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THE ECONOMIC STATUS OF AMERICAN CASUALTIES
OF THE VIETNAM WAR

by

Timothy David Stanley

B.S. Civil Engr., Virginia Military Institute
(1984)

Submitted to the Department of Electrical Engineering in Partial Fulfillment of the
Requirements for the Degree of

MASTER OF SCIENCE
in Operations Research

at the

Massachusetts Institute of Technology

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Signature of the Author

Timothy D. Stanley
Operations Research Center
8 May, 1992

Certified by

Arnold I. Barnett
Professor of Operations Research
Sloan School of Management
Thesis Supervisor

Accepted by

Richard C. Larson
Professor of Electrical Engineering
Co-Director, Operations Research Center

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Abstract

An analysis of data concerning American casualties of the Vietnam war indicates that wealthy communities had only slightly lower casualty rates than poorer communities. Detailed data for urban and rural areas, as well as data for casualties from wealthy towns, is examined in order to test the hypothesis that casualty patterns reflect great economic disparity. Various perspectives on the data consistently lead to the conclusion that economic disparity among casualties of the Vietnam war is often overstated in public debate about the issue

Thesis Supervisor: Dr. Arnold Barnett

Title: Professor of Operations Research

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Table of Contents

Abstract	2
Acknowledgments	3
Table of Contents	4
List of Tables	6
List of Figures	7
I. Introduction	8
II. Previous Research	10
Rural Casualties	11
Cities	12
Wealthy Communities	12
III. Method	14
Selection of the Sample	14
IV. Data Collection Results	17
V. Analysis of Data	18
Urban Analysis	18
Rural Analysis	21
Wealthy Analysis	22
VI. Application of Findings to Original Sample	25
Assignment of Incomes to Casualties	25
Estimation of National Income Distribution	26
Results	26
National Disparity Statistic	26
Regional Disparity Statistics	26
VII. Other Issues	29
The Draft and Race	29
Opting Out Analysis	31
Participation in Force vs. Casualties	31
VIII. Conclusions	34
Appendix A: Collection of National Archives Data	37
Appendix B: Census Terms and Products	39
Appendix C: Adjustment of Original Sample	42
Assignment of Incomes to Casualties	42
Rural Casualties	42

Urban Casualties.....	43
Estimation of National Income Distribution	46
Appendix D: Data Collection Results	50
Bibliography.....	54
Biographical Note.....	56

List of Tables

Table 1: Percent of Casualties in Each Decile and Age Adjustments.....	20
Table 2: Evidence of Rural Inflation.....	22
Table 3: Misreporting of Wealthy HOR's.....	23
Table 4: Percentage of Casualties in Each Decile by Region.....	28
Table 5: Disparity Statistics Based on Draft Status.....	30
Table 6: Estimated Draft Casualties in the Paygrades E4 and Below	30
Table 7: Casualties from Wealthy Communities Over Time	32
Table 8: Participation of Casualties from Wealthy Communities in Different Paygrades.....	32
Table 9: Percentage of City Casualties Actually Living in Suburbs.....	43
Table 10: Percentage of Casualties in Each Quartile of Income Distribution	43
Table 11: Percentage of Each City's 15 Year Old Males in Each Quartile of Income Distribution.....	44
Table 12: Percentage of Casualties in Each Quartile of Income Distribution Adjusted for Military Age Population	45
Table 13: Average Percent Casualties in Each Category.....	45
Table 14: Division of Sample Casualties Between Categories	45
Table 15: Telephone Book Rule for Randomization	46
Table 16: Initial Results of Randomization.....	46
Table 17: Percent of Each City's Population in Each Quartile of Family Income Distribution.....	47
Table 18: National Income Distribution.....	49
Table 19: Data Collection Results, Baltimore	50
Table 20: Data Collection Results, Chicago.....	51
Table 21: Data Collection Results, Portland.....	51
Table 22: Data Collection Results, San Antonio.....	52
Table 23: Data Collection Results, Columbia	52
Table 24: Data Collection Results, Ann Arbor.....	53
Table 25: Data Collection Results, Random and Wealthy Samples	53

List of Figures

Figure 1: Example Disparity Statistic	11
Figure 2: Percentiles Assigned to Casualties from Wealthy Towns.....	23

I. INTRODUCTION

The belief that the burden of the Vietnam conflict was borne by the poor and underprivileged of our society is widely accepted. It has become an integral part of the way we perceive the war. It is a belief that stretches across the political spectrum. It not only influences policy decisions that affect how we man our military, it also provides part of the background against which we judge the fitness of our potential political leaders.

