesson chose to enter this handgun market after the early substantial production success of other manufacturers (see Figure 6 for increased production in early 1990s of this caliber of handgun), but at a higher price point. So again, Ring of Fire manufacturers are a supply shock to the overall handgun market during this period through this particular type of handgun. This can be corroborated with information on pricing distribution of all 380 ACP production seen within Figure 10. There is an obvious shift in production (and a lot of it) to lower-priced 380 ACP handguns within the early 1990s and then a shift back to some higher-priced handguns over time.

Finally, we complete the same analysis for the 9mm handgun market over the 1980-2000 time period. Figure 11 shows that both Smith & Wesson and Ruger were more involved within this handgun market, but with generally increasing real prices through the 1980s. However, when the Ring of Fire manufacturers entered this market segment during the early 1990s, they produced some much lower-priced 9mm options and both Smith & Wesson and Ruger began to decrease their price offerings as well. Figure 12 gives a distribution of real prices for total 9mm autoloader production over time. Starting in the late 1980s and continuing through the mid-1990s, there is noticeably more production at significantly lower prices (a third of the 1984 prices) of these types of handguns. Later in the sample, the real price points begin to return to their previous higher levels.

Combined, these early results suggest a drop in real prices of “entry-level” (low-priced) autoloaders (especially for ones tied within previous research to criminal activity) through the 1980s with an extreme increase in production is a MICRO 101 supply-shock scenario, followed by a negative supply-shock scenario beginning around 1993.

We posit two primary reasons for these back-and-forth supply shocks within the handgun market (particularly with certain types of firearms): first, manufacturing improvements, and second, a change in regulatory posture by the ATF, in part driven by the Firearms Owner’s Protection Act of 1986.

In Wintemute (1994) there is a thorough discussion of the expansion of gun production, especially by “Ring of Fire” producers in the 1980s. This is in part due to the development of cheap machining techniques and cheaper product design. This would explain (at least part of)

the positive supply shock effect through 1993, but not the ensuing negative supply shock.

However, Vizzard (1997) claims that under the Reagan administration generally, but particularly after the Firearms Owner's Protection Act 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 FOIPA impact was less important changes in ATF resources and activities in the 1978-1983 period.

Table 2 presents summary statistics on the number of Federal Firearms Licensees (FFL) inspections by the ATF and the rate as a percent of the total number of licensees. There is a very substantial fall of such inspections in 1982 and a significant increase (almost doubling) of inspections in 1992 and 1993. Using the numbers in the US Budget Appendices we can see in Table 3 that the enforcement budget for the ATF fell substantially during the late 1970s and early 1980s, and then recovered during the early 1990s. Summary graphs can be seen in Figures 13 and 14.

The previous research on enhanced handgun manufacturing techniques and the shifts in ATF aggressiveness towards firearms manufacturing support our supply-side shock theory for the divergence of gun homicides from the crack market during the early 1990s. It appears that specific circumstances could have driven a supply shock of low-priced handguns to coincide with the period of crack's rise within the US consumer market of the 1980s and early 1990s. Even as this drug market continued to rise and then level off during the 1990s, gun homicides/suicides decreased substantially. This change in gun deaths (and not crack markets) coincided with a specific policy regime change within the ATF during the early 1990s which negatively affected gun availability (and so deaths), but not the crack market. This derivative of the negative supply shock of handguns can better explain the divergence of the guns/crack epidemic of the 1990s.

4 Demand Shock: Issues and Evidence

There are three weaknesses with the standard demand argument: (a) gun violence falls rapidly after 1993, while all measures of crack use show stable or increasing patterns; (b) local measures of crack use have 25-50% lower correlation with local gun homicides than a global measure of

crack use, suggesting that trends may be driving results; (c) gun homicides stay very closely correlated with gun suicides, a standard proxy for gun ownership, suggesting that conditional on gun ownership, violence levels remained fairly constant.

4.1 Disconnection After 1993

From 1993 onwards there is a substantial reduction in violence generally and gun violence in particular.

The pattern can be seen in Figure 1. While cocaine overdoses (very tightly linked to crack use as opposed to general cocaine use) 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 this 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 15 from the Office of National Drug Control Policy (Price & Purity 2004) shows that crack prices had generally fallen 30 to 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 resolution” hypothesis comes from work by criminologists at the University of Missouri - St. Louis. Between 1990 and 2010 a group of about five or six, 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.

4.2 Crack and Homicide: Local vs Global Measures

Another issue with the crack market demand shock argument for gun violence among young black men is based on the relative correlation of crack measures, gun violence and general time trends. Briefly put, while on the one hand, the most precise measures of crack usage in a particular location are strongly correlated with gun homicide among young black men (roughly 20% among MSAs), they are substantially *less* correlated than the *mean values* of these measures.

Tables 4 and 5 provide the correlations between the four variables in levels and then in first differences. As can be seen, while gun homicides among young black men in an MSA are strongly correlated with the crack index in both levels and differences, the correlations are much higher for the *average* levels of the crack indices.

To put it more generally, the most precise knowledge we have of crack market activity in a particular city and year is substantially less informative as to the rate of violence among young black men (in some cases is only 1/4th as good in explaining variance) than just knowing what year it is.

4.3 Gun Homicides and Gun Suicides

Tables 4 and 5 and Figure 1 show 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).

There is no clear change in the relationship between gun suicides and gun homicides (granting that gun suicides is very noisy), especially in the lead up of violence around 1985. If crack markets drove higher levels of violence, which then led to an increase in demand for firearms, we would naturally expect an increase in gun homicides first, and then, with some lag, an increase in gun suicides as gun ownership moved up in an “arms race.” The absence of this pattern suggests that there was little or no cultural change in the inclination to violence among young black men during this period, conditional on owning a gun.

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 (based on an assumption of one suicide per 1,500 owners, discussion follows).

However, because of the relatively small population of young black men in the United States in urban areas (1.5-1.6 million during the 1980s and 1990s) and in particular at the MSA level, gun suicide as an index of gun ownership has a significant sampling error built in.

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. [For the rate for black males ages 18-24, some adjustment (not yet made) needs to be made for the differential gun ownership and gun suicide rates for males and females.]

Since a number of major MSAs have 10,000 or fewer young black males, and gun ownership rates among young black males probably don't go above 50% even at the peak and are perhaps 10-20% early on, for many MSAs the expected number of gun suicides per MSA for the early 80s is less than one.

Moreover, combining the gun ownership rate of 10% with a per owner suicide rate of 0.000669 leads to a predicted gun suicide rate for much of this time period of 0.0001 or less, with a standard deviation of 0.01 - one hundred times larger. We thus need a population of young black men

greater than 10,000 to get the sampling error of the gun suicide rate to be less than the gun suicide rate itself.

5 Regression Analysis

As a very preliminary effort to see how gun suicide rate (our best measure of gun availability) and our best measures of crack market activity compare in explaining gun homicide rates, we run fixed effect regressions of the change in gun homicide rates among young black men on changes in these variables. Output from these regressions can be seen at Tables 6 and 7.

As can be seen, it is difficult to tie either gun availability (as proxied by gun suicides) or crack market development (as proxied by the crack index). Given the inherent noise of the measures, it's not clear how this can be improved. We continue to develop this work, adding additional controls and exploring a range of econometric techniques.

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 for 25 ACP, 380 ACP and 9mm autoloaders (as well as other calibers). Additionally, this increase in supply seems to have increased gun availability among young black men (as measured by gun suicides).

At the same time, the link between guns and gun violence on one hand, and crack markets and dealing on the other, are not strong. 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. What's more, the overlap from 1985 to 1993 in the national rates appears to be due to a simple trend in both homicides and crack use. The link between crack markets and gun homicides among young black men is weak within the period 1985 to 1993, and disappears after that point.

This is somewhat surprising: a substantial amount of the gun violence in urban areas during this period occurred in and around crack markets. Both a priori and based on observation we would expect crack markets to lead to additional gun violence.

All of these observations are true. However, there are two separate questions: first, how much overlap was there in the individuals committing (and falling victim to) gun violence and individuals engaged in crack dealing? Second, how much of the increase in gun fatalities was due to an increase in crack dealing vs an increase in gun possession?

As to the first, there is no doubt whatsoever that a very high percentage of crack dealers were also gun owners and engaged in gun violence - the overlap is very high. However, to use an obviously fallacious argument, there was also a very high overlap (among urban young black males) between gun ownership and certain clothing and music tastes. But rap music and baggy pants did not, in fact, kill anybody.

The key to the second question is the relative magnitudes of two effects: (a) the effect of a per person increase in conflict rates due to crack, versus (b) an increase in the fatality rate per incident of conflict. Zimring (1968) finds that the presence of a gun at an incident of armed robbery increases the odds of a homicide by a factor of five. An increase in gun ownership among individuals likely to be active in illegal markets seems likely to increase the risk of fatality per incident of conflict by a similar rate, and (as noted above) it seems that gun ownership/access among young black men increased by 10 percentage points or more in this period, perhaps doubling. Given the change in gun access and ownership strongly indicated by the gun suicide data, and assuming a general background rate of conflict, the gun homicide rate is almost exactly what we would expect.

For the growth and development of crack markets to be as significant or more significant than gun ownership, we would need to see either (a) evidence that crack market activity in an area directly caused an increase in gun ownership, (b) evidence that crack markets in a neighborhood increased the rate of conflict (armed or unarmed) among young black men by a factor of two or more. Neither claim seems supported by the data.

A Data Appendix

We have used or plan to use data from multiple sources for this research. All the data described below is in our possession in some form; with the exception of the Gun Digest data for non-autoloaders, pre-1990 AFMER data and some Blue Book of Gun Values information, all of it is in directly usable spreadsheet and/or dataset form.

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, 2015.

A.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/is being entered

A.1.1 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 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. 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. Personnel will manually enter similar data for revolvers within the upcoming months.

The autoloader 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.3 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 8.

