

AN ECONOMIC ANALYSIS OF A DRUG-SELLING GANG'S FINANCES*

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We use a unique data set detailing the financial activities of a drug-selling street gang to analyze gang economics. On average, earnings in the gang are somewhat above the legitimate labor market alternative. The enormous risks of drug selling, however, more than offset this small wage premium. Compensation within the gang is highly skewed, and the prospect of future riches, not current wages, is the primary economic motivation. The gang engages in repeated gang wars and sometimes prices below marginal cost. Our results suggest that economic factors alone are unlikely to adequately explain individual participation in the gang or gang behavior.

Street gangs have a long history in American cities [Thrasher 1927]. Until recently, gangs were organized primarily as social peer groups. Any economic activities were of secondary importance [Suttles 1968; Klein 1995]. The last two decades, however, have given rise to a dramatic transformation in street gangs, or what Taylor [1990] terms their "corporatization." When crack became widely available in the mid-1980s, sold in small quantities in fragmented street-corner markets, street gangs became the logical distributors. The potential profit in drug dealing dwarfed that previously available to gangs through other criminal channels. As a consequence, gangs became systematically involved in the distribution of various narcotic substances including heroin and crack-cocaine [Block and Block 1993].

Recent academic literature on gangs has examined some aspects of their financial activities. Hagedorn [1988] and Padilla [1992] suggest that gang members pursue financial activities in response to alienation from legitimate labor markets. Jankowski's [1991] study of 37 gangs found that nearly all of them had an expressed commitment to illicit revenue generation, but that

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performance differed according to various factors including organizational structure and community relations. Spergel [1995] has shown significant racial and ethnic differences in illegal entrepreneurship. Akerlof and Yellen [1994] present a model analyzing the relationship between police enforcement against gangs and community cooperation.¹ In spite of this pioneering work, however, many gaps in the literature remain. Although quantitative data are sometimes used anecdotally, there is little in the way of systematic data collection. Virtually all of the existing scholarship is based on verbal reports by gang members, or in exceptional cases, direct observation of trafficking [Bourgois 1989; Williams 1989]. The illicit nature of gang activities and the lack of formal accounting procedures have precluded more systematic quantitative analysis prior to this study. Finally, many of the studies report that gangs are embedded in citywide hierarchies, but they do not examine the impact of this organizational structure on a gang's financial dealings.

A number of researchers have estimated the returns to crime [Freeman 1992; Grogger 1995; Viscusi 1996; Wilson and Abrahamse 1992] and drug selling [Reuter, MacCoun, and Murphy 1990; Fagan 1992; Hagedorn 1994] through the use of self-reports.² The returns to drug selling tend to be much greater than that of other criminal activities, with frequent drug sellers reporting mean annual incomes in the range of \$20,000–\$30,000. Studies relying on ethnographic observation, however, find much lower values for drug-related earnings, e.g., Bourgois [1995] and Padilla [1992]. One explanation for this discrepancy is that the self-report and ethnographic studies have focused on very different populations. The self-report studies have tended to survey independent drug dealers, i.e., those with no gang affiliation, whereas ethnographic research has focused on low-level members of a hierarchy. Independents are likely to have greater ability, experience, and access to capital than “foot soldiers” who sit at the low end of the street gang's organizational hierarchy. Our data, which span the levels of a gang hierarchy, from rank-and-file members to imprisoned leaders, offer a partial solution to this problem. Higher-level gang members may tend to have similar characteristics to independents.

In contrast to the returns to crime, there has been little

1. There is also a related literature on organized crime (see, for instance, Reuter [1983] and Schelling [1984]).

2. See Fagan and Freeman [1999] for a survey of this literature.

attention paid to the “career path” of gang members, market structure, organizational forms, competitive strategies, and how economic activity is structured in the absence of legally enforceable contracts.³ In this paper we are able to directly analyze for the first time a wide range of economic issues related to gangs and drug distribution. We do so through the use of a unique data set containing detailed financial information over a recent four-year period for a now-defunct gang. These data were maintained by the leader of the group as a management tool for tracking the gang's financial activities and for monitoring the behavior of gang members. Updated monthly, the data include breakdowns of costs and revenues into major components, as well as information on the distribution of profits as wages to gang members at different levels of the hierarchy. Information on both price and quantity is included. These financial data are supplemented with information on the numbers of violent deaths, injuries, and arrests of gang members over this period, as well as interviews and observational analysis of the gang. While the data suffer from important limitations and a number of potential biases (which appear below), they nonetheless represent a substantial improvement on previously available information.

Using these data, we analyze the extent to which the individual and collective actions of gang participants can reasonably be characterized as emanating out of economic maximization. We address three different issues in this regard. First, we examine the economic returns to drug dealing relative to legitimate labor market activities. The higher the returns to drug selling, the more likely it is that the economic aspects of the gang are paramount. We then consider the causes and consequences of gang wars. Finally, we analyze the risk trade-offs made by gang members and whether these can be reconciled with optimizing decision making.

A number of insights emerge from the paper. Street-level sellers appear to earn roughly the minimum wage. Earnings within the gang are enormously skewed, however, with high-level gang members earning far more than their legitimate market alternative. Thus, the primary economic motivation for low-level gang members appears to be the possibility of rising up through the hierarchy, as in the tournament model of Lazear and Rosen [1981]. The average wage in the gang (taking into account all

3. Southerland and Potter [1993] is an exception on this last point.

levels of the hierarchy) is perhaps somewhat above the available legitimate market alternatives, but not appreciably higher.

Gang wars are costly, both in terms of lost lives and lost profits. Almost all of the deaths of drug sellers are concentrated in war periods. Moreover, the violence keeps customers away. This negative shock to demand is associated with a fall of 20-30 percent in both the price and quantity of drugs sold during fighting, and the drug operation becomes far less profitable. In spite of this, the gang discussed in this paper fights with rivals roughly one-fourth of the time. Gang wars are also an extremely costly means of dispute resolution, but given the absence of legally enforceable property rights and contracts, other means of resolving conflicts may be circumscribed. There is also evidence that frequent gang wars are the result of an agency problem, namely the desire of low-level gang members to build a reputation for toughness may be in their personal interest, but will almost assuredly be costly to the gang as a whole. We also document that the gang prices below marginal cost during gang wars. Such pricing can be reconciled with economic optimization if maintenance of market share is important and there are switching costs among drug purchasers [Klemperer 1995], but may simply reflect flawed decision making.

Finally, drug selling is an extremely dangerous activity. Death rates in the sample are 7 percent annually. Given the relatively low economic returns to drug selling noted above, the implied willingness to accept risk on the part of the participants is orders of magnitude higher than is typically observed in value of life calculations. This suggests either that gang members have very unusual preferences, that the ex post realization of death rates was very different than the ex ante expectation, systematic miscalculation of risk, or the presence of important noneconomic considerations.

Based on these findings, we conclude that even in this gang—one of the most economically sophisticated and successful gangs—the decision making of members is difficult (but not impossible) to reconcile with that of optimizing economic agents. Certainly, economic considerations play an important role in the decisions of members and the activities of the gang. However, we find that social/nonpecuniary factors are likely to play an important role as well. Of course, all of these conclusions are based on the analysis of a single gang's experience. The degree to which these results are broadly generalizable remains an open question.

The structure of the paper is as follows. Section I provides background on the community in which the gang is situated, the organizational structure of the gang, and the competitive environment within which it operates. Section II describes and summarizes the data set. Section III analyzes the economic returns to drug selling in the gang. Section IV examines the causes and consequences of gang wars. Section V documents the dangers of drug selling and the willingness of gang members to accept risk. Section VI offers a brief set of conclusions.

I. THE GANG AND THE SOCIAL, ECONOMIC, AND COMPETITIVE ENVIRONMENT IN WHICH IT OPERATES

The gang⁴ for which we have data is located in an inner-city neighborhood in a large, industrial American city.⁵ Table I provides social and economic data from the 1990 Census of Population and Housing for two census tracts representative of those in which the gang operates, as well as nationwide averages for purposes of comparison.⁶ Residents of the area are almost exclusively African-American (over 99 percent), as are all of the gang members. The labor market experiences of the residents, particularly males, are far worse than those in the United States as a whole. Unemployment rates for males in 1990 were over 35 percent—six times higher than the national average. In addition, over 40 percent of males were not in the labor force. The female unemployment rates are roughly half of the male unemployment rate.

4. There is some imprecision in our use of the term "gang" here. Among gang members themselves, the group we analyze is termed a "set." A set is the small, geographically concentrated unit around which local drug dealing is organized. A particular set is likely to have affiliations with other sets in an overarching gang structure (e.g., the Crips or the Bloods). In this paper we use the term gang rather than set when referring to the small group we analyze in order to avoid confusion of the mathematical and gang definitions of the word "set." We will use the term "organization" to denote the overall cooperative that encompasses the many geographically localized units.

5. Throughout the paper we withhold precise details of the gang's location, identity, and the exact time period examined in order to protect the anonymity of those who have provided us with the data. The data were obtained in the course of research for a multicounty study of gang activities initiated by Venkatesh in the mid-1980s.

6. The boundaries of the gang's turf do not closely conform with a single census tract. The part of the city in which the gang operates, however, is quite homogeneous along socioeconomic lines. The census tracts we have chosen are representative of the gang's immediate neighborhood. The summary statistics presented are population-weighted averages of the values for the two census tracts, except for median family income, which is a simple average.