There are several reasons to suppose that the economic status of Vietnam casualties would be different from that of the general population of the United States; the availability of college draft deferments being foremost among them. Also, historically armies have largely been made up of society's less fortunate. The low wages paid to military personnel would also seem to make the prospect of military service particularly unattractive to the sons of the wealthy.¹

For many of the Vietnam generation, this perception seems to be based on personal, anecdotal evidence. The noted defense analyst James Fallows has written that the Vietnam conflict was largely a "class war", defending this assertion based on his observations as a student at Harvard during the sixties. One imagines, however, that any impression based on experiences as a student in or near Harvard Square is likely to be distorted.

When one looks for broader evidence to justify this belief, there is little to be found. Much has been written about the draft (again much of it anecdotal in nature) but little empirical research has been focused on the casualties of the war. Rather, it seems an article of faith that the system of draft deferments and other socioeconomic factors resulted in great disparity among the casualties. It is the lack of reliable evidence on the casualties of the war that prompted this study. If this issue is to continue to influence the way our nation sets policy, it should be based in fact and empirical evidence; not vague personal impressions or conventional wisdom.

This paper examines data about the 58,152 casualties of the Vietnam conflict in an effort to test the belief that the poor suffered a disproportionate share of the casualties in Vietnam. We analyze the data in several different ways. While no single analysis is conclusive in and of itself, the analyses taken together present a consistent picture. We conclude that while some disparity exists, it is no where near the degree many people would expect; certainly not enough to characterize Vietnam as a "class war."

¹During the Vietnam era, the salary paid to the lower enlisted grades was below the national minimum wage.

We begin in Section II with a discussion of the research of Professor Arnold Barnett and Michael Shore of MIT that prompted this study. We briefly review their work and some of the questions it raised. In Sections III and IV we then discuss our efforts to collect better data to address those questions specifically. In Section V we analyze the data with these issues of Section II specifically in mind. With the insight provided by these analyses, in Section VI we repeat Barnett and Shore's analyses to arrive at one overall national statistic for the disparity among the casualties of the war. We also compute similar figures for different regions of the country and a regionally weighted national disparity statistic. In Section VII we briefly discuss several other issues that arose during our analysis of the data. We conclude in Section VII with some observations about all these analyses.

Two points are in order here on the scope of this study. The first is that we are concerned with casualties of the war. We do not try to estimate the economic disparity among all who served in Vietnam. While this is partly a function of the availability of data, it is also true that it is those who died, and their families, who sacrificed the most for the war. By restricting attention to the casualties of the war, we also avoid a potential problem of widening the study to all who served. Suppose, for instance, that an analysis of all Vietnam era servicemen showed that there were more sons of the wealthy in the service than is commonly believed. It would be wrong to assert that the wealthy bore a fair share of the burden of the war, based on such a finding, if all the wealthy managed to secure relatively safe jobs within the military. Focusing on the casualties of the war avoids this problem.

The second point is that we focus on economic status rather than social status. While it is possible to estimate a casualty's economic status based on his civilian address and census data, it is rarely possible to estimate a casualty's social status using even the best data available. In our society, though, economic status and social status are largely synonymous. For this reason we feel that the concentration on economic status presents no great problem for our study.

II. PREVIOUS RESEARCH

This paper builds on research previously done by Professor Arnold Barnett and Michael Shore of MIT. For their research they used the names and Home of Record (HOR) for each casualty listed in the Vietnam Veterans Memorial Directory of Names. Based on a random sample of approximately 1,500 names their findings suggested that perhaps economic disparity among the casualties of Vietnam was not as great as commonly believed. Using the median income of a casualty's HOR as a proxy for his income, they compared the economic status of Vietnam casualties to that of the entire nation.

To measure the degree of disparity among the casualties in their sample, they used a statistic analogous to the gini coefficient which is often used to measure the disparity of income distribution for a given population. They instead used it to measure the disparity of the distribution of casualties. We will use the same statistic at several points in this study.