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.4 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.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 NBER Vital Statistics Multiple Causes of Death Data

For 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.7 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.8 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.9 Linking County FIPS and MSA

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

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

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, accessed via the Federal Reserve Economic Data (FRED2) website:

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

A.11 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.12 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>

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CALIBER OR GAUGE OF FIREARMS RECOVERED FROM SUSPECTS 21 AND UNDER				
Caliber	All Firearms (<i>N=1,550</i>)		Firearms Less than 2 Years Old (<i>N=215</i>)	
	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 1

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).

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.

Data on ATF from US Budgets								
Year	Direct Programs for Firearms (in 000's of 2009 Dollars) Actual Expenditure (from Budget 2 Years Later)		Invest- igations	Law Enforcement Activity, Firearms			Gun traces	Permanent Positions (FTE, all ATF)
	Regulatory	Law Enforcement		Arrests	Cases	Suspects Rec'd For Prosecution		
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

Table 3

Data from US Budgets (1980 to 1996) 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. Deflated by GDP Deflator series. Note the 50% fall in ATF firearms budget from 1978 to 1983 and 25% fall in total headcount, with recovery by the very early 1990s.

39 STATES								
	Gun Homicide Rate YBM	Gun Suicide Rate YBM	Crack Index Adj	Crack Index Unadj	Average across all Observations			
					Gun Homicide Rate YBM	Gun Suicide Rate YBM	Crack Index Adj	Crack Index Unadj
Correlation in Levels								
Gun Homicide Rate, YBM	1.0000							
Gun Suicide Rate, YBM	0.2500	1.0000						
Adj Crack Index	0.1966	0.1275	1.0000					
Unadj Crack Index	0.2429	0.1215	0.8589	1.0000				
Avg GHR, YBM	0.5841	0.3111	0.4393	0.4633	1.0000			
Avg GSR, YBM	0.5264	0.3452	0.4952	0.5083	0.9011	1.0000		
Avg Adj Crack Index	0.3974	0.2647	0.6458	0.6614	0.6803	0.7669	1.0000	
Avg Unadj Crack Index	0.4073	0.2640	0.6428	0.6645	0.6973	0.7649	0.9954	1.0000
Correlation in First Differences								
Gun Homicide Rate, YBM	1.0000							
Gun Suicide Rate, YBM	-0.0232	1.0000						
Adj Crack Index	0.0167	0.0383	1.0000					
Unadj Crack Index	-0.0043	0.0495	0.9090	1.0000				
Avg GHR, YBM	0.3647	0.0773	0.0196	0.0187	1.0000			
Avg GSR, YBM	0.1574	0.1790	0.2360	0.2531	0.4316	1.0000		
Avg Adj Crack Index	0.0135	0.0798	0.5289	0.5411	0.0371	0.4461	1.0000	
Avg Unadj Crack Index	0.0125	0.0830	0.5242	0.5460	0.0343	0.4635	0.9910	1.0000

Table 4

For the 40 states used by Evans et al. (2012), correlations in levels and differences of gun homicide rates among young black men, gun suicide rates among young black men, crack index (from Fryer et al. (2013)) and annual means across the observations for these four measures. The fact that annual averages are more highly correlated than individual observations suggests that overall trends are extremely strong, and the risk of spurious correlation is high.

49 MSAs								
	Gun Homicide Rate YBM	Gun Suicide Rate YBM	Crack Index Adj	Crack Index Unadj	Average across all Observations			
					Gun Homicide Rate YBM	Gun Suicide Rate YBM	Crack Index Adj	Crack Index Unadj
Correlation in Levels								
Gun Homicide Rate, YBM	1.0000							
Gun Suicide Rate, YBM	0.2888	1.0000						
Adj Crack Index	0.1995	0.1452	1.0000					
Unadj Crack Index	0.3039	0.0919	0.8615	1.0000				
Avg GHR, YBM	0.5204	0.2891	0.4410	0.4864	1.0000			
Avg GSR, YBM	0.4698	0.3192	0.4642	0.5080	0.9051	1.0000		
Avg Adj Crack Index	0.4169	0.2712	0.5530	0.6093	0.8061	0.8472	1.0000	
Avg Unadj Crack Index	0.4105	0.2662	0.5520	0.6107	0.7939	0.8310	0.9978	1.0000
Correlation in First Differences								
Gun Homicide Rate, YBM	1.0000							
Gun Suicide Rate, YBM	0.0700	1.0000						
Adj Crack Index	0.0707	0.0055	1.0000					
Unadj Crack Index	0.0486	-0.0281	0.7962	1.0000				
Avg GHR, YBM	0.3326	0.0923	0.1411	0.1387	1.0000			
Avg GSR, YBM	0.1676	0.1779	0.0173	-0.0171	0.5057	1.0000		
Avg Adj Crack Index	0.1078	0.0041	0.3599	0.4235	0.3410	0.0306	1.0000	
Avg Unadj Crack Index	0.0979	-0.0074	0.3529	0.4293	0.3125	-0.0369	0.9851	1.0000

Table 5

For the 49 MSAs used by Evans et al. (2012) where data from Fryer et al. (2013) can be combined, correlations in levels and differences of gun homicide rates among young black men, gun suicide rates among young black men, crack index (from Fryer et al. (2013)) and two time trends. The fact that annual averages are more highly correlated than individual observations suggests that overall trends are extremely strong, and the risk of spurious correlation is high.

Fixed Effects Panel Regression, States

Dependent Variable: Year-over-year Changes Gun Homicides per 100,000, Young Black Men

	39 States		With more than 10,000 BYM		With more than 30,000 BYM	
Y-o-Y Change Gun Suicide	-0.132	-0.132	0.105	0.099	-0.042	-0.042
Rate per 100,000 YBM	(-1.031)	(-1.031)	(0.618)	(0.589)	(-0.244)	(-0.244)
Y-o-Y Change unadj	-0.54		0.79		1.70	
crack index	(-0.208)		(0.293)		(0.607)	
Y-o-Y Change adj		0.91		2.10		2.50
crack index		(0.376)		(0.750)		(0.758)
Y-o-Y Change \$'000s	0.30	0.30	6.70*	6.90*	9.50**	9.50**
Real Per Capita Income	(0.068)	(0.068)	(2.393)	(2.464)	(2.969)	(2.969)
Time Fixed Effects	INCLUDED					
Economic and Population Controls	INCLUDED					
N	780	780	602	602	438	438
N of groups	39	39	32	32	23	23
R^2 Within	0.139	0.139	0.197	0.198	0.311	0.311
R^2 Between	0.030	0.068	0.620	0.595	0.297	0.300
R^2 Overall	0.138	0.139	0.197	0.197	0.303	0.303
Log Likelihood	5218.2	5218.3	4159.3	4159.6	3143.1	3143.3

* signifies significant at 5%, ** at 1%

t-statistics, using robust standard errors, in parentheses

Table 6

Fixed effects panel regression results for 39 states, those included in Evans et al. (2012), but excluding DC.

Fixed Effects Panel Regression, MSAs

Dependent Variable: Year-over-year Changes Gun Homicides per 100,000, Young Black Men

	49 MSAs		With more than 10,000 BYM		With more than 30,000 BYM	
Y-o-Y Change Gun Suicide Rate, YBM	0.133 (0.760)	0.132 (0.750)	0.210 (1.500)	0.212 (1.504)	0.217 (0.858)	0.212 (0.828)
Y-o-Y Change Unadj crack index	0.80 (0.250)		-0.70 (-0.194)		0.50 (0.086)	
Y-o-Y Change adj crack index		1.40 (0.778)		0.10 (0.040)		-0.60 (-0.171)
Y-o-Y Change \$'000s Real Per Capita Income	4.2 (2.100)	4.3 (2.150)	-0.1 (-0.027)	0.0 (0.000)	1.8 (0.692)	1.6 (0.615)
Time Fixed Effects	INCLUDED					
Economic and Population Controls	INCLUDED					
N	970	970	732	732	324	324
N of groups	49	49	40	40	17	17
R^2 Within	0.120	0.121	0.138	0.137	0.268	0.268
R^2 Between	0.007	0.006	0.283	0.287	0.000	0.000
R^2 Overall	0.115	0.116	0.136	0.136	0.261	0.261
Log Likelihood	6241.9	6242.2	4792.2	4792.2	2180.1	2180.1

* signifies significant at 5%, ** at 1%

t-statistics, using robust standard errors, in parentheses

Table 7

Fixed effects panel regression results for 49 MSAs, those included in Evans et al. (2012) where matches with Fryer et al. (2013) cities are possible.

Mapping from Brands to AFMER Data			
Gun Digest Brand	ID	ID Number	AFMER Entry
AMT	AMT	1	ARCADIA MA
Beretta	Beretta	2	BERETTA U
Bryco	BryCalJen	3	BRYCO ARMS
	BryCalJen	3	CALWESTCO,
Colt	Colt	4	COLT
Davis	Davis	5	DAVIS INDUSTRIES
F.I.E	FIE	6	FIREARMS IMPORT
F.I.E./Interdynamic	FIE	6	
Grendel	Grendel	7	GRENDEL, I
Jennings	BryCalJen	3	JENNINGS F
Kel-Tec	Kel-Tec	8	KEL TEC CN
Kimber	Kimber	9	KIMBER MFG
Lorcin	Lorcin	10	LORCIN ENG
Interdynamic	Navegar	11	NAVEGAR IN
Intratec	Navegar	11	
Phoenix Arms	Phoenix	12	PHOENIX AR
Raven	Raven	13	RAVEN ARMS
SIG	SIG	14	SIG ARMS
Smith & Wesson	Smith and Wesson	15	SMITH & WESSON
Springfield	Springfield	16	SPRINGFIELD
Springfield Armory	Springfield	16	
Springfield Inc.	Springfield	16	
Stallard	Stallard	17	STALLARD A
Ruger	Sturm Ruger	18	STURM, RUG
Sundance	Sundance	19	SUNDANCE INDUSTRIES

Table 8

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.