TABLE I
DEMOGRAPHIC, SOCIAL, AND ECONOMIC CHARACTERISTICS OF THE NEIGHBORHOOD

Variable	Gang's census tracts	U. S. average
Percent Black	99.6	12.0
Male unemployment rate (percent)	35.8	6.5
Female unemployment rate (percent)	19.8	6.2
Percent of children in poverty	56.2	18.3
Percent of children in single-parent families	77.6	21.5
Percent of children in families receiving public assistance	60.3	12.3
Median family income	15,077	35,225
Educational attainment (age 25 +)		
Less than high school	49.3	24.8
High school	28.7	30.0
Some college	17.4	24.9
Bachelor's degree or beyond	4.7	20.3
Percent owner-occupied housing	10.4	64.2
Percent of housing units that are boarded up	15.3	0.4
Place of residence five years earlier (in percent)		
Same house	52.9	53.3
Different house, same country	44.2	25.5
Different county	2.9	21.3

All data are from the 1990 Census of Population and Housing, located at the United States Census web-site www.census.gov. The values in the first column report population weighted averages for the two census tracts in which the gang operates. For the variable median family income, a simple average of the two medians is taken. Percent of children in single-parent families is calculated as the fraction of children not living in a family with married parents.

Children in the neighborhood experience high probabilities of adverse economic circumstances. Over half of the children were below the poverty line at the time of the 1990 census. More than three-quarters of all children live in single-parent families, and 60 percent are in families that receive public assistance.

Median family income is \$15,077 annually, less than half of the national average. A small fraction of the census tract is public housing, although the immediate neighborhood in which the gang operates does not include any large-scale public-housing complexes. Roughly half of adults in the community do not have a high-school diploma. Only one in twenty residents has a degree from a four-year college, compared with one in five Americans generally.

A striking feature of the mobility patterns among neighborhood residents is the rarity with which outsiders move into the neighborhood. Although there is movement within the county, less

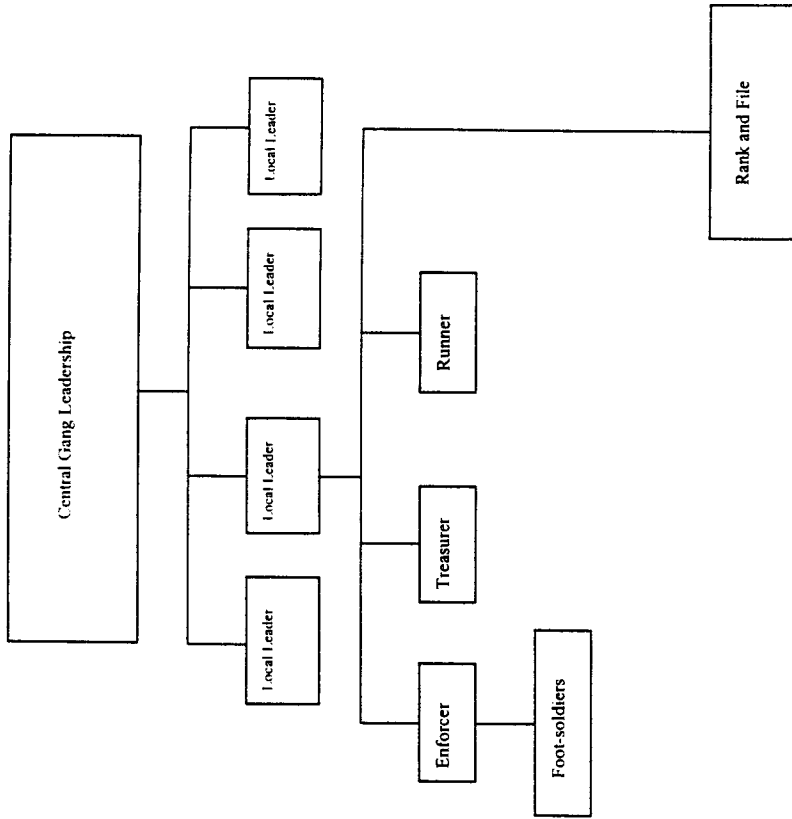


FIGURE I
Organizational Structure

than 3 percent of the 1990 residents lived outside of the county in 1985. For the United States as a whole, residents were seven times more likely to have moved to their current home from outside of the county. The number of residents in the neighborhood in 1990 is less than half the number in 1950.

The organizational structure of the gang as a whole is shown in Figure I. We use the titles used by the gang, except where those titles would reveal the gang's identity. The structure of the organization is simple compared with most firms of comparable size (see, for example, Baker, Gibbs, and Holmstrom [1994]). The top-level of the organization is made up of what we broadly denote the "central leadership." This body is chaired by four to six individuals with responsibility for devising the long-term strate-

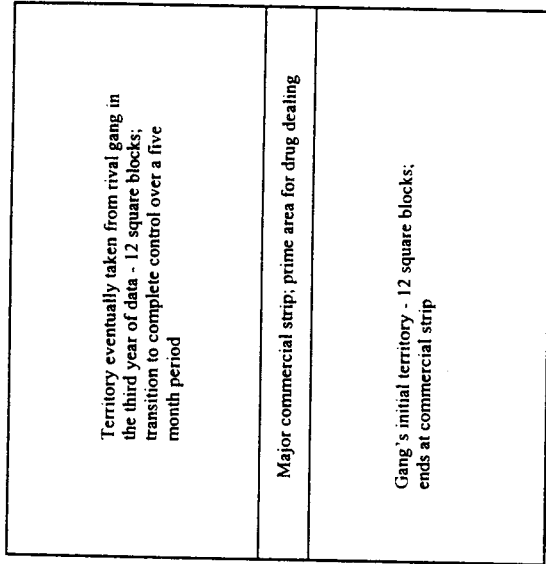
gies of the multistate organization, and maintaining relationships with suppliers and affiliates in other regions of the country. The central leadership also includes approximately twelve persons who are responsible for collecting dues, overseeing recruitment of new members, allocating punishments, and serving as liaisons to the community.⁷ Roughly one-third of these leaders are imprisoned at any given time. The next tier in the organization is a group of "local gang leaders" with specific territorial responsibility for one or more localized gang. In the organization we study, there are roughly 100 of such gang leaders. Reporting in to each gang leader are three "officers." The "enforcer" is responsible for ensuring the safety of group members, the "treasurer" manages the liquid assets of the group, and the "runner" performs the risky task of transporting large quantities of drugs and money to and from the supplier. Reporting to the enforcer are the "foot soldiers" who serve as street-level drug sellers and from whose ranks future officers and leaders arise. Foot soldiers are typically 16–22 years of age, although potentially much older. At the periphery of the gang is a "rank-and-file" member pool who span all ages (the age range in the group we study is 14 to 40) and who have little formal responsibility for drug selling. Rank and file, unlike foot soldiers and higher gang members, pay dues to the gang, in return receiving protection, status, and a reliable supply of drugs for those who deal independently.⁸

The structure of the overall organization is similar to that of a franchised company. Gang leaders pay a fee to the franchisers (central leadership), but are the residual claimants on the profits accruing to their franchise. In return for those tribute payments, higher-ranking leaders ensure that a local gang has sufficient protection (both on their turf and in prison), stable alliances with other gang sets such that gang members can travel to other areas of the city with relative safety, access to reliable sources of wholesale drugs, and the possibility for members to rise up the hierarchy into the upper echelon, where personal revenue and power are considerably enhanced. The individual, local gang units, like separate franchise owners, have relatively little interaction with one another.

7. Within the organization, a clear distinction is made between those performing the two different functions of the central leadership. We ignore these differences here because they are not material to the analysis we perform.

8. Rank and file who deal drugs would not do so on the gang's own turf (without risk of serious punishment) but rather might sell in other neighborhoods, at their workplace in the legitimate sector, or at school.

Area to northwest controlled by an affiliated gang



Area to west controlled by an affiliated gang

Area to the south controlled by a rival gang, but no active hostilities during the time period studied

FIGURE II

The Geographic and Competitive Landscape of the Gang

The data that we have are for just one gang within the larger organizational structure. That gang is overseen by a local gang leader, and has one enforcer, one treasurer, and one runner at any given point in time. The number of foot soldiers ranges between 25 and 75 over the period examined, and there are 60 to 200 rank and file. At any given point in time, roughly one-fourth of the males aged 16–22 in the neighborhood are foot soldiers.

The geographic and competitive landscape in which the gang operates is detailed in Figure II. This gang's turf for most of the time period examined is a twelve-square block area bordered by major thoroughfares on all sides. Most of the drug-dealing is conducted along the edges of the territory on or near one of the major streets. The gang sells perhaps 30 percent of the drugs to those living within the twelve-block area—most of the remaining purchasers come from a relatively limited geographic range. In this particular area, few buyers come from the suburbs.

The areas to the immediate north and south of this gang's turf are controlled by separate, rival gangs. The time period for which

Area to the East has similar socio-economic characteristics, but far less gang activity

we have data is punctuated by a series of violent conflicts between the group we study and the rivals to the north, culminating with the eventual seizure of the rival group's turf, a twelve-square block area, in the latter part of our sample period. Although relations with the gang to the south have historically been quite hostile, there were no major conflicts between these two groups in the years for which we have data. To the west of this group is territory controlled by another gang of the same organizational affiliation. To the east are residential tracts similar in demographic makeup, but with somewhat higher socioeconomic status and neighborhood cohesion. The area to the east has markedly lower gang and drug activity throughout the sample.