To get this statistic we prepared plots of "Percentage of Casualties" vs. "Percentage of Population." For instance, a point (X,Y) on the graph would indicate that the poorest X percent of the population suffered Y percent of the casualties. Thus a 45 degree line would indicate no disparity. To measure the degree of disparity, that is, how far the observed plot deviates from the 45 degree line, we measure the area between the graph and the 45 degree line. (If the graph falls below the 45 degree line the area is negative.) The result is a figure between -.5 and .5. We then multiple the area by two to get a figure between -1 and 1. Figure 2 shows a sample of such a plot.²

Barnett and Shore estimated the national disparity statistic to be slightly below 0.1, indicating only a slight overrepresentation of the poor among the casualties of the war. Although intriguing, their findings did not provide a definitive answer to the question of the degree of disparity among Vietnam casualties. They identified three major issues which they felt were deserving of further research. These issues were: 1. the distribution of casualties from rural areas; 2. the distribution of casualties in large cities; and 3. the distribution of casualties in very wealthy communities. A short discussion of each of these topics will serve both as a review of their results and as a description of some of the questions that we hope this research will answer.

²This plot corresponds to the unadjusted national disparity statistic computed in Section VI.

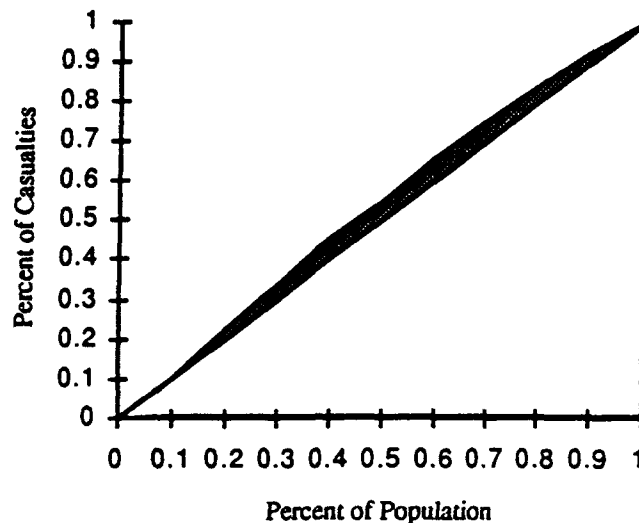


Figure 1: Example Disparity Statistic

Rural Casualties

In 1970, 26.5% of the U.S. population lived in rural areas. The average income of people living in rural areas was generally below the average income of people living in towns or cities. The Vietnam Veterans Memorial Directory of Names, however, only provides a town name for each casualty. Undoubtedly many towns had their casualty counts inflated by casualties which should actually be counted as belonging to the rural area surrounding the town.

Since the Census only provides median income information for towns with a population of 2,500 or more, Barnett and Shore's work focused only on towns of this size; in effect ignoring rural casualties. They compared the median incomes of the HOR's of a random sample of casualties to the distribution median incomes for all towns in the nation with a population of 2,500 or more. Since they postulated that small towns in rural areas (and hence towns with below average incomes) were more likely to have their casualty counts inflated by casualties that actually lived in rural areas outside the town, the statistic they computed was probably biased *upward*. It remained unresolved how the proper inclusions of all casualties, both rural and urban, would affect the true disparity statistic for the entire nation.

Cities

A strong argument could certainly be made against using the median income of a large city as a proxy for the median income of all its casualties. If a pattern of disparity exists across the entire nation, then it is also likely to exist *within* cities. It is also possible that large cities mask an even greater degree of disparity than that prevailing outside of large cities, since the nation's large urban areas also contain many of the nation's poorest citizens.

The particular functioning of local draft boards may have also contributed to greater disparity within large cities. A local draft board in a suburban community, faced with the necessity of filling an induction quota, may have been forced into a strict interpretation of the deferment rules. Within large cities, the wealthy may have found it easier to secure deferments, since a city draft board would have a larger pool of poor and working class from which to draw its quota.

In an effort to address this issue, Barnett and Shore looked at all casualties from the Queens borough of New York City. Although a borough of New York, Queens is a large heterogeneous urban area in its own right. Historically, the residents of Queens have identified more strongly with their local neighborhoods than with the larger city of New York. They therefore tended to list these neighborhoods as their HOR when they entered the service. Using the casualties that listed a Queen's neighborhood as their HOR, Barnett and Shore were able to estimate the distribution of casualties within Queens. Using census tract income data they estimated the disparity of Queens to be 0.07. A major goal of our research was to see if this statistic is representative of other large cities.