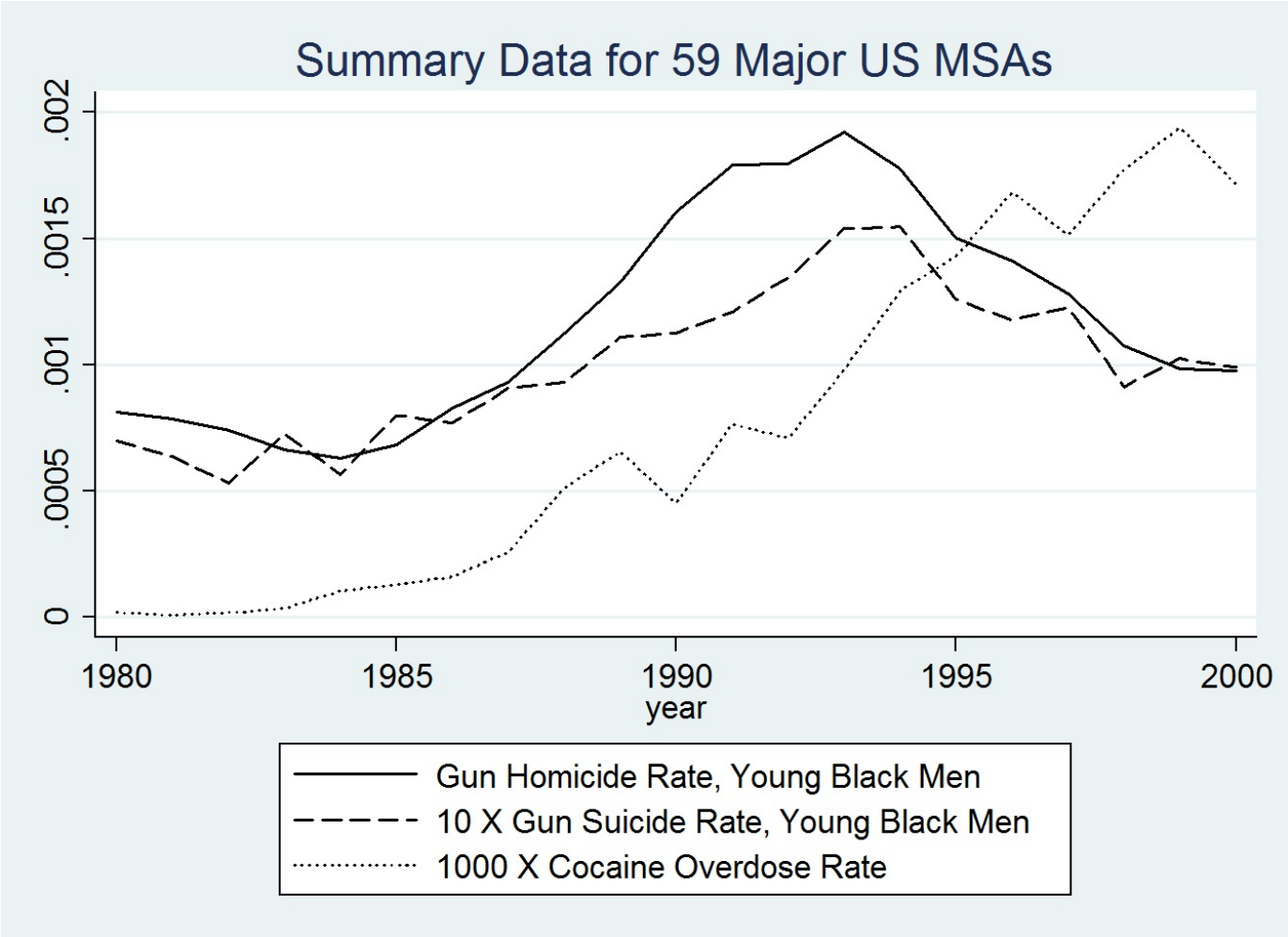


Figure 1.

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 the crack indices used by Fryer et al. (2013).

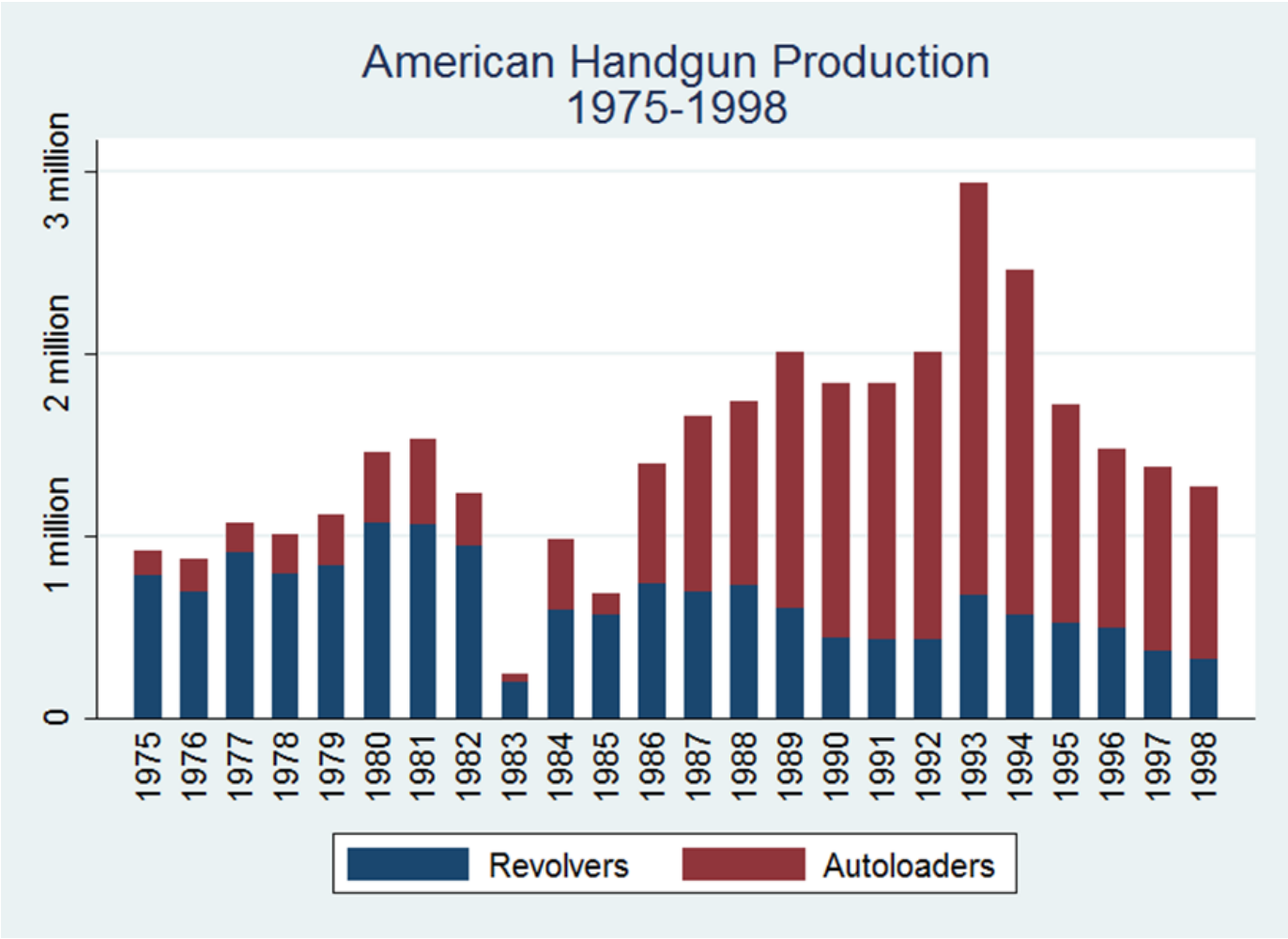


Figure 2.

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

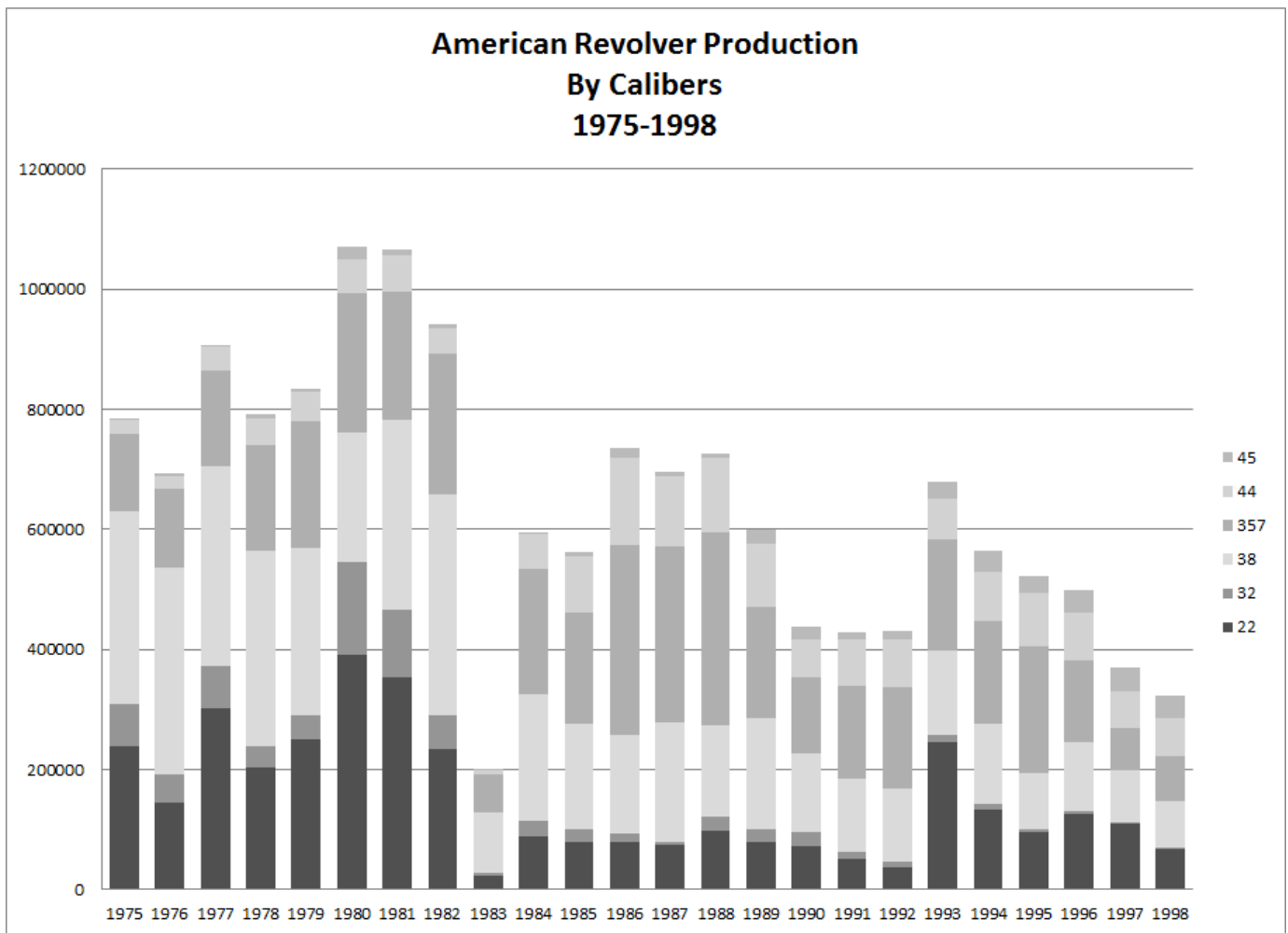


Figure 3.