II. DATA AND DESCRIPTIVE STATISTICS

The data set contains detailed financial information on the activities of the gang described above on a monthly basis for a recent four-year period. The data were originally maintained by the leader in control of the gang, and they were updated each month by the enforcer, who compiled the information by hand. The data end abruptly with the arrest of the gang leader and other officers. Shortly thereafter, the gang, weakened by these arrests and beset by infighting, was overpowered by rivals, its turf divided between enemy gangs. The gang we study is no longer in operation. Most of the former gang members have since abandoned drug dealing. The person who supplied us the data is a former gang member with ties to the gang that tracked the data (although he was not necessarily directly affiliated with this particular group). Our informant, after serving a prison sentence, now holds a full-time job in the legitimate sector. For obvious reasons, we have accommodated his request to remain anonymous.

Given the unusual nature of the data, it is important to consider both its reliability and the degree to which it is representative of gangs more generally. On the most basic question of authenticity, we have no reason to doubt that the data actually represent the financial records of the gang. In terms of understanding the possible biases in the data, it is worth noting that it served two purposes: (1) a tool for managing the day-to-day operations of the gang, much as a CEO relies on management information systems (MIS) data in a firm, and (2) a means of tracking operations for reporting to higher levels in the gang hierarchy. The first purpose suggests that the intention of the data keepers

was to accurately capture the gang's finances, although their ability to do so effectively may be subject to question. The second use of the data, however, raises the concern that the scale of operations and profitability of the enterprise are systematically understated since high profits are likely to lead to greater demands for tribute from the gang leadership.

Although the source of the data assures us that it is not the case, we nonetheless believe that it is prudent to view the revenue and profits as lower bounds on the true values for two reasons. First, the gang leader had substantial power to make financial arrangements "off the books." For instance, during the time period examined the gang leader received an unknown amount of compensation from nongang members in return for the right to sell heroin on the gang's turf. This income is not recorded in our data set. Second, the revenue reported reflects only that obtained by the gang, missing that fraction of the proceeds which is appropriated by gang members, either for their own use or for resale. While usage of crack by gang members appears to be low (it is strongly discouraged by gang leaders), a nonnegligible fraction of the drugs/drug revenues appear to be pilfered by the low-level gang members.⁹ We do not have a good measure of the extent of such activities, but estimate that at most 15 percent of the revenues are skimmed by those selling the drugs.¹⁰

The data contain monthly breakdowns of the major sources of revenues and expenditures for the gang. Table II presents monthly averages for each of the four years covered. Of the 48 months spanned by our sample, six months of data are missing.¹¹ Averages are calculated based only on those months for which data are available. All dollar values are converted into 1995 dollars using

9. This pilfering takes a number of different forms. First, those who are responsible for putting the crack into bags for sale on the street report that they routinely kept some portion for themselves. It was also common practice for street-level sellers to examine the bags of crack they are responsible for selling, removing some of the crack from the bags with the largest quantity. Finally, sellers attempted to engage in price gouging when buyers are suspected of being naive. Excess proceeds from sales made at an inflated price were unlikely to be reported back to the gang enforcer. While all of these activities were technically against gang rules, and were sometimes punished by violent beatings, it appears that they were nonetheless commonplace.

10. We base this estimate of 15 percent on conversations with a number of former gang members, although we have no good means of verifying this magnitude. At most one-third of this skimming would be for personal consumption, with the remainder either unreported profits or the removal of some of the crack for later resale.

11. Data for December are missing in three of the four years and represent half of the missing data in the sample. According to our source, December is a slow month for drug sales.

TABLE II
GANG FINANCES BY YEAR
Monthly Averages in 1995 Dollars

Category	Year 1	Year 2	Year 3	Year 4
Total revenues	18,500	25,600	32,000	68,400
Drug sales	11,900	19,100	24,800	53,000
Dues	5,400	5,200	5,100	9,600
Extortionary taxes	1,200	1,300	2,100	5,800
Total nonwage costs	8,100	11,600	14,000	25,200
Cost of drugs sold	2,800	4,000	5,000	11,900
Tribute to gang hierarchy	3,200	4,400	5,000	6,000
Mercenary fighters	1,000	1,000	1,300	1,200
Funerals/payments to families of the deceased	300	1,200	0 ^a	1,100
Weapons	300	400	300 ^a	1,800
Miscellaneous expenses	500	800	2,400 ^a	3,200
Total gang wages	6,200	8,000	9,500	32,300
Officers	2,600	2,600	2,100	3,300
Foot soldiers	3,600	5,400	7,400	29,000
Net profit accruing to leader	4,200	6,000	8,500	10,900
Monthly wage per foot soldier	140	200	180	470
Price and quantity of drugs sold:				
Quantity	1,310	2,054	3,109	7,931
Price	8.64	9.18	8.00	6.69

Data in the table reflect monthly averages for the year listed at the top of the table. Values are based on monthly data for the four-year period. Data are unavailable for 6 of the 48 months in the sample, with yearly averages based only on those months with data. Dollar values have been converted into 1995 dollars using the GDP deflator. All values are rounded to the nearest hundred dollars. Estimates include only revenue sources included in official gang records. The units on quantity are number of "bags," an artificial unit of measure that roughly matches the number of drug transactions that take place. The price is a price per "bag."
a. Detailed information on the breakdown of some cost categories is unavailable for five months of year 3; all such costs are allocated to the category "miscellaneous."

the GDP deflator. Revenues are broken down into three sources: proceeds from drug sales (almost exclusively crack-cocaine), dues from gang members, and "street taxes," i.e., money extorted from individuals (and occasionally companies) conducting business on the gang's turf. Examples of those required to pay street taxes would include grocery store owners, gypsy cabs, people selling stolen goods, and those providing services such as auto or plumbing repair. Average monthly revenue from all sources for the gang rose from \$18,500 to \$68,400 over the period examined. As noted above, these revenues are best viewed as a lower bound on the true figures. Proceeds from the sale of crack are the gang's major source of income, and growth in drug sales accounts for virtually all of the increase in revenue over time. Dues collected

from gang members are nearly constant until the final year, when the gang membership expands dramatically with the expanded turf. It is important to note that in this gang, core gang members (i.e., officers and foot soldiers) were not required to pay dues. Only the peripheral members of the gang (i.e., rank and file) paid these fees.¹²

Although the revenue numbers may appear low, "back-of-the-envelope" calculations suggest that they are reasonable. Using these revenue figures and average dollars per sale of \$10, we estimate that the number of sales per hour by a drug-selling team ranges from five to twelve over the sample. That frequency of sale is consistent with self-reports of the participants as well as recent observational data we have collected in similar neighborhoods.

In the original data, the nonwage costs are broken down into six categories: costs of drugs sold, payments to higher levels of the gang, weapons, payments to mercenary fighters (nongang members who are hired for short periods of time to help fight in gang wars), funeral costs and payments to families of the deceased, and miscellaneous expenses.¹³

The greatest nonwage expenditure of the gang was the regular tribute payment to higher levels of the gang. Such payments amount to almost 20 percent of total revenues. Expenditures related to drugs comprise the next largest nonwage cost component, accounting for 15 percent of total revenue, and almost 25 percent of drug sales. The price paid by the gang to obtain powder cocaine, which is subsequently transformed into crack by the gang for resale on the street, declines roughly 35 percent over the sample period, reflecting a citywide decline in the price of bulk cocaine. Surprisingly, there appears to be substantial imprecision in the measurements used in these bulk drug transactions. Standard units such as kilograms and pounds are not used by the gang (although the supplier does use such units). Quantities instead described in various "street" units that we are able to only roughly translate into kilograms.¹⁴ Thus, we report our results in an artificial unit ("bags") that approximates the standard quan-

12. This dues structure is unusual. Typically all gang members pay dues. The value of the dues that foot soldiers avoid could be considered as income. Average dues, however, are only about \$50 per month, so the basic conclusions are unchanged.

13. Included in miscellaneous expenses are costs for parties, community events organized by the gang, lawyers' fees, bribes, etc.

14. For instance, the gang would pay roughly \$1500 for the quantity of cocaine that fits in a ziploc-type sandwich holder.

ity in which street sales occur, rather than in kilograms. While this choice of units is essentially arbitrary, it has the attractive feature of roughly capturing the number of sales made by the gang in a month. A bag contains an extremely small quantity of crack-cocaine (e.g., a few pebbles) and typically sells for about \$10 on the street. By our calculations, between 10,000 and 15,000 bags can be produced from one kilogram of powder cocaine, making the street value of a kilogram of pure cocaine converted into crack between \$100,000 and \$150,000.

Information about relative prices and quantities are presented in the bottom panel of Table II. The quantity sold rises over the period examined, especially in the final year after the gang expanded its turf. Price initially rises, but falls in the final year. The rise and subsequent fall in prices in our data roughly matches the city-level street price estimates based on data collected by the Drug Enforcement Agency in the STRIDE database and analyzed in Abt [1997]. Between years 1 and 2, Abt [1997] reports a 13 percent increase in citywide crack prices, compared with 6 percent for this gang.¹⁵ From years 2 to 4, the city price of crack falls 40 percent, compared with 27 percent for the gang we analyze. Note that the deviations between the prices charged by our gang and overall city prices are consistent with a story in which fighting in the early part of the period depresses prices. Increased local market power due to the gang doubling its turf allows the gang to charge a higher price in the latter part of the period, a topic we will return to later in the paper.