Wealthy Communities

Some commentators on the subject of disparity among Vietnam casualties have suggested that affluent towns such as Beverly Hills, California, and Chevy Chase, Maryland were largely isolated from the dangers of the war.³ Barnett and Shore, however, found a surprising number of casualties from these and several other well know wealthy areas. In certain instances these towns actually had casualty rates above the national average. It is possible, though, that casualties from these towns tended to be less representative of the whole community than for less affluent towns.

³See Fallows, "What Did You do in the Class War, Daddy?," Washington Monthly, Oct 1975, pp.5-19

If such a trend existed, the national disparity statistic Barnett and Shore found would certainly be biased downward. In addition to this, when discussing the economic status of casualties, there is a natural tendency ask about the casualties among the very wealthiest Americans. For this reasons we decided to look a wider range of affluent communities to see what patterns could be observed.

III. METHOD

To address these problems it was first necessary to find a source of data more detailed than the Vietnam Veterans Memorial Directory of Names. We were able to find two. The first was "The Combat Area Casualties File, Southeast Asia" available from the National Archives on electronic tape. This file contained information on all military personnel who died in Southeast Asia from 1957 to 1975. The file contained little information of use that was not found in the Directory of Names, but it did make it possible to quickly and accurately determine casualty counts for cities, states, paygrades, services, etc.

The second source of data was the military personnel records of individual casualties. The National Personnel Records Center, a branch of the National Archives located in St Louis, Missouri, maintains the personnel records for all former military personnel. With the permission of each branch of the service, we were allowed access to these records. With these files it was possible to obtain exact addresses for a sample of casualties.

This data offered tremendous opportunities to address the problems mentioned above. It also made it possible to improve the degree of resolution of the study. Since an analysis of this type relies on approximating an individual's income by using his community's median or average income, it is obviously desirable to identify for each casualty the smallest Census unit in which he lived. Analyses of this type often rely on income information for zip code areas. Using products available through the Census Bureau, we were able to identify exactly where within a city each casualty lived. This allowed us to use income data for block groups, the smallest unit for which the Census Bureau reports income figures, to approximate a casualty's income. (See Appendix C for a discussion of Census terms and concepts.) Thus we were able to improve the degree of resolution beyond that usually considered acceptable in studies of this nature.

Selection of the Sample

Although the National Archives records were an excellent source of data, their collection presented certain problems. These records are not stored electronically. Each file had to be physically examined and the pertinent information recorded by hand. This process was both time consuming and expensive. In addition to the expense of travelling to St Louis, we were required to reimburse the National Personnel Records Center for the

cost of retrieving each record examined. These factors made it necessary to limit our sample size.

When selecting our sample, we decided not to simply request the records of the casualties in Barnett and Shore's earlier sample. We made this decision for several reasons. The primary reason was that we believed that the best way to address the concerns of the original study was to design samples to examine the issues directly. Specifically it was felt that concentrated samples from a few large cities would give a clearer idea of the casualty patterns in urban areas than a sample of the same size spread over many cities. With this decision, and a similar one for the sample of casualties from wealthy communities, we simply could not afford the time or money to also examine the records of the more than 1,500 casualties in Barnett and Shore's sample. The size of such a combined sample would also probably have made it impossible for the Center for Personnel Records to accommodate our study. Finally, the cost of the Census products required to identify the block groups for addresses in many different cities would have been prohibitive. For these reasons we decided to design three samples to address the specific issues described in Section II.

To examine the distribution of casualties within large cities, we selected five cities from different regions of the country; Baltimore, Maryland; Chicago, Illinois; Columbia, South Carolina; Portland, Oregon; and San Antonio, Texas. Using the HOR information from the casualty tape, we made an alphabetical listing of each city's casualties. We then selected every third name from each of these lists. This constituted a sample of 664 names.⁴

To address the wealthy city issue, we first made a list of all towns in the U.S. with a population over 2,500 and median annual family income of \$12,500 or more as listed in the 1970 Census. The towns in this list comprised a total population of 17,224,983; 8.48% percent of the U.S. population in 1970. From an alphabetical listing of these towns we selected 47.⁵ We examined the records of all casualties that listed one of these towns as their HOR. This sample consisted of 210 names.

The rural issue presented a greater problem when selecting a sample. As mentioned above, it was not possible to tell if a casualty came from a rural area by simply using the casualty's listed HOR. It was also likely that the extent of this "rural inflation" would vary with the size of the town or city concerned, the nature of the surrounding area, and the

⁴The list of every third name actually composed 633 names. We supplemented this with 31 names since we knew that we probably would not be able to see every record requested. These additional, replacement names were chosen in a manner similar to the way the first names were chosen but only taking about a 1% sample of the names not originally chosen.