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

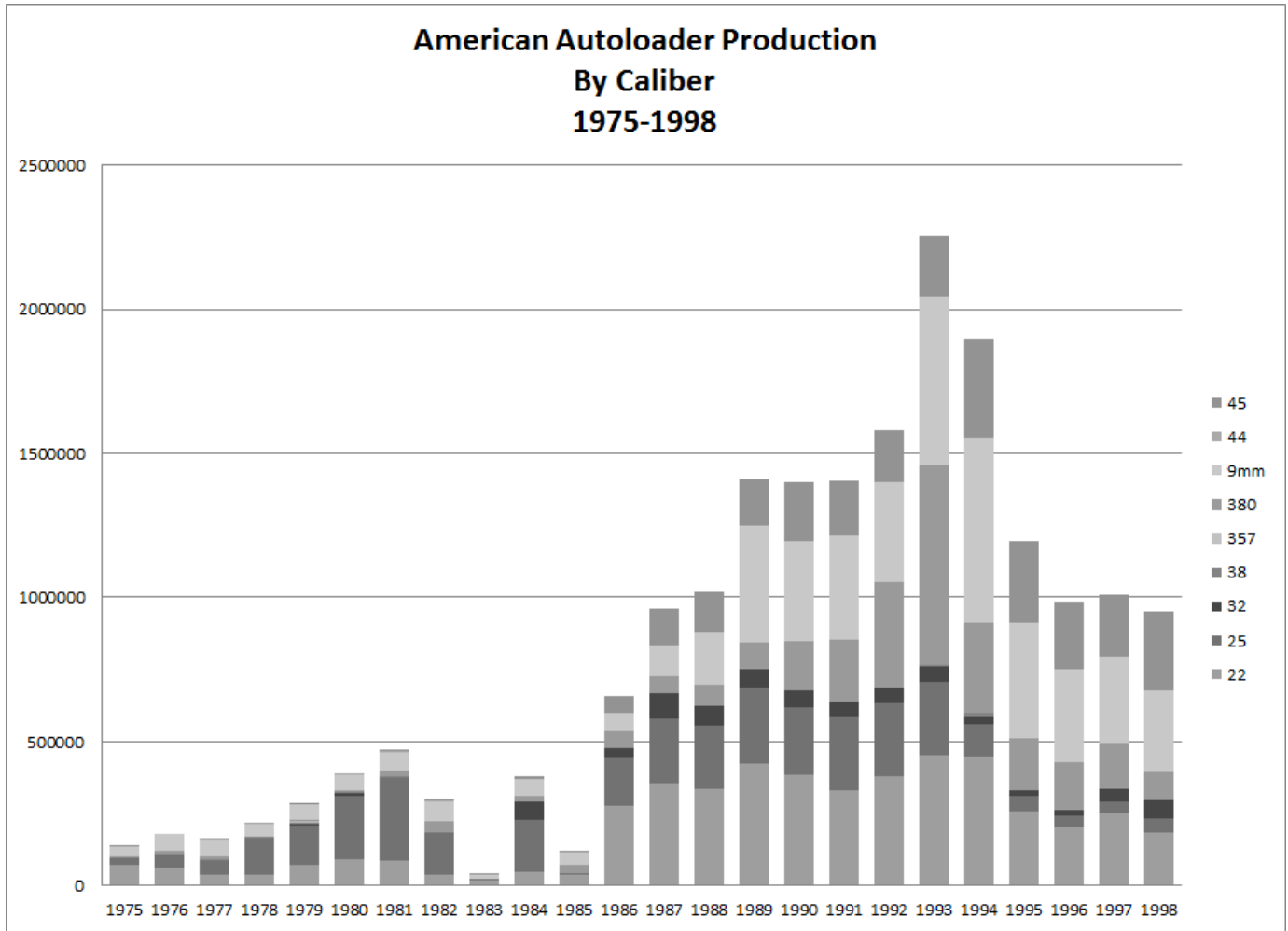


Figure 4.

US-based production of autoloaders from 1975 to 1998, by caliber. Note that after 1993, 9mm, 45 ACP and 22 LR go from about 60-65% of production to 80-85%. The reduction in 25 ACP, 32 ACP, and 380 ACP may in part be due to increased ATF activity.

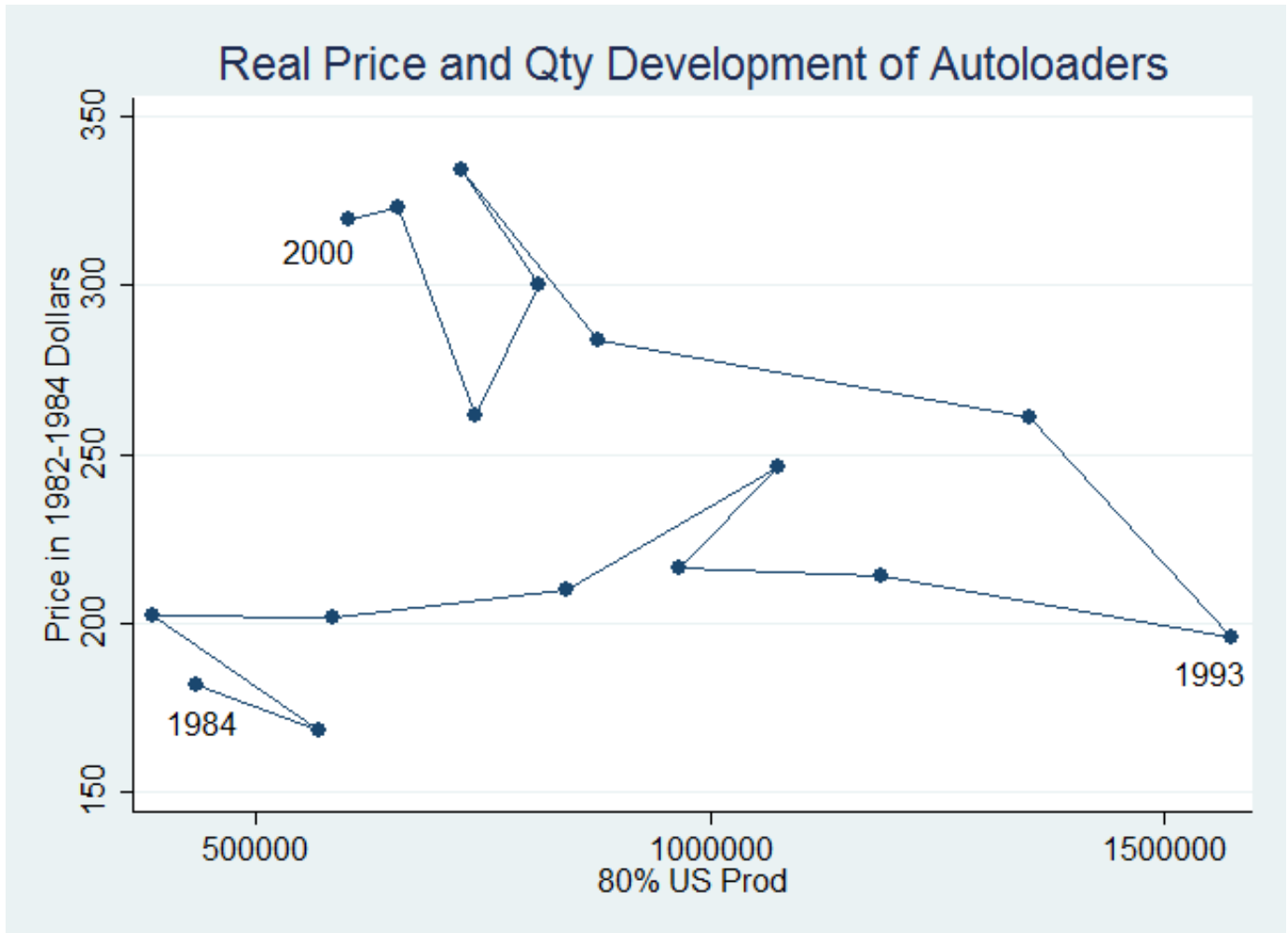


Figure 5.

Movements of real prices (1982-1984 dollars) and quantities in the United States, for 22 LR, 25 ACP, 32 ACP, 380 ACP and 9mm, combined. While quantity from 1984 to 1993 expands, price movement is “sideways”, with neither increase nor decrease; we argue this hides substantial price fall within calibers, thus suggesting an overall positive supply shock. Price movement after 1993 is upwards, even as quantity declines, highly consistent with negative supply shock, we believe due to active ATF intervention in gun markets. 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.