Another important expenditure item is for mercenary fighters known as "warriors" whom the gang hires on a retainer basis to fight in wars. Fees for warriors are roughly \$2000 per person per month of service. The warriors have various duties including guarding areas where drugs are sold, occupying front-line positions on the gang's turf, and performing drive-by shootings. The use of hired warriors declines at the end of the sample as the gang increasingly chose to use internal resources (foot soldiers) for fighting rather than contracting-out this task. This decision on the part of the gang appears to be linked in part to its difficulty in controlling the expanded turf, over which the gang had no inherent legitimacy. The original territory was much easier to defend because the gang's roots were in their original neighbor-

15. The prices we report from Abt [1997] are the real price per unit of pure cocaine purchased in quantities smaller than an ounce in the city where the group we study is located.

hood and the "original" gang members continued to reside there. Furthermore, prior to expansion, all of the gang violence involved the gang to the north. After the takeover, the gang's enemies increase in number, leading to a rise in the baseline frequency of violence when discrete wars are not taking place. Consequently, developing this fighting expertise within the organization became more valuable.

Funerals and related expenses such as compensating victims' families are costly to the gang. Typically, for a foot soldier who is killed, the gang pays \$5000, or approximately three years of foot-soldier wages, to his family for compensation and funeral services. Such payments are viewed as extremely important by the gang leaders, both to maintain community support for the gang and, because in the words of one gang leader, "*You got to respect family.*"¹⁶ Interestingly, when the gang expanded, members conscripted from the former rival outfit were treated much less generously than were those who belonged to the original gang.

The purchase of weapons, at a cost of \$300–\$400 per month, is initially a relatively small component of gang costs. Expenditure on weapons increases dramatically in the final year, both due to increased fighting, and because the gang reduced its reliance on outside warriors, choosing instead to defend itself. Combined with miscellaneous expenses, all of these nonwage costs total to just less than 50 percent of revenues.

The remainder of the revenues are distributed as wages to gang members, or are retained by the gang leader as profits. The earnings of the gang members involved with drug distribution is the focus of the next section.

III. THE ECONOMIC RETURNS TO DRUG SELLING IN THE GANG

In this section we attempt to measure the economic return to selling drugs in the gang. We begin with the "official" data reported in the gang's books. Later, we incorporate "off-the-books" sources of income as well.

An individual's rank within the gang is of critical importance for his personal remuneration. The local gang leader is the

16. We have consciously chosen to leave participant quotes in a raw form in order to provide as accurate a reflection of their statements as possible. Consequently, we have made no attempt to eliminate misstatements, profanity, and colloquialisms that typically would be edited out.

residual claimant on drug profits. As shown in Table II, the gang leader retains between \$4,200 and \$10,900 a month as profit, for an annual wage of \$50,000–130,000. This value is well above what leaders could hope to earn in the legitimate sector given their education and work experience. For instance, a former leader of a rival gang is now employed in the legitimate sector at an annual salary of \$16,000. His legitimate sector wage may be lower than it otherwise would have been, however, due to his intervening years spent in prison [Lott 1992; Nagin and Waldfogel 1995].

The officers each earn roughly \$1000 per month. This wage is relatively constant, although in war periods reductions sometimes occur. These tasks are generally full-time jobs (in the sense that the people who perform them would be unlikely to be concurrently employed in the legitimate sector, although they may not strictly involve 40 hours of work per week). The standard of living associated with holding these jobs is only slightly higher than a full-time minimum wage job.

This gang is unusual in that foot soldiers for the most part received a flat wage. Compensation was not directly linked to the volume of sales.¹⁷ Their wage depended both on the number of shifts in which they distributed crack and on their position within their drug-selling team. Crack was sold in teams of six foot soldiers, with a team leader, a carrier who delivers the goods, two laborers who package the goods, make change, etc., and a lookout. Wages were highest for the team leader and lowest for the lookout who is typically an entry level foot soldier.

Our monthly data, however, are not broken down to that level of detail. The only information we have is total wages paid to all foot soldiers in a month. Based on field notes recorded at the time, we have a reasonably accurate assessment of the number of shifts that were taking place, other gang-related activities that required the participation of foot soldiers, and the number of active foot soldiers. By combining this information with total foot-soldier wages, we are able to construct estimates of monthly earnings per foot soldier and an hourly wage.

It is important to recognize that imprecision in all of these measures introduces uncertainty into our wage and earnings estimates. While not perfectly accurate, we are most confident in our figures on “official” monthly earnings per foot soldier. As

17. In many other gangs, earnings of street-level sellers are closely tied to the number of sales through a commission structure.

discussed earlier, however, there are also “off-the-books” sources of income that are excluded from the gang's accounting data. Hourly wage determinations are subject to greater uncertainty, both because of possible inaccuracies in our estimates of the number of shifts performed and due to the inherent ambiguity in determining whether some gang-related activities (e.g., gang meetings, attending functions as a member of the local leaders entourage) should be classified as work or leisure.

Official monthly payments to each foot soldier are low: only \$200 per month or less until the final year. Based on observation and discussion with the gang leader, we estimate that the typical foot soldier worked four four-hour shifts per week selling drugs, and performed approximately four hours of other tasks for the gang, for a total of twenty hours of work per week. Hours worked per person appear to have stayed relatively constant over time. The increased demand for labor by the gang was accomplished through an expansion of the number of foot soldiers from approximately 25 at the beginning of the time period to over 60 in the final year. Based on these estimates of hours worked, the hourly wage earned by the typical foot soldier was below the federal minimum wage.

While these foot-soldier wages are strikingly low, there are both theoretical arguments and corroborating empirical evidence in support of these numbers.¹⁸ From a theoretical perspective, it is hardly surprising that foot-soldier wages would be low given the minimal skill requirements for the job and the presence of a “reserve army” of potential replacements among the rank and file. Similar features are observed in other gang case studies [Bourgois 1995; Padilla 1992]. Empirically, the behavior of the foot soldiers suggests that they are not well off financially. First, gang members below the level of gang leaders live with family because they cannot afford to maintain a separate residence. Second, many foot soldiers also hold low-paying jobs in the legitimate sector, typically working as service-sector employees in shopping malls and fast-food restaurants, performing physical labor such as demolition, or working in small local businesses like dry cleaners or grocery stores. We estimate that 75–80 percent of the foot soldiers are employed in the legitimate sector at some point over the

18. Data manipulation on the part of gang record-keepers cannot explain these low wages. If the gang were using the records to convince the central gang that they could not afford to pay additional money in tribute, we would expect foot-soldier wages to be systematically exaggerated rather than understated.

course of a year. Job tenure, however, is generally quite low, so that perhaps only 40–50 percent of the foot soldiers are employed in the legitimate sector at any given point in time (see also Hagedorn [1994]).¹⁹ Previous research suggests that even among well-paid drug sellers [Fagan 1992; Reuter, MacCoun, and Murphy 1990], more than 25 percent participate in the legitimate economy. The higher numbers we obtain for legitimate labor market participation are consistent with the lower drug-related earnings of the foot soldiers in our sample.

If there is one overriding puzzle in the data, it is the fact that foot-soldier wages rise dramatically in the final year of the data, more than doubling to \$470 per month. There are a number of potential explanations for this phenomenon. One possible reason is that foot soldiers assume more of the responsibility for defending the gang's turf, which carries great risk for which they must be compensated (as will be shown later, the risk of death almost doubles in the final year). Second, the gang leader becomes a member of the gang's central leadership (the elite group of sixteen who oversee the entire organization). This dramatically limits the amount of time he is able to spend monitoring this particular group, perhaps providing an incentive to pay efficiency wages. Third, efficiency wages may also serve the purpose of ensuring the loyalty of this group, especially the newly incorporated foot soldiers who were formerly members of the rival gang. Maintaining control of this turf is critical to the gang leader's ability to remain as a member of the central leadership, a position that allows him to extort nearly \$200,000 annually from other gangs across the city.²⁰ While we were unable to ask the gang leader himself why foot-soldier wages increased so much, we asked another former leader familiar with the situation what his

19. There is some anecdotal evidence that legitimate labor market participation responds to changing wages in the drug trade. For instance, a former foot soldier describes his past labor market behavior in the following way: "Well, once, when I was starting out slinging [selling drugs], we took over another building and we, well really just me and Kock, we had the whole place. But, even when everybody was in there, we were making like two times a month what we was getting before. Its not a lot of money, but if you start getting more money from [the officers of the gang], you get into your head that you don't need no other work. So I quit [my job at a fast-food restaurant]. But I went back and got the job I quit at, 'cause slinging wasn't bringing me no money after a while, you know, too dangerous and s---." Unfortunately, our data on legitimate labor market participation are not detailed enough to examine this issue more systematically.

20. Another possible explanation for the increased monthly wage would be an increase in hours worked. That does not appear to be the case, however.

explanation was. His answer suggested that many of the arguments mentioned above may be part of the story:

You never forget the n----- that got you where you are. You always got to treat them good 'cause you never know when you need them. That n----- [the gang leader who took over another territory] don't know if he can trust [his new foot soldiers] yet, so he gotta be real careful. If he don't take care of his own boys, he ain't gonna be up there [in the central gang leadership] very long, so he pays them real nice, you know. He just has to cause n----- got all these folks under him. It ain't easy to watch all them, so you gotta make sure they on your side.