⁵We arrived at the figure of 47 by looking at the average number of casualties from each town and selecting a number of towns that would give us a sample of approximately 200 casualties.

region of the country. For this reason we simply took every hundredth name from an alphabetical listing of all casualties; a total of 571 names.⁶ It was hoped that the exact addresses of the names in this sample would provide some insight into the extent of inflation of town casualty counts by rural casualties.

⁶We excluded from consideration casualties which listed a HOR outside of the 50 states and DC. Thus we only considered 57,590 of the 58,152 casualties.

IV. DATA COLLECTION RESULTS

The personnel records for 1,445 casualties were requested. One thousand two hundred and fifty nine (1,259) records were examined. For every individual whose record was examined we were able to identify an exact address. For many of these individuals more than one address was available. When more than one address was available, all were recorded and one was designated as the primary address. As a result, a total of 2,210 addresses were recorded. Appendix A explains why we were not able to see all the records requested, and how we determined which address to designate as the primary address.

Of these 2,210 addresses, 1,772 were located in parts of the country that were divided into census tracts in the 1970 Census. We were able to identify the appropriate census tract for 1,592 of these addresses. Nine hundred and eighty eight (988) addresses were identified to block group or enumeration district. Appendix B describes the Census terms used in this study and the products we used to determine the location of each address.

The addresses recorded and the HOR listed in the Combat Casualty File agreed in the vast majority of cases. Of the 1,259 primary addresses, 1,125 matched the HOR listed on the Combat Casualties File. In 88 of the 134 cases where these did not agree, a secondary address agreed with the listed HOR. In 27 of the remaining 46 cases the primary address was in the proximity of the listed HOR; close enough to indicate a likely rounding error. Thus in only 19 cases, (4% of the total sample), was there no evidence of the listed HOR in a casualty's file. The results of the data collection are summarized in greater detail in Appendix D.

V. ANALYSIS OF DATA

Urban Analysis

In order to understand the implications of the analysis of urban casualties it is first necessary to understand the way in which the Census reports population and income figures for large urban areas. The Census Bureau first designates all large urban areas in the nation as "Standard Metropolitan Statistical Areas," (SMSA). Each SMSA corresponds to one large central city, though in some cases there may be two or more cities of roughly equal size at the center of the SMSA. In every case, the SMSA includes not only the central city, but also smaller cities and suburban towns.

Population and income information for each SMSA is aggregated in several ways. Counts are first given for the entire SMSA; the central city and all its environs. In addition to this summary, counts are given for the central city and other large cities within the SMSA. These counts correspond to the traditional corporate or city limits. Finally, counts are provided for the "Urban Balance" of the SMSA. This count includes all people living in medium and small towns within the SMSA as well as people within the SMSA but not inside any identifiable town or community. For instance; for the Denver SMSA, population and income figures are given for the entire metropolitan area. Separate counts are then given for the cities of Aurora, Boulder, Denver, and Lakewood. The balance of the population of the SMSA living outside of these cities is found under "Urban Balance." Using Table 12 of the State Summary Reports it is possible to determine how many of the residents of the SMSA lived in towns or communities with a population under 2,500. These people are classified as "Urban Fringe."

Perhaps the most important and striking result to come out of the analysis of the urban sample was a phenomenon analogous to the rural inflation described earlier. In the case of large cities, however, the phenomenon would more accurately be described as suburban inflation. It was found that an average of approximately 20% of the casualties that had listed a central city of an SMSA as both their address actually lived outside the central city. They should therefore properly be considered as belonging to the "Urban Balance."

Two things should be noted here. The first is that this figure is not surprising. In 1970 15,912,383 people, 13% of the urban population of all SMSA's, lived in areas classified as "Urban Fringe." The second is that the area surrounding the central city of an SMSA was generally much wealthier than the central city itself. In fact, 100% of the cities

in the wealthy sample we collected were inside an SMSA; in the suburbs of some large city.⁷

It was obvious that these suburban casualties would have to be excluded from consideration when computing the disparity statistic for the cities in our sample, since they were not included in the Census tabulation of each city's median income. It was also clear that any national statistic based on community incomes should take this misreporting into account.