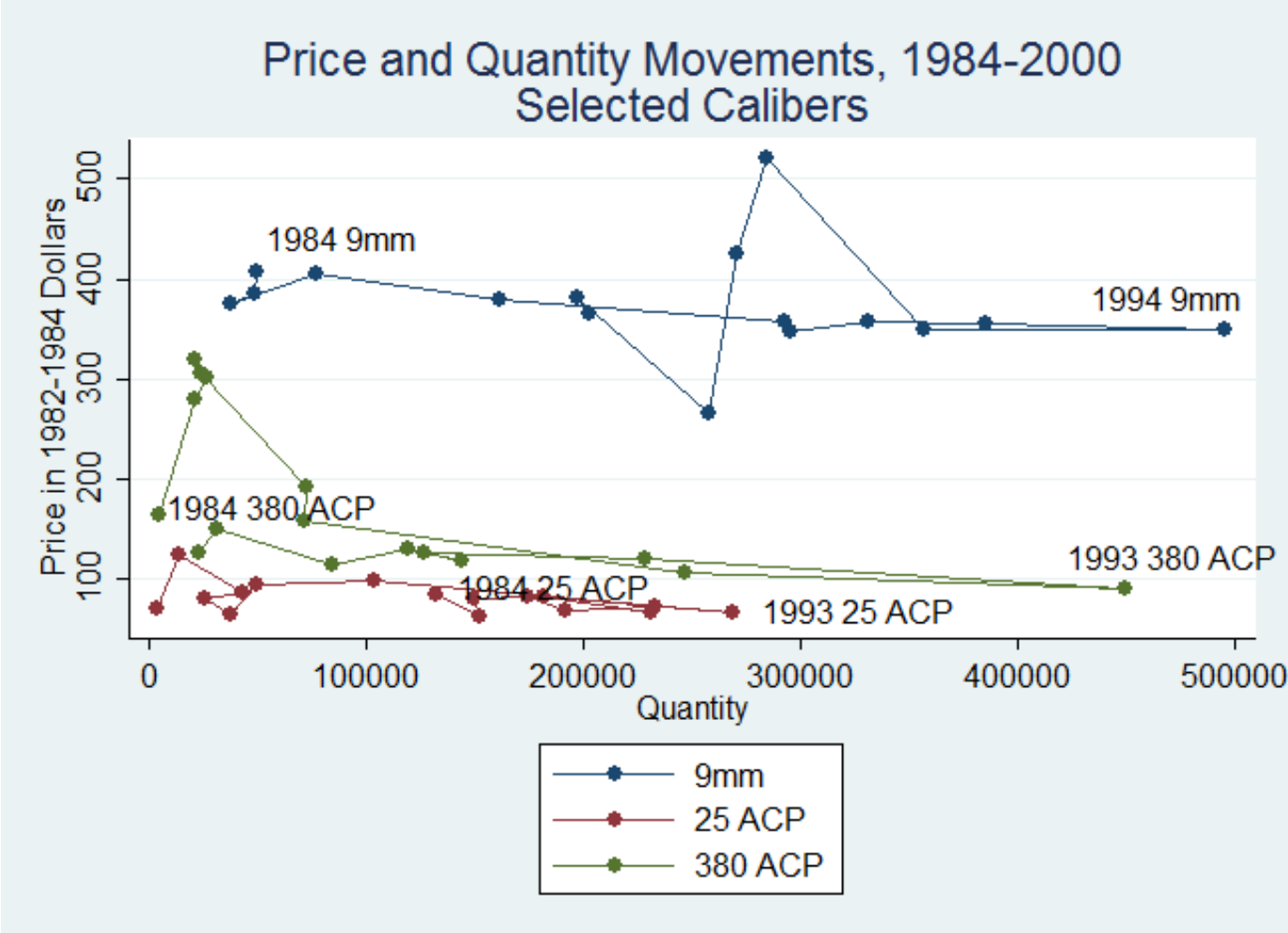


Figure 6.

Movements of real prices (1982-1984 dollars) and quantities in the United States, for 9mm, 380 ACP and 25 ACP. Note the surge in quantity and fall in price from 1984 to 1993/1994, a classic supply shock movement. 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.

Real Price Development 25 ACP, Selected Manufacturers (no quantity weighting)

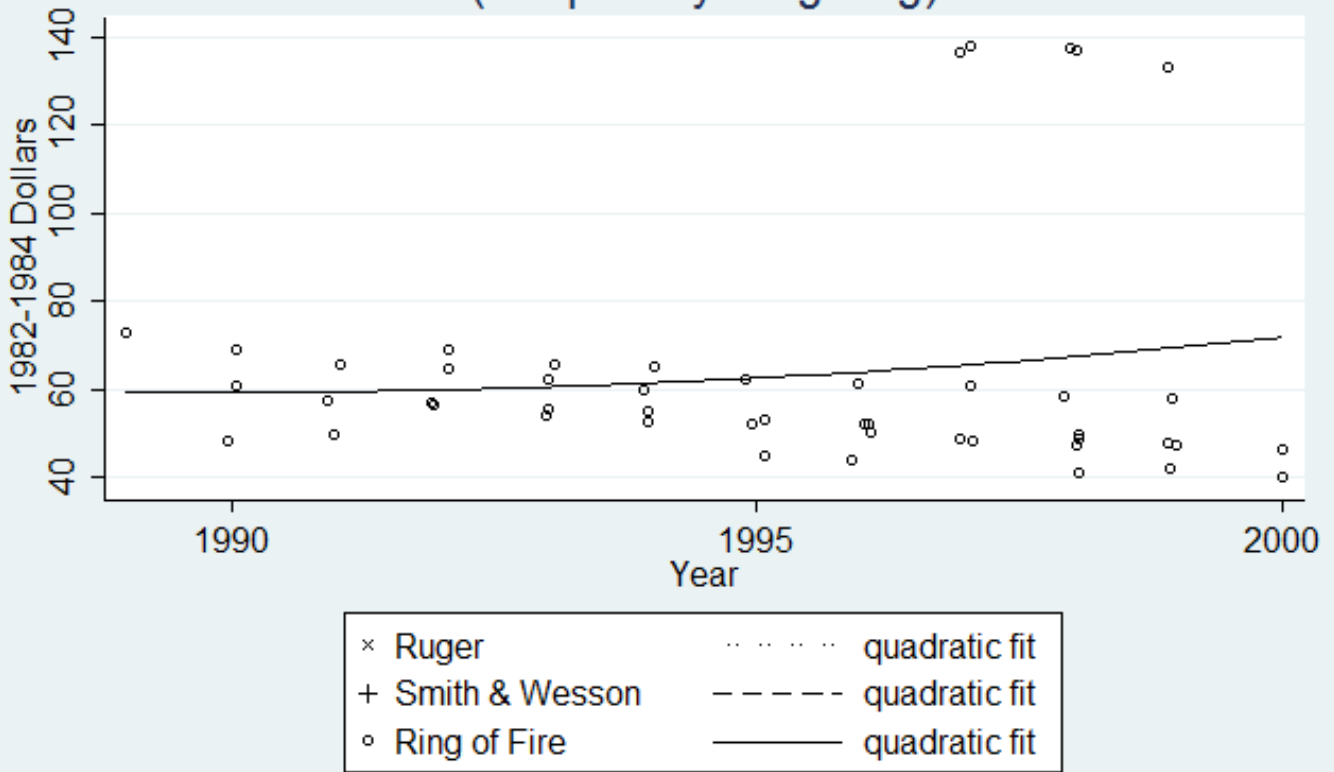


Figure 7.

Movements of real prices (1982-1984 dollars) for 25 ACP caliber guns for the Ruger, Smith & Wesson, and Ring of Fire brands Source: Authors calculations, based on Gun Digest Gindex 1980-2000.

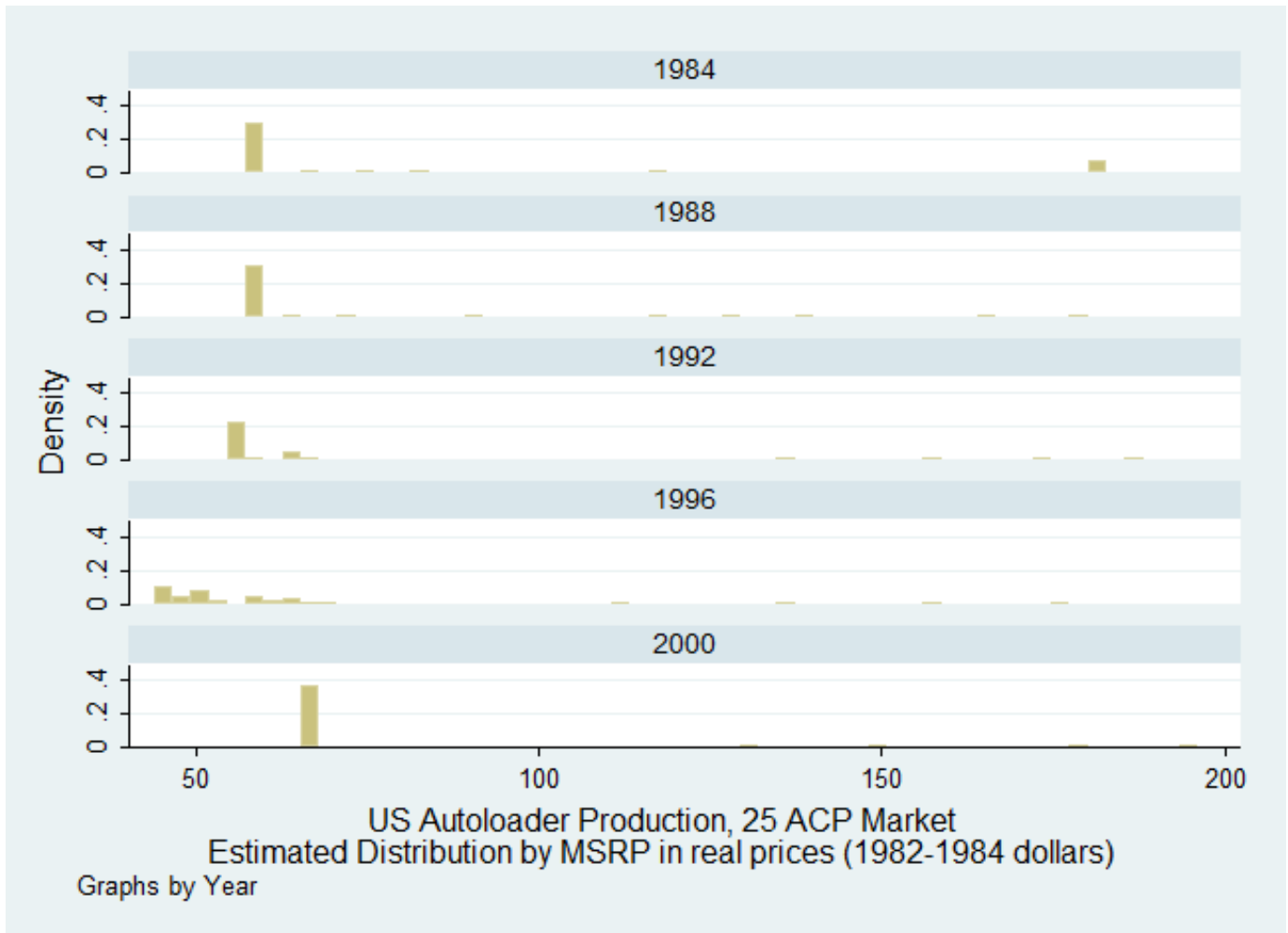


Figure 8.