Given the enormous gap between the wages of the foot soldiers and those higher up in the gang, the most reasonable way to view the economic aspects of the decision to join the gang is as a tournament, i.e., a situation in which participants vie for large awards that only a small fraction will eventually obtain [Lazear and Rosen 1981]. Gang members themselves appear to be keenly aware of this, as evidenced by the following quote from a foot soldier: "You think I wanta be selling drugs on the street my whole life? No way. But I know these n----- [above me] are making more money, and it's like, people don't last long doing this s---. So you know, I figure I got a chance to move up. But if not, s---, I get me a job doin' something else."

Table III presents empirical documentation of the tournament aspects of gang participation. If gang members are risk neutral, then the average wage in the organization captures the expected return to gang participation.²¹ For comparative purposes, observed hourly wages for the gang leader and foot soldiers are also presented. These rough estimates of average wages in the organization are based on a number of assumptions. First, it is assumed that the gang we study is representative of the roughly 100 locally based gangs that fall under the umbrella of the extended gang network, both in terms of number of members and the tribute paid to the central leadership.²² We further assume that 75 percent of the tribute paid to the central gang organization is profit (the other 25 percent covered various operating costs). Finally, we assume that the perceived likelihood of rising to each level of the gang is given by static expectations based on the

21. Of course, any particular individual's expected return will depend on his or her ability and effort. In a tournament context, the expected return (as well as, by definition, the actual return) may be very skewed.

22. After the gang we study expands its turf in year 3, we treat it as if it represents two of the 100 locally operating gangs.

TABLE III
GANG PARTICIPATION AS A TOURNAMENT

	Estimated hourly wage including only official income sources		Estimated hourly wage including both official and unofficial income sources		
	Gang leader wage	Foot soldier wage	Average wage for all gang members	Gang leader wage	Foot soldier wage
Year 1	\$4.80	\$1.70	\$ 5.90	\$32.30	\$2.50
Year 2	\$5.90	\$2.40	\$ 7.40	\$47.50	\$3.70
Year 3	\$5.60	\$2.20	\$ 7.10	\$65.90	\$3.30
Year 4	\$8.70	\$5.60	\$11.10	\$97.20	\$7.10

Estimates in the first three columns are based on the data reported in Table II. Estimates in the last three columns attempt to correct for possible underreporting of income due to either theft or "off-book" transactions. We assume that 10 percent of the value of drug sales is obtained "off-book" by the gang leader and that 15 percent of the value of drug sales is appropriated by the foot soldiers. We assume 20 hours a week of work by foot soldiers, and 40 hours a week by the gang leader and other gang officers. In addition, we assume that this gang is typical of the roughly 100 gangs operating within the larger organizational structure both in terms of tribute paid to the central leadership and with respect to the probability of advancement to the central leadership. The average wage for the organization as a whole includes the profit component of payments to the central leadership (assumed to be 75 percent of the overall tribute). All dollar values are in 1986 dollars.

composition of the current hierarchy in which there are roughly 3000 foot soldiers, 300 officers, 100 local leaders, and 16 central gang leaders.

Columns 1-3 present average wages under the assumption that the official data fully capture the wages and profits to the organization. Columns 4-6 adjust the official data under the assumption that the gang leader fails to report 10 percent of drug revenues and the foot soldiers skim an additional 15 percent. Focusing on that second set of estimates, which we believe to be more representative, the average wage in the organization ranges from \$5.90-\$11.10 during the sample period. This value is above legitimate market wages available to the foot soldiers, who, as poorly educated inner-city youths, are unlikely to earn much more than the minimum wage.²³ As discussed later, however, the wage premium earned by gang members is quite small given the enormous risks associated with selling drugs.

Table III demonstrates the enormous skew in the distribution of wages within the gang. The gang leader earns 10-20 times more than the average foot soldier. While this earnings gap is small compared with frequently cited numbers about CEO pay

²³ Note also that upward mobility within the gang occurs much more quickly than in the formal sector. A successful gang member may become a local leader by his early- to midtwenties.

(e.g., Reingold [1997]), it should be noted that the gang leader to whom we refer has only a few hundred employees, and is two levels in the hierarchy below those who run the gang organization. More directly comparable are the data on franchise owners who, like gang leaders, put up capital and are residual claimants on accumulated profits. Michael and Moore [1995] report that franchise owners receive slightly over \$100,000 (in 1995 dollars) in operating income, a number similar to that earned by gang leaders in our data. To the extent that employees of franchises appear to be paid more than the foot soldiers, the distribution of wages is more skewed in the gang than in the typical franchise.

Relative to existing estimates of the returns to drug selling based on self-reported data, our numbers appear low. There are a number of possible explanations for this discrepancy. First, there may be systematic misrepresentations in either our accounting data or in the self-reports of drug sellers. Although we do not have self-reported data for this particular gang, when we have asked foot soldiers in other gangs how much they earn, we often obtain highly inflated values relative to what the gang leaders report foot soldiers in the gang making. Second, our sample of drug sellers is very different from that of Reuter, MacCoun, and Murphy [1990] in Washington, DC, or Fagan [1992] in New York. Both of those studies focused on independent dealers who are not wage earners, but rather entrepreneurial capitalists. The sellers in those studies are more similar to officers or local leaders than foot soldiers and earn incomes that are consistent with the higher-level members of this gang.

IV. CAUSES AND CONSEQUENCES OF GANG WARS

Due to the illicit nature of the drug trade, gangs do not have access to legally enforceable contracts or property rights. The illegality of drug selling also makes advertising difficult. As a consequence, violence emerges both as a primary tool with which disputes are resolved (both within the gang and across gangs) and is used strategically as a form of nonprice competition. In this section we investigate gang wars.

In this paper a gang war is defined as a prolonged period of violence involving repeated exchanges of weapons fire between rival gangs. During gang wars, there is an easily discernible reduction in street activity and public loitering, and typically a heightened police presence. Information on the existence of a gang

TABLE IV
THE IMPACT OF GANG WARS ON GANG FINANCES
Monthly Averages in 1995 Dollars

Category	Preexpansion		Postexpansion	
	Gang war	No gang war	Gang war	No gang war
Total revenues	17,100	25,600	54,500	76,900
Drug sales	10,900	19,000	44,500	58,900
Dues	5,300	5,300	10,000	10,000
Extortionary taxes	900	1,300	0	8,000
Total nonwage costs	10,200	10,600	30,400	24,500
Cost of drugs sold	2,800	3,900	11,300	12,800
Tribute to gang hierarchy	1,400	5,000	5,800	5,900
Mercenary fighters	3,600	0	5,000	0
Funerals/payments to families of the deceased	1,000	300	2,300	800
Weapons	600	300	3,000	1,600
Miscellaneous expenses	800	1,100	3,000	3,400
Total gang wages	7,900	6,600	25,600	37,600
Officers	1,500	2,900	2,300	3,800
Foot soldiers	6,400	3,700	23,300	33,800
Net profit accruing to leader	-1,000	8,400	-1,500	14,800
Monthly wage per foot soldier	220	130	370	540
Price and quantity of drugs sold:				
Quantity ("bags")	1,442	2,019	7,556	8,563
Price (per bag in 1995 dollars)	7.12	9.54	5.90	6.86

Data in the table reflect monthly averages for the time periods in which a gang war is or is not ongoing, both before and after the expansion in territory. The five months corresponding to the transition period associated with the growth in territory are excluded from the table due to ambiguity about the presence or absence of a gang war. Values are based on monthly data for the four-year period. Data are unavailable for 6 of the 48 months in the sample. All dollar values have been converted into 1995 dollars using the GDP deflator. All values are rounded to the nearest hundred dollars. Estimates include only revenue sources included in official gang records.

war during a particular month was collected by Venkatesh in the context of a past ethnographic analysis. Over the period we study, there are seven episodic gang wars lasting for a total of twelve months, or roughly one-quarter of our sample. There are gang wars in each of the four years of our sample. In addition, there is a five-month period of transition in the third year of our data during which the gang incrementally seizes control of the territory to the north. This transition period was characterized by a protracted, low-level incidence of violence, unlike the acute outbursts of violence in the other gang wars.

Table IV separates the data on revenues and costs into pre-

and postexpansion time periods both with and without gang wars. The five-month transition period is excluded from this table. Comparing columns 1 and 2 (gang wars versus no gang war prior to expansion), drug revenues fall almost in half in war months. The quantity of drugs sold falls 29 percent, and price falls 25 percent. Thus, gang wars differ from episodes where cooperation breaks down among colluding suppliers [Porter 1983; Ellison 1994]. In those cases, price falls, and quantity rises. In contrast, gang wars induce large, adverse demand shocks. Customers are afraid to come purchase drugs, as evidenced by the following observation by a gang officer: "Ain't no way nobody gonna come 'round here looking for their rock [crack] if they know they gonna get shot. People got too many options, man, they got too many n----- that they can buy they s---- from, so why come to us if we can't keep s---- safe for 'em?"

During gang wars, net profits are actually slightly negative (-\$1000 per month preexpansion; -\$1500 per month postexpansion). A month of fighting costs the gang leader over \$10,000 on average in short-run profits. Interestingly, prior to the takeover the gang sells drugs at or below marginal cost during gang wars. Drug sales bring in \$10,900 per month during gang wars. Foot-soldier wages, payments to mercenary fighters, and costs of drugs sold are all marginal costs. Expenditures on those three categories add up to \$12,800 in gang wars, well above the revenues generated.

The decision to price below marginal cost suggests one of three possibilities. First, the gang is simply mispricing their product. Second, the low price is a strategic response designed to punish the rival gang for the attack. Third, there may be costs for drug buyers associated with switching suppliers. If that is the case, then pricing below marginal cost in the short run to maintain market share may be rational [Klempner 1995]. Discussions with leaders suggest that it is the last of these explanations that drives the decision to sell their product cheaply during gang wars. In the words of one leader, "Wars is bad for everybody, so you just gotta deal with it, take the loss. Cats, when they start using, they need their s--- [drugs]. They can go all over to get what they need if you ain't selling. So you take care of them. Sometimes we just give them something free so they come back when s---- quiets down."

A final feature to note with respect to gang wars is the steep increase in foot-soldier wages during wars in the early part of the

sample. Preexpansion, foot-soldier wages are almost 70 percent higher during gang wars.²⁴ The increase in foot-soldier wages appears to be a clear example of compensating differentials. As one foot soldier put it at the time: "Would you stand around here when all this s--- [shooting] is going on? No, right? So if I gonna be asked to put my life on the line, then front me the cash, man. Pay me more 'cause it ain't worth my time to be here when [the gangs are] warring."

Comparing columns 3 and 4 of Table IV, the compensating differential paid by the gang in war months disappears. While this is somewhat puzzling, one explanation is that foot soldiers are being paid such a high wage postexpansion. Thus, even though the wage falls somewhat during wars, it is higher than in preexpansion war months. Given that the gang leader absorbs losses in war periods, a cash-flow constraint on the part of the leader would provide a simple explanation for why wages do not rise during wars in the latter half of the sample. According to another gang leader, it is not actually cash constraints that limit wage payments, but rather the perceived importance of the leader making a profit: "You got all these n----- below you who want your job, you dig. So, you know, you try to take care of them, but you know, you also have to show them you the boss. You always have to get yours first, or else you really ain't no leader. [If] you start taking losses, they see you [as] weak and s----."

Table V presents regression analysis of the data in order to control for multiple factors changing in the data simultaneously. Trends in the drug trade, seasonal fluctuations, and the expansion of the gang's turf make direct interpretation of the summary statistics potentially misleading.

The basic specification utilized is as follows:

$$(1) \quad \begin{aligned} DEPVAR_t = & \alpha + \beta_1 WAR + \beta_2 TRANSITION \\ & + \beta_3 POSTEXPANSION \\ & + SEASON INDICATORS \\ & + TIME TREND + \epsilon_t, \end{aligned}$$

where t indexes time and $DEPVAR$ is any one of a range of possible gang financial measures: profits (as measured by the residual

24. This rise is almost certainly a lower bound on the increase in the hourly wage because the number of hours worked during gang wars is typically less than that in nongang war months.

TABLE V
REGRESSION RESULTS

Variable	Gang surplus (leader profit plus wages)	Gang leader profit	Revenues from drug sales	Price	Quantity	Foot soldier hourly wage
Gang war	-13,407 (2,210)	-11,030 (1,307)	-10,982 (1,830)	-1.90 (.38)	-879 (147)	1.30 (.45)
Transition period	1,352 (3,496)	-998 (2,038)	690 (3,246)	-1.49 (.84)	719 (225)	1.08 (.76)
Postexpansion	23,735 (3411)	-444 (1,983)	24,340 (3,246)	-2.09 (.89)	4,818 (218)	4.07 (.75)
Summer	-1,546 (2,393)	-771 (1,402)	-1,531 (2,125)	.06 (.50)	-144 (156)	-0.7 (.51)
Fall	3,685 (2,261)	4,456 (1,319)	3,048 (2,085)	.60 (.52)	325 (145)	-1.3 (.49)
Winter	2,045 (2,681)	2,737 (1,575)	1,283 (2,336)	.55 (.53)	-83 (175)	-0.5 (.56)
Monthly trend	261 (106)	162 (62)	483 (101)	-.006 (.028)	57 (7)	.004 (.023)
Intercept	12,120 (2321)	5,204 (1,352)	12,193 (2,178)	9.15 (.59)	1,238 (149)	1.83 (.51)
ρ	-.23	-.26	-.03	-.23	-.30	-.10
Adjusted R^2	.90	.80	.94	.50	.99	.74
Mean of dependent variable	22,294	7,474	28,267	8.05	3,789	3.41

Dependent variable is listed at the top of each column. The unit of observation is a month. Data cover a four-year period, with six months missing over the sample. All values are in dollars except for quantity, which roughly corresponds to number of bags sold. The Cochran-Orcutt estimation method is used to allow for first-order serial correlation. ρ is the estimated degree of serial correlation. All estimates are based on official gang records and have not been corrected for potential underreporting. Standard errors are in parentheses.

income stream accruing to the local leader), price, quantity, etc. WAR is an indicator variable equal to one if a gang war occurs in the month in question, or zero otherwise. WAR is best interpreted as a summary statistic for risk. Given the limited sample, it is impossible to disentangle the individual contributions of the underlying risk factors (death, injury, and arrest), all of which are positively correlated. $TRANSITION$ is an indicator variable equal to one in the five months during which the gang's turf was expanding, and zero otherwise. $POSTEXPANSION$ is an indicator variable equal to one after the expansion is complete, and zero otherwise. The omitted category is preexpansion. Three seasonal dummies are included (spring is the omitted category), as is a linear time trend. When included, a quadratic time trend was

never statistically significant and generally did not have a large effect on the key coefficients. Equation (i) is estimated using the Cochran-Orcutt procedure allowing for first-order serial correlation in the error term.

Table V presents the regression results. Each column corresponds to a different dependent variable. Somewhat surprisingly, there does not appear to be a strong seasonal component to any of the variables. In general, fall appears to be the best season for selling drugs, and summer the worst. For most of the columns, however, one cannot reject the null hypothesis of no seasonal effects. Even after controlling for the turf expansion, there are strong positive trends in gang surplus, profit, drug revenues, and quantity sold. Drug revenues, for instance, increased almost \$500 per month over the sample, everything else held constant. This increase is entirely attributable to an increase in the quantity of drugs sold. Price exhibits a negative, but statistically insignificant trend. The transition period is not very different from the preexpansion months: quantity rises and price falls, but revenues, profits, and total surplus are statistically indistinguishable from the earlier period. The postexpansion months, on the other hand, represent a radical break.

Wars are associated with dramatic declines in price, quantity, profit, and drug revenue. The regression results support the compensating differential story, with foot-soldier hourly wages about 40 percent higher during gang wars. All of these estimates are roughly consistent in magnitude with the impacts observed in the summary statistics in earlier tables. In all cases the gang war variable is highly statistically significant.²⁵

Given the costs of gang wars, it is somewhat puzzling that they occur so frequently in the data. Economists generally believe that two parties should be able to bargain to an efficient outcome, although there are many examples to the contrary (e.g., labor strikes, the killing of hostages, wars, etc.). The bargaining problem faced by the gangs is a particularly difficult one due to the absence of property rights and legally binding contracts. The

25. It is possible that gang wars have both contemporaneous and lagged effects on gang finances. To test that hypothesis, once-lagged values of WAR were added to the specifications in Table V. Although never statistically significant, the lagged war variables take on the opposite sign of the contemporaneous war measure in almost every instance. For instance, drug revenues are roughly \$4000 higher than otherwise would be expected in the month after a gang war (standard error equal to 2500). This suggests that there is some intertemporal demand shifting taking place, with buyers delaying consumption until the gang war ends.

conditions of the Coase Theorem, therefore, do not apply. Given liquidity constraints on the part of the local leaders, problems of commitment, and an inability to prevent new entrants, it would be difficult for one gang leader to make a large cash transfer to the other in return for transferring control of turf. Furthermore, given the risk of violence, face-to-face bargaining is difficult because the opposing gang leader may simply kill you. Thus, fighting may have been the only feasible means of transferring control.

While it is not surprising that a costless transfer of control could not be arranged, the inability of the two gangs to better maintain a collusive equilibrium is somewhat of a puzzle. This is especially true given that gang wars are so costly for both sides and that both participants demonstrate a willingness to punish the other gang (e.g., drive-by shootings) *ex post*. The explanation for this appears to be that there are important agency problems within the gang that make such collusion unstable. Much of the violence is not sanctioned by the gang, but rather arises because a particular foot soldier interested in moving up the hierarchy may have a strong incentive to build a reputation for toughness and thus may engage in violence even if such actions run counter to the best interests of the gang. Once such violence occurs, it is difficult for the opposing gang not to retaliate. Reining in the violent propensities of the foot soldiers appears to be one of the most important managerial tasks of a gang leader. As one leader put it, "We try to tell these shorties [foot soldiers] that they belong to a serious organization. It ain't all about killing. They see these movies and s---, they think its all about running around tearing s--- up. But, its not. You gotta learn how to be part of an organization, you can't be fighting all the time. Its bad for business." Leaders adhere to these words when it comes time for promotion. Although willingness to engage in limited violence increases the likelihood of promotion to the rank of officer, those who engage in wanton violence do not advance [Venkatesh and Levitt 1999].