Distribution of 25 ACP production in real prices (1982-1984 dollars) for select years. Note the substantial development and then retreat of production at the bottom of the market in the late 80s and early 90s. Source: Authors calculations, based on Gun Digest Gundex and ATF AFMER reports 1980-2000.

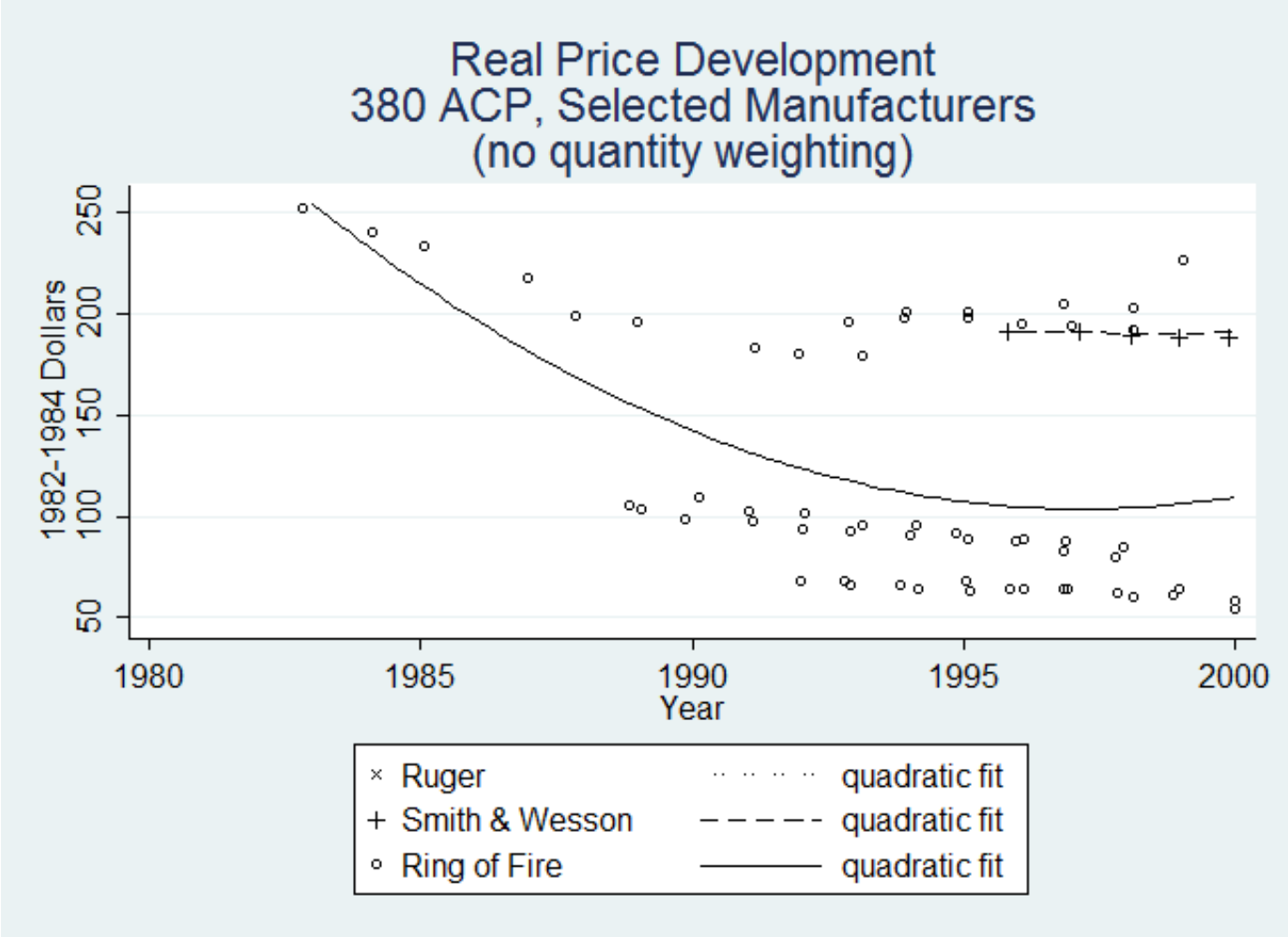


Figure 9.

Movements of real prices (1982-1984 dollars) for 380 ACP caliber guns for the Ruger, Smith & Wesson, and Ring of Fire brands Source: Authors calculations, based on Gun Digest Gindex 1980-2000.

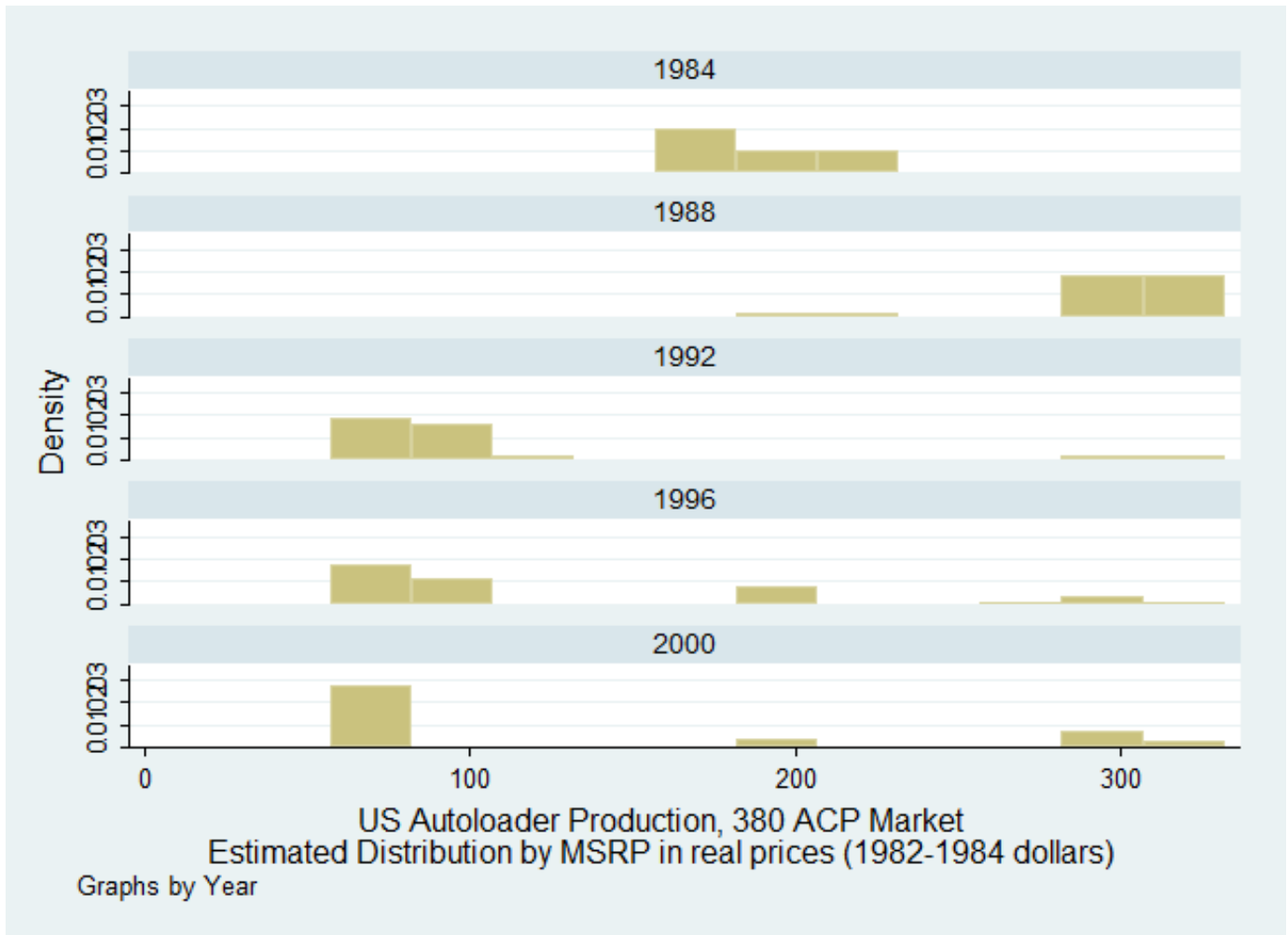


Figure 10.

Distribution of 380ACP production in real prices (1982-1984 dollars) for select years. Note the substantial development and then retreat of production at the bottom of the market in the late 80s and early 90s. Source: Authors calculations, based on Gun Digest Gundex and ATF AFMER reports 1980-2000.