Although fighting may have been a high cost means to transfer control of the territory north of the gang we observe, it is clear that there are efficiency gains once the takeover is complete. Gang surplus and drug revenues are over \$23,000 a month higher after the expansion, or almost double the mean values for these variables observed over the sample. Based on admittedly crude information obtained from the rival gang to the north, their drug revenue was three times lower than the subsequent earnings

reaped after the gang we observe usurped control. The escalation in revenue is primarily due to the weak organizational structure of the rival gang, one ill-suited to drug selling. In the rival gang, the local leader serves as a wholesale distributor from whom low-level gang members (like our foot soldiers) purchase drugs, which they in turn sell on the street. Low-level sellers need to raise capital to purchase the wholesale drugs. This turns out to be an important constraint. Consequently, the rival gang has a smaller number of sellers on the street at any given time. These different organizational structures are carried over from the 1960s, prior to crack. The rival gang was unable or unwilling to adopt a more corporate form when crack arrived.²⁶ In addition, the increased profitability after consolidation is a by-product of the doubling of territory which increased the local market power of the gang. Many of the customers come on foot, so increasing a gang's turf from 12 square blocks to 24 square blocks may substantially reduce competition. Consistent with the local market power hypothesis is the fact that the price of crack charged by the gang does not fall as quickly after the takeover as does the citywide price of crack (a 27 percent decline between year 2 and year 4 for the gang relative to a 40 percent citywide price fall [Abt 1997]).²⁷

A final point worth noting on gang wars is that their strategic aspects are not lost on the participants. Gangs use violence on their competition's turf as an explicit strategy for shifting demand to their own territory. As one former member of the rival gang put it during a gang war:

See the thing is they [the gang for which we have data] got all these places to sell, they got the numbers [of sellers], you know. It's not like we can really do what they doing. So we gotta try get some kinda advantage, a business advantage. If we start shooting around there [the other gang's territory], nobody, and I mean it you dig, nobody gonna step on their turf. But we gotta be careful, 'cause they can shoot around here too and then we all f-----. But, it's like we ain't got a lotta moves we can make, so I see shooting in their 'hood as one way to help us.

In fact, in some cases, a gang engages in drive-by shootings on a rival's turf, firing into the air. The intention is not to hurt anyone,

26. Interestingly, this same scenario plays out in many areas across the city. The share of turf in the city represented by the rival gang family declines sharply in the five years after the arrival of crack, most likely as a result of the ineffectiveness of this gang at maximizing drug revenues.

27. Noise in the price series is substantial, so this conjecture must be viewed as highly speculative.

TABLE VI
FREQUENCY OF ADVERSE EVENTS

Adverse event	Likelihood of occurrence per person month							
	Preexpansion				Postexpansion			
	Gang war	No gang war	Transition period	Gang war	No gang war	Gang war	No gang war	Cumulative frequency over four-year period
Violent death	.012	0	.018	.021	.002	.277		
Nonfatal wound or injury	.078	.033	.100	.075	.051	2.40		
Arrest	.155	.103	.214	.219	.133	5.94		
Number of months in sample	9	17	5	3	8	42		

Data are based on interviews, research notes gathered over the course of the period, and gang records. Adverse events include only those affecting core gang members (i.e., leader, other officers, foot soldiers). The first four columns capture monthly frequencies; the final column is the cumulative frequency over the four years in our study, taking into account the fraction of months that fall into each category in the sample.

but rather to scare potential buyers. It is interesting to note that the gang member understands the game-theoretic consequences of such actions corresponding to retaliation by the rival, in which case both parties are worse off than if no violence had occurred.

V. THE DANGERS OF DRUG SELLING AND THE WILLINGNESS OF GANG MEMBERS TO ACCEPT RISK

Table VI presents information on the frequency of adverse events in our sample, expressed in terms of likelihood per gang member per month. Results are separately compiled for war and nonwar months before and after the takeover, and for the transition period. These data are based on field notes compiled concurrent with the events. The number of deaths is complete and accurate. The counts on injuries and arrests represent lower bounds as some of these might have been left out of the field notes. Unfortunately, we do not have good information on time served in jail or prison by the gang members as a consequence of these arrests.

Table VI highlights the tremendous risks associated with participation in the drug trade, at least in this particular gang during times of fighting. The per-person likelihood of death ranges from 1 to 2 percent a month during gang wars and the transition period. Using the actual number of months in the sample falling into each category (listed in the bottom row of the table), it is possible to construct the cumulative frequency of adverse events

per gang member over the four-year period observed. That number is displayed in the last column of Table VI. Gang members who were active for the entire four-year period had roughly a one in four chance of dying. Furthermore, there was an average of over two nonfatal injuries (mostly gunshot, but some due to knives or fists) per member, and almost six arrests.²⁸ The risks associated with selling drugs in this sample are astonishing. By comparison, homicide victimization rates for black males aged 14–17 in the United States are roughly 1 in 1000 per year, about 1/80 the rate we observe in this sample. Even among rank and file of this gang (those affiliated with the gang, but not actively engaged in the drug trade), homicide rates are only about 1 in 200 annually in our sample.

Using the frequency of adverse events, it is possible to calculate a rough estimate of the willingness of the foot soldiers to accept risk of death, or extrapolating, the implicit valuation they place on their own lives in the current context [Viscusi 1992]. In order for such calculations to be reasonable, the participants must be relatively well-informed about the rewards and risks, and the ex post outcomes must be consistent with ex ante projections. We generate estimates using four different possible comparisons. In each instance, we focus only on the likelihood of death, ignoring differences in the number of injuries or arrests. For this reason, the values we obtain may be systematically upward biased. In all cases, we use the estimated wage that includes not only the officially recorded payments but also the “off-the-books” income adjustment.

The first comparison is between foot-soldier wages in war and nonwar months in the preexpansion portion of our sample. The average monthly wage in war and nonwar months is calculated to be \$250 and \$150, respectively, or a \$100 differential.²⁹ Given an observed differential in the chance of violent death of .012 per month from Table VI, the implied value of a life is a little over \$8000. This number may be unrealistically low because foot soldiers may be compelled to sell drugs during war months

28. The injury numbers do not include injuries sustained as the result of punishment by the gang for rules violations. Note that these adverse event calculations refer only to core gang members (i.e., the leader, officers, and foot soldiers). For peripheral gang members (i.e., the rank and file) who are not actively involved in drug dealing, the risks are an order of magnitude lower. One rank and file was killed during our sample, and a handful were wounded.

29. These monthly wages are based on the values reported in Table IV, but adjusted for off-the-books income.

through threats of punishment—in some gangs compulsion may be quite pronounced with high exit costs. Furthermore, to the extent that heroic actions in wars are rewarded with promotions, this static analysis may not adequately capture the trade-offs involved in war months. Certainly, acts of heroism by soldiers in wartime periods are not uncommon, further calling into question the relevance of this particular calculation as a measure of willingness to accept risk.

A second possible approach relies on a comparison of foot-soldier wages pre- and postexpansion. In contrast to the previous measure, this calculation may systematically overstate the value of a life since the overall profitability of the drug operation is increasing over time. Thus, part of the wage increase may not be due to the increased risk in the latter part of the sample, but to other factors. Taking a weighted average over all relevant months, average foot-soldier wages rise from \$185 per month before expansion to \$570 after expansion. The weighted average chance of death per person per month rises from .00415 before expansion to .00718 afterwards. This approach yields an implicit valuation of \$127,000 on a foot-soldier life.

The final two comparisons are between gang wages and market wages (both before and after expansion). We use an (after-tax) market wage of \$4.00 as the baseline.³⁰ We also assume that the likelihood of violent death is zero for nongang members.³¹ The average gang wage before expansion is \$6.60. Assuming twenty hours of work a week, the gang premium translates into an extra \$220 per month. Given a .00415 chance of death per month, the implicit valuation on life is \$53,000. A similar calculation for the postexpansion period yields a valuation of \$90,000. Note that these last two comparisons may overstate the willingness to accept risk if gang work is more pleasant than a formal-sector job or there are nonpecuniary benefits associated with gang membership.³²

In all four scenarios examined, foot soldiers demonstrate an apparent willingness to accept risks of death in return for small

30. Because of low earnings, the tax rate on legitimate sector earnings is likely to be low. However, if the individual lives in a household receiving AFDC and this income is reported, then the marginal tax rate may in fact be close to (or even greater than) one.

31. Using the death rate of rank and file from this gang does not materially affect the conclusions.

32. Although many of the nonpecuniary benefits of the gang are available to the rank and file without the high risk of death faced by foot soldiers.

amounts of financial compensation. The values obtained in this paper are far below those typically found in the literature [Viscusi 1992]. Our results are consistent with the matter-of-fact manner in which foot soldiers speak about death. For instance, one nineteen year-old foot soldier described his situation as follows, "It's a war out here, man. I mean everyday people struggling to survive, so you know, we just do what we can. We ain't got no choice, and if that means getting killed, well s---, it's what n----- do around here to feed their family."

An alternative explanation for the low estimated value of life is that the ex post death rates exceeded the ex ante predictions of the participants. The death rates in our sample are higher than have been found in past research. Kennedy, Piehl, and Braga [1996], for instance, estimate annual death rates of Boston gang members to be between 1.5 and 2 percent.³³ Using that death rate in place of the numbers we obtain, the wage differentials we find yield estimated valuations of life of at most \$500,000—still only one-tenth the typical estimate in this literature.