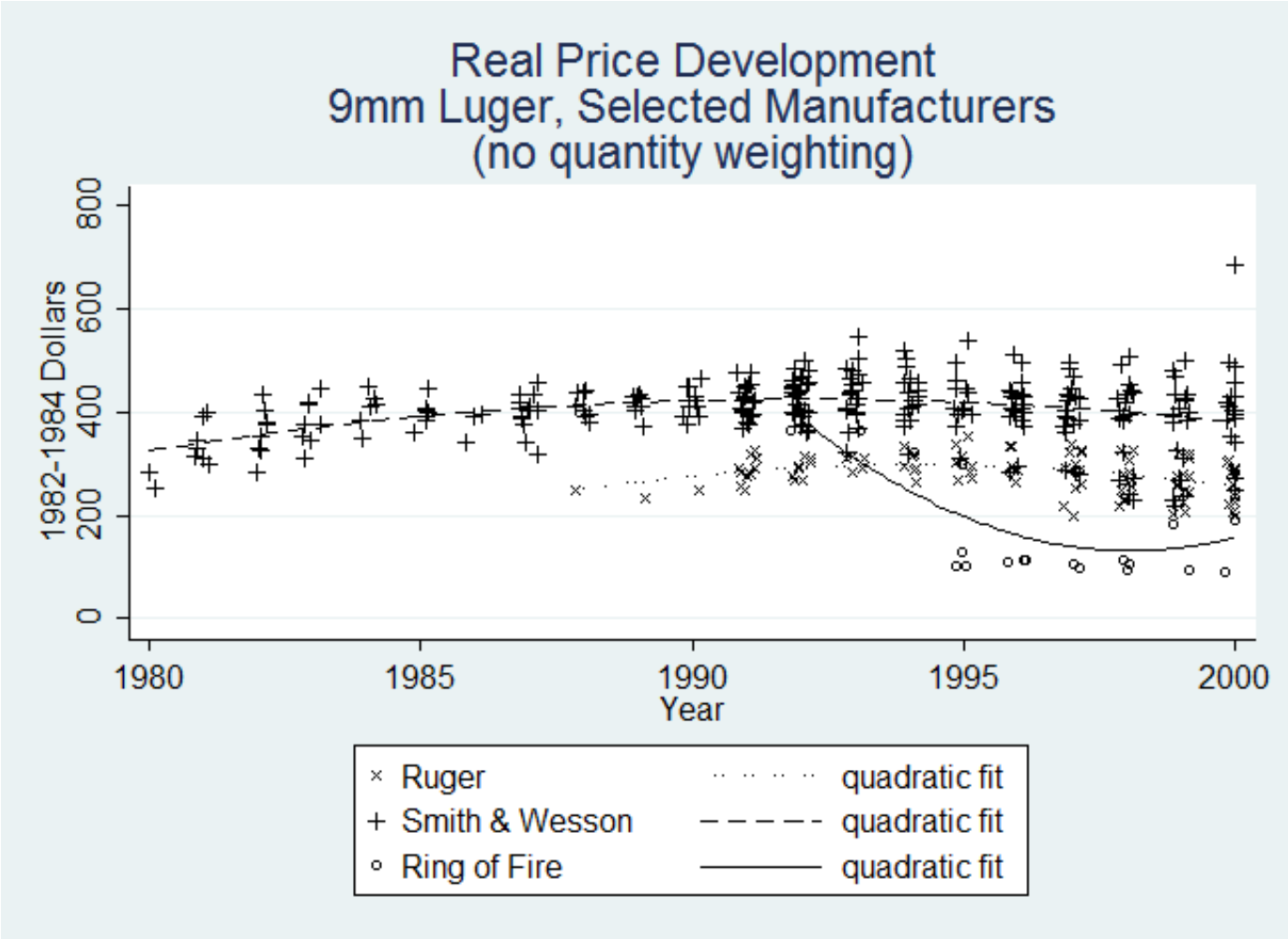


Figure 11.

Movements of real prices (1982-1984 dollars) for 9mm caliber guns for the Ruger, Smith & Wesson, and Ring of Fire brands Source: Authors calculations, based on Gun Digest Gundex 1980-2000.

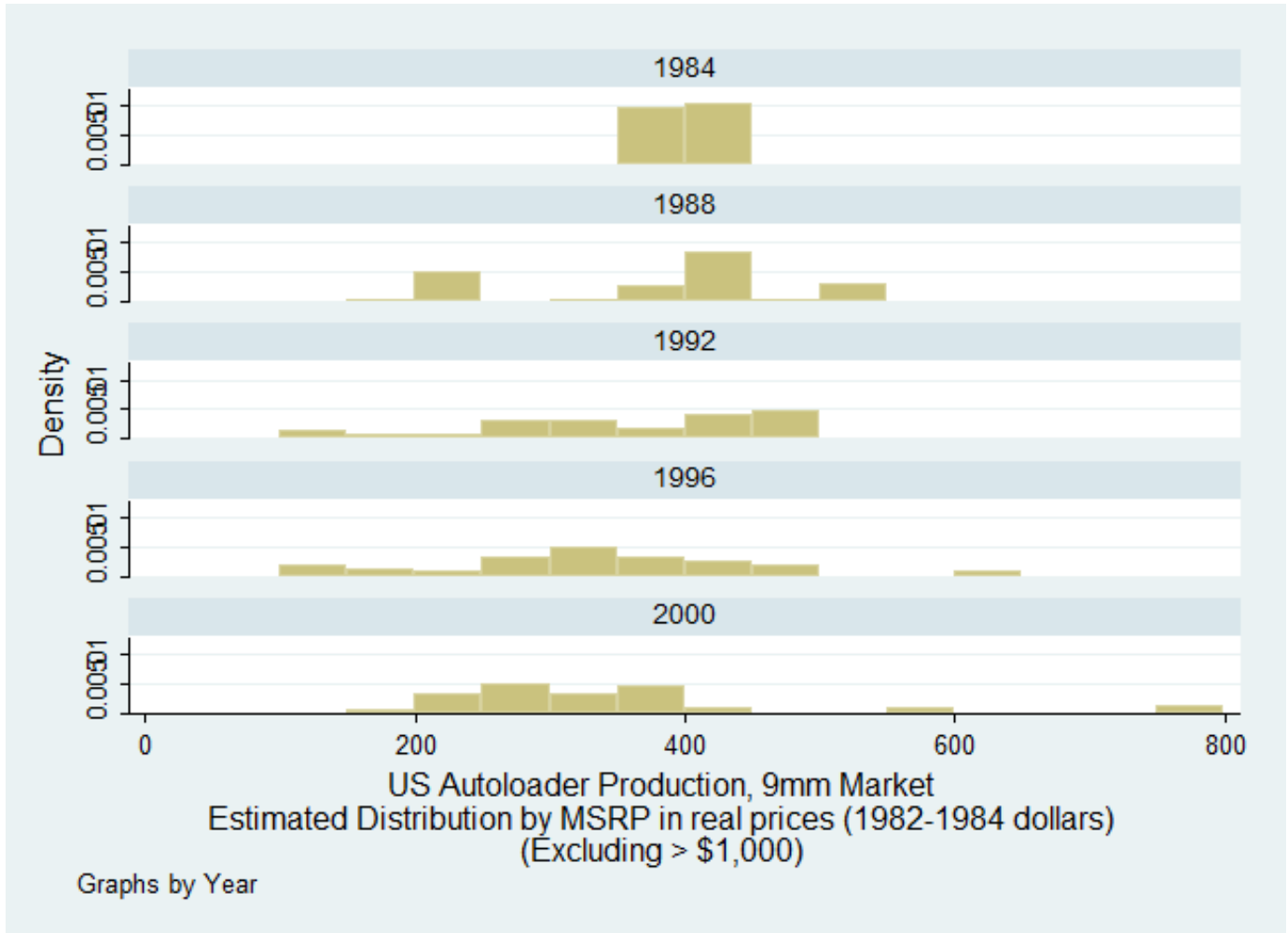


Figure 12.

Distribution of 9mm production in real prices (1982-1984 dollars) for select years. Note the substantial development and then retreat of production at the bottom of the market in the late 80s and early 90s. Source: Authors calculations, based on Gun Digest Gundex and ATF AFMER reports 1980-2000.

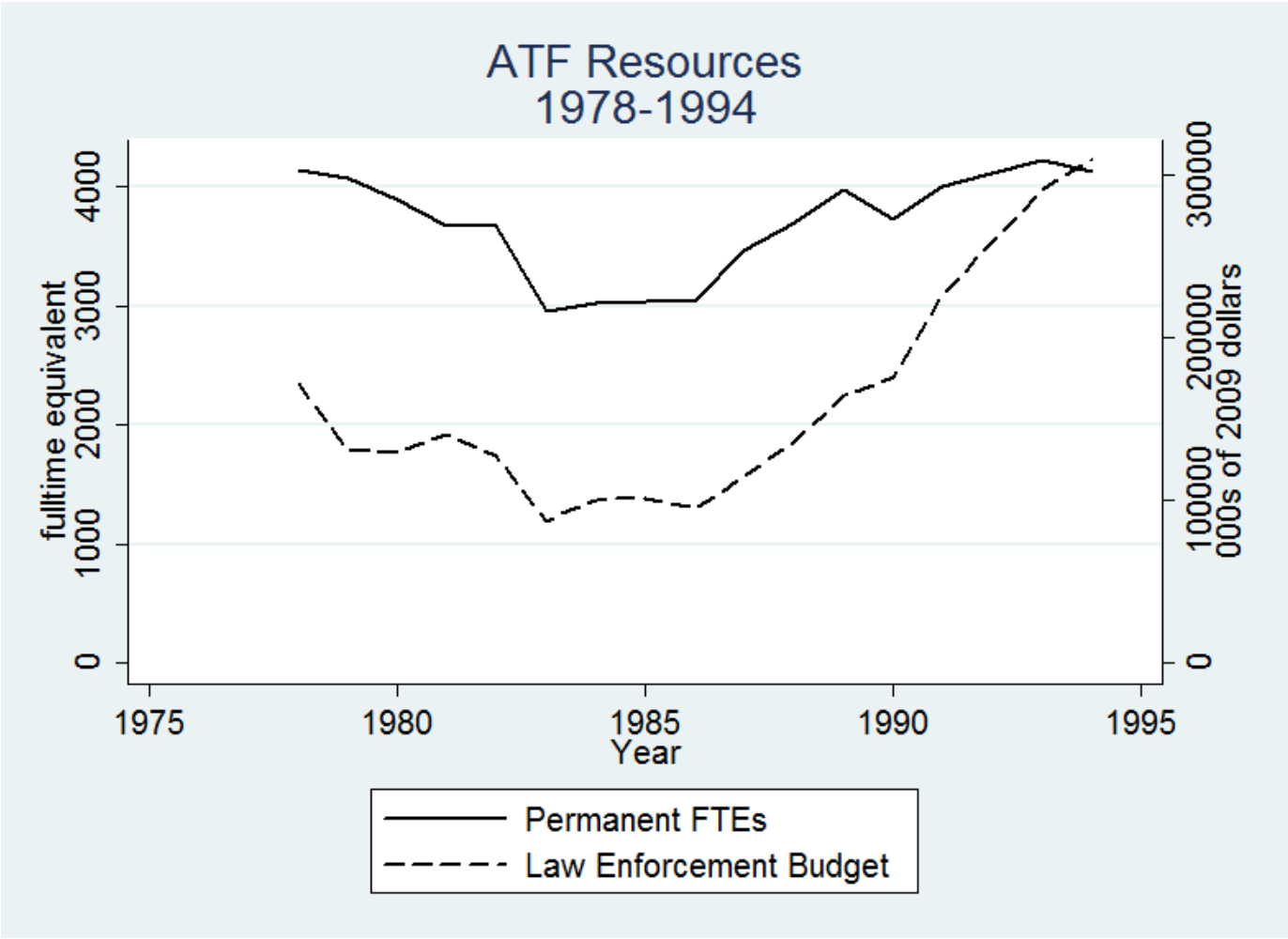


Figure 13.

ATF resources in personnel and budget for law enforcement. Source: Federal Budgets for 1980 to 1995. Real dollar computations using GDP Deflator series (GDPDEF) from FRED2.

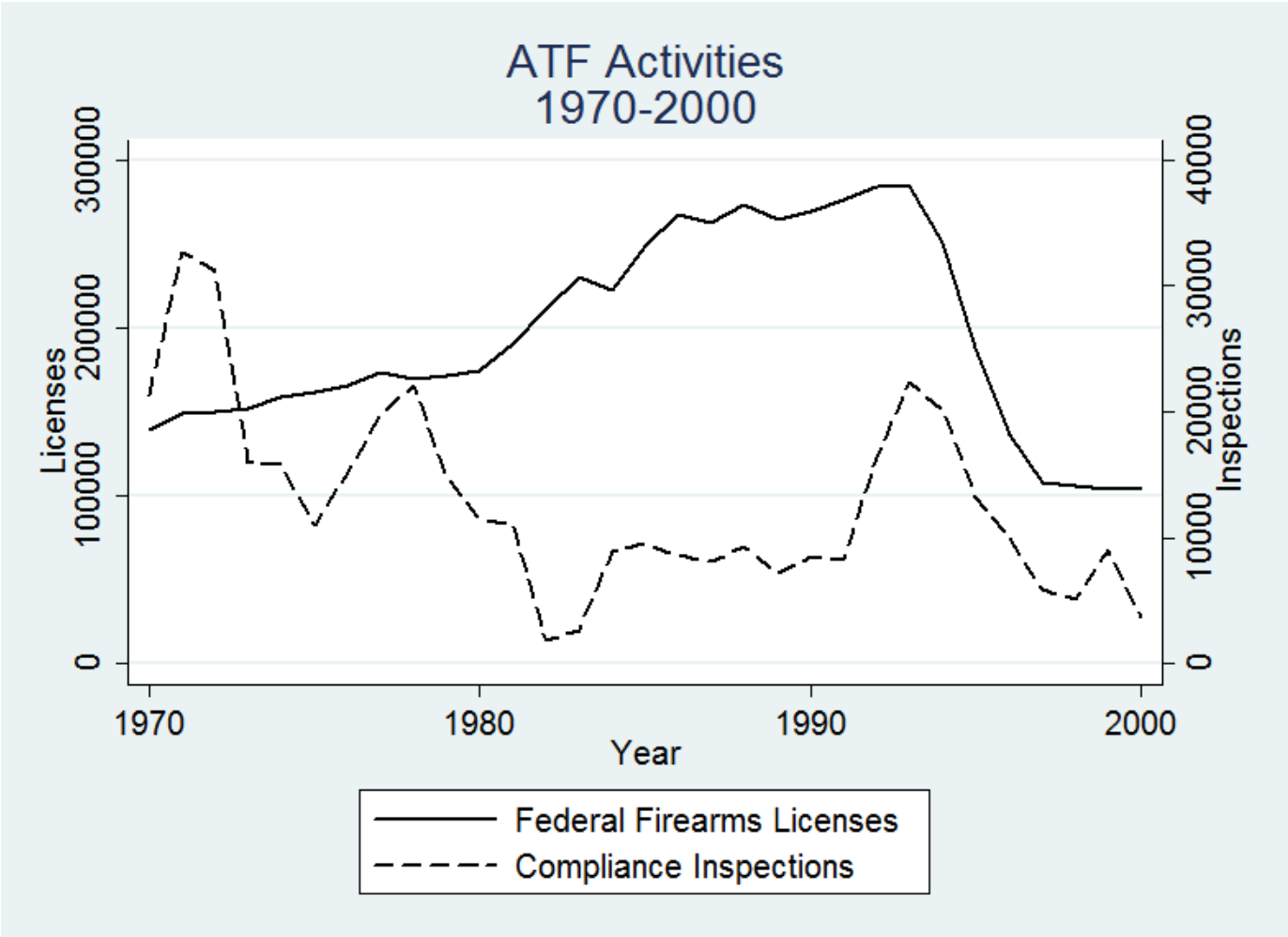


Figure 14. ATF FFL and compliance inspections. Source: 2011 Report on Firearms Commerce, ATF

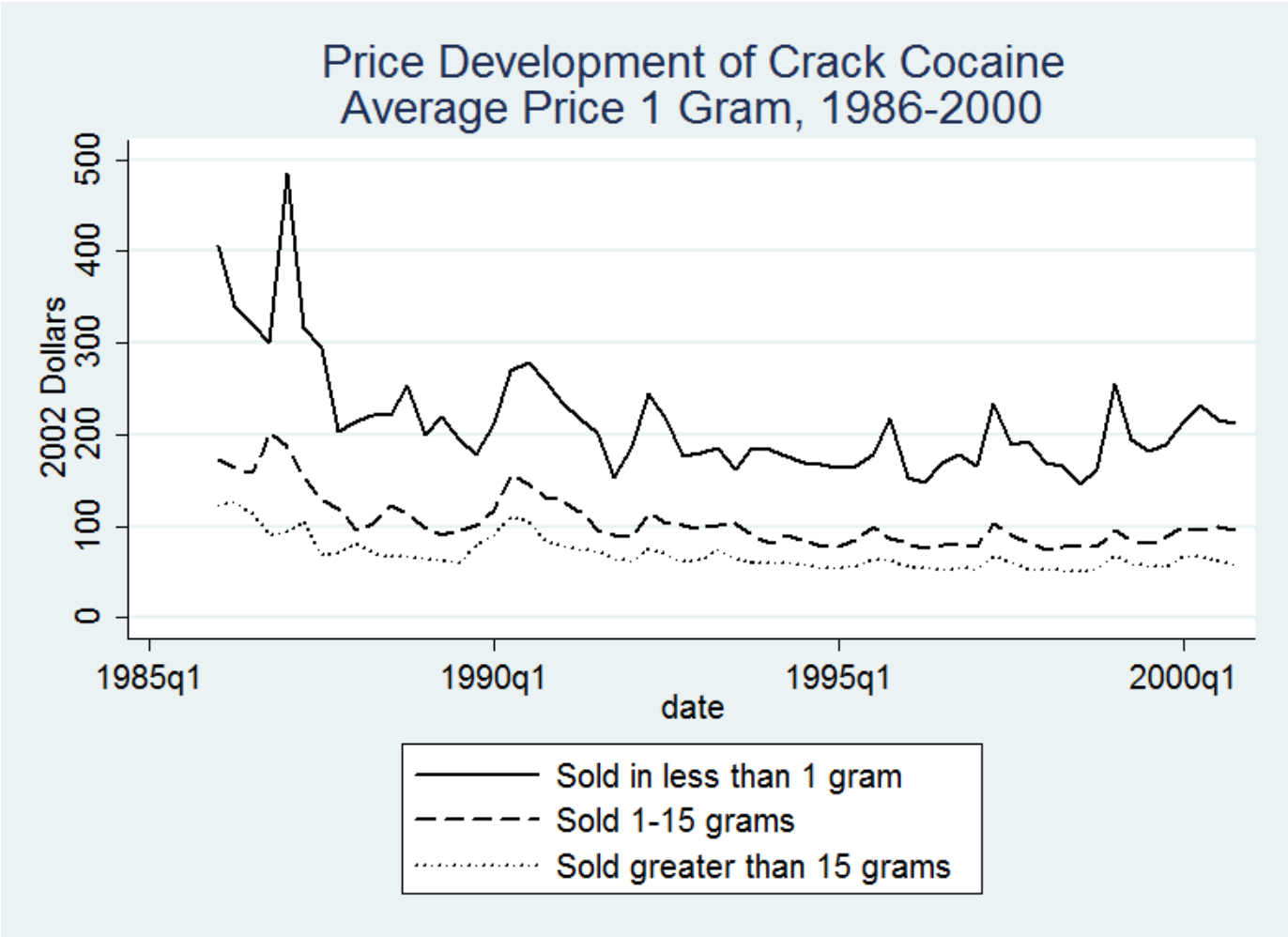


Figure 15.
Data on crack prices in major cities from the Office of National Drug Control Policy.