VI. CONCLUSION

This paper provides the first detailed analysis of the financial activities of an entrepreneurial street gang. The data imply that for this gang drug dealing is not particularly lucrative, yielding average wages only slightly above those of the legitimate sector. Hourly wages for those on the lowest rung of the gang hierarchy are no better than the minimum wage. The wage structure within the gang is highly skewed, however, so that the more reasonable way to measure the economic rationale for gang participation is in the context of a tournament. Gang wars are extremely costly in terms of injuries, death, and profits. Nonetheless, fighting takes place over roughly one-fourth of the sample. The willingness to accept a risk of death among gang members appears to be extremely high.

Taken as a whole, our results suggest that even in this financially sophisticated "corporate" gang, it is difficult (but not impossible) to reconcile the behavior of the gang members with an optimizing economic model without assuming nonstandard prefer-

33. Rosenfeld and Decker [1996] report that annual violent death rates among all African-American males between the ages of 15 and 24 in St. Louis were 0.5 percent in the early 1990s. For gang members this number was undoubtedly much higher.

ences or bringing in social/nonpecuniary benefits of gang participation. Similarly, while certain business practices such as frequent gang wars and pricing below marginal cost can be fit into a framework of economic maximization, the possibility of suboptimal decision making cannot be eliminated from consideration.

Our results provide general guidance as to possible public policy interventions that might be useful for combating gang violence. The fact that most foot soldiers are simultaneously employed by the gang and in the legitimate sector suggests that gang participation may be sensitive to improvements in outside opportunities. That suggests a possible role for job-market interventions aimed at high-risk youths (see also Grogger [1991]).³⁴ However, given the tournament structure of the gang and the symbolic value attached to the upward mobility, minor changes in the immediate economic returns to foot soldiers do not appear paramount in determining gang involvement. Thus, it seems unlikely that such a policy by itself could be successful.

An alternative approach to reducing the attractiveness of gang involvement is to lower the profitability of the organization. One way to do this would be to substantially increase punishments and enforcement against drug purchasers. This would put downward pressure on both the price and quantity of drugs sold. A very different strategy is drug legalization. Faced with competition from legal sources of drugs, the gang's market would evaporate. Without profit to fight over, gang violence would likely return to precrack levels. Of course, the adverse consequences of either draconian punishment of drug users or legalization might be severe and need to be weighed against any benefits associated with reduced gang violence.

It is impossible to know how representative the particular gang we study is. To the extent that the gang kept detailed financial records and was expanding prior to the police crackdown that led to their demise, one might suspect that this group was more economically sophisticated than the typical street gang. Obtaining parallel data for other gangs remains an important challenge.

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34. A higher minimum wage might be counterproductive, however, if it leads to an increased income in the neighborhood and thus an increased demand for crack. For a more general discussion of organized crime in a general equilibrium context, see Zakharova [1998].

REFERENCES

- Abt and Associates, "Prices of Illicit Drugs: 1981-1997," Law and Public Policy memorandum, 1997.
- Akerlof, George, and Janet Yellen, "Gang Behavior, Law Enforcement, and Community Values," in Henry Aaron, Thomas Mann, and Timothy Taylor, eds., *Values and Public Policy* (Washington, DC: Brookings Institution, 1994).
- Baker, George, Michael Gibbs, and Bengt Holmstrom, "The Wage Policy of a Firm," *Quarterly Journal of Economics*, CIX (1994), 921-955.
- Block, Carolyn B., and Richard Block, "Street Gang Crime in Chicago," Research in Brief, National Institute of Justice, Office of Justice Programs, U. S. Department of Justice, 1993.
- Bourgois, Philippe, "In Search of Horatio Alger: Culture and Ideology in the Crack Economy," *Contemporary Drug Problems*, XVI (1989), 619-150.
- , *In Search of Respect: Selling Crack in El Barrio* (Cambridge: Cambridge University Press, 1995).
- Ellison, Glenn, "Theories of Cartel Stability and the Joint Executive Committee," *Rand Journal of Economics*, XXV (1994), 37-57.
- Fagan, Jeffrey, "The Dynamics of Crime and Neighborhood Change," in *The Ecology of Crime and Drug Use in Inner Cities* (New York: Social Science Research Council, 1992).
- Fagan, Jeffrey, and Richard Freeman, "Crime and Work," unpublished manuscript, 1999.
- Freeman, Richard, "Crime and the Employment of Disadvantaged Youths," in George Peterson and Wayne Vroman, eds., *Urban Labor Markets and Job Opportunity* (Washington, DC: Urban Institute Press, 1992).
- Grogger, Jeff, "Certainty vs. Severity of Punishment," *Economic Inquiry*, XXIX (1991), 297-309.
- , "The Effect of Arrests on the Employment and Earnings of Young Men," *Quarterly Journal of Economics*, CX (1995), 51-72.
- Hagedorn, John, *People and Folks: Gangs, Crime and the Underclass in a Rustbelt City* (Chicago: Lake View Press, 1988).
- , "Homeboys, Dope Friends, Legrits, and New Jacks," *Criminology*, XXXII (1994), 197-219.
- Jankowski, Martin Sanchez, *Islands in the Street: Gangs and American Urban Society* (Berkeley: University of California Press, 1991).
- Kennedy, David, Anne Pihl, and Anthony Braga, "Youth Violence in Boston: Gun Markets, Serious Youth Offenders, and a Use-Reduction Strategy," *Law and Contemporary Problems*, LIX (1996), 147-183.
- Klein, Malcolm, *The American Street Gang: Its Nature, Prevalence and Control* (New York: Oxford University Press, 1995).
- Klemperer, Paul, "Competition When Consumers Have Switching Costs: An Overview with Applications to Industrial Organization, Macroeconomics, and International Trade," *Review of Economic Studies*, LXII (1995), 515-539.
- Lazear, Edward, and Sherwin Rosen, "Rank Order Tournaments as Optimum Labor Contracts," *Journal of Political Economy*, LXXXIX (1981), 841-864.
- Lott, John, "An Attempt at Measuring the Total Monetary Penalty from Drug Convictions: The Importance of an Individual's Reputation," *Journal of Legal Studies*, XXI (1992), 159-187.
- Michael, Steven, and Hollie Moore, "Returns to Franchising," *Journal of Corporate Finance*, II (1995), 133-155.
- Nagin, Daniel, and Joel Waldfogel, "The Effects of Criminality and Conviction on the Labor Market Status of Young British Offenders," *International Review of Law and Economics*, XV (1995), 109-126.
- Padilla, Felix, *The Gang as an American Enterprise* (New Brunswick: Rutgers University Press, 1992).
- Porter, Robert, "A Study of Cartel Stability: The Joint Economic Committee, 1880-1886," *Bell Journal of Economics*, XIV (1993), 301-314.
- Reingold, Jennifer, "Executive Pay," *Business Week*, April 21, 1997, 58.
- Rosenfeld, Richard, and Scott Decker, "Consent to Search and Seize: Evaluating an Innovative Youth Firearm Suppression Program," *Law and Contemporary Problems*, LIX (1996), 197-219.
- Reuter, Peter, *Disorganized Crime: Illegal Markets and the Mafia* (Cambridge: MIT Press, 1983).
- Reuter, Peter, Robert MacCoun, and Patrick Murphy, *Money From Crime: A Study of the Economics of Drug Dealing in Washington, D. C.* (Santa Monica, CA: RAND), 1990.
- Schelling, Thomas, "What Is the Business of Organized Crime?" in *Choice and Consequence* (Cambridge: Harvard University Press, 1984).
- Southerland, Mittie, and Gary Potter, "Applying Organization Theory to Organized Crime," *Journal of Contemporary Criminal Justice*, IX (1993), 251-267.
- Spergel, Irving, *The Youth Gang Problem: A Community Approach* (New York: Oxford University Press, 1995).
- Stutless, Gerald, *Social Order of the Slum* (Chicago: University of Chicago Press, 1968).
- Taylor, Carl, *Dangerous Society* (East Lansing: Michigan State University Press, 1990).
- Thrasher, Frederick, *The Gang* (Chicago: University of Chicago Press, 1927).
- Venkatesh, Sudhir, and Steven Levitt, "Aging in an American Street Gang: Toward a Life-Course Perspective on Gang Involvement," American Bar Foundation, *Law's Disciplinary Encounters*, Bryant Garth, Robert Nelson, Victoria Woeste, eds., (2000, forthcoming).
- Viscusi, Kip, *Fatal Tradeoffs: Public and Private Responsibilities for Risk* (Oxford: Oxford University Press, 1992).
- , "The Risks and Rewards of Criminal Activity: A Comprehensive Test of Criminal Deterrence," *Journal of Labor Economics*, IV (1996), 17-40.
- Williams, Terry, *The Cocaine Kids: The Inside Story of a Teenage Drug Ring* (Reading, MA: Addison-Wesley, 1989).
- Wilson, James Q., and Allan Abrahamse, "Does Crime Pay?" *Justice Quarterly*, IX (1992), 359-377.
- Zakharova, Daria, "Dynastic Criminal Organizations," unpublished manuscript, University of Minnesota Department of Economics, 1998.