The disparity statistics computed for the cities in our urban sample seemed to reinforce Barnett and Shore's earlier results for Queens. The statistics for Baltimore, Chicago, Portland, and San Antonio were 0.12, 0.10, -0.01, and 0.26 respectively; an average of 0.12.⁸ A statistic for Columbia was not computed. After casualties from outside the city limits were excluded, only three casualties from Columbia remained; hardly enough to compute a meaningful statistic.

Note that these figures represent the disparity based on comparing the casualties in each block group to the entire population of the city by block group. No adjustment was made for the number of military age in each block group. In their original study Barnett and Shore found little relationship between the wealth of a community and the percent of its citizens who were eligible for military service. There is, however, evidence of such a pattern *within* cities.

Measuring this trend directly is complicated by the fact that young men in their late teens and early twenties are beginning to move away from where they grew up. Thus, the census counts for males in this age group do not always reflect the true number of young men of military age from a particular area. We therefore attempted to observe this trend without looking exclusively at the counts for 19 to 26 year old males. Instead, several counts were examined; males in the age groups 0 to 13, 14 to 18, and 30 and above; and two, three, four, five, and six person families. Each count showed a consistent trend for the wealthier portions of each city (with the exception of Portland) to have fewer young men of military age. The number of 15 year old males reflected this trend well in each case. In order to maintain consistency with Barnett and Shore's earlier work, we used the number of 15 year olds in each decile as a proxy of the percentage of the population that was eligible for military service. The adjusted figures for each city are shown by decile in Table 1.

⁷The exception is Ann Arbor, Michigan which was, itself, the central city of an SMSA.

⁸The wealthy sample also provided evidence of this urban pattern. As part of the wealthy sample, the record for each casualty that listed Ann Arbor as their HOR was requested. Examination of the records showed 10.5% suburban inflation in Ann Arbor and a disparity statistic of less than -0.2. (See Appendix D, Table 24).

Decile	Baltimore		Chicago	
	Unadjusted	Adjusted	Unadjusted	Adjusted
1st	19.5	15.2	13.2	9.4
2nd	9.2	7.7	9.6	9.0
3rd	8.0	8.4	10.3	9.5
4th	8.1	7.7	13.2	13.5
5th	12.7	11.2	11.7	13.4
6th	12.6	12.5	7.5	8.0
7th	6.9	7.2	11.4	12.7
8th	5.7	7.8	10.6	10.5
9th	12.7	12.8	7.2	7.0
10th	4.6	6.6	5.3	7.3

Decile	Portland		San Antonio	
	Unadjusted	Adjusted	Unadjusted	Adjusted
1st	0	0	21.5	16.9
2nd	19.2	23.9	13.9	14.1
3rd	15.4	13.8	9.2	7.9
4th	0	0	7.7	9.2
5th	15.4	14.5	18.5	19.8
6th	11.5	12.8	9.2	8.6
7th	7.7	7.7	7.7	8.8
8th	15.4	13.6	6.1	6.8
9th	11.6	11.6	4.7	4.9
10th	3.8	3.6	1.5	1.5

We obtained the figures in this table by first ranking the block groups of each city by the block groups' mean incomes. Each decile represents 10% of each city's total population when ranked in this way. The figure in the "Unadjusted" column indicates the percentage of a city's casualties in each decile. The figure in the "Adjusted" column represents the percentage of casualties in each decile corrected for the city's *military age* population. We obtained this figure by multiplying the figure in the "Unadjusted" column by ten and dividing by the percentage of the city's 15 year old males in the decile.

Table 1: Percent of Casualties in Each Decile and Age Adjustments

Using these adjusted figures the disparity statistics for Baltimore, Chicago, Portland, and San Antonio are 0.02, 0.04, 0.05, and 0.21 respectively; an average of 0.08. The age adjustment reduces both the mean and variance of the disparity statistics by approximately 60%.

From the figures for the percent of casualties in each decile, it is clear that there is a good deal of variability in the sample. A few observations can be made, though. The age adjustment does tend to smooth the trend to some extent. Also, there does not appear to be a sharp drop off in casualty rates until the top decile. Averaging the adjusted figures for each decile across all four cities we find that the middle deciles suffered casualties in about equal proportion to their population. The lowest three deciles had about 34% of the casualties and the top three had about 23%.

It should be noted that analysis for each city was based on block group data. This effectively divided each city into literally hundreds of neighborhoods; 2,423 in the case of Chicago. The average population of a Chicago block group was only 1,388.⁹ Disaggregating to this degree makes the use of average income as a proxy of a casualty's income easier to accept. The fact that the results are comparable to Barnett and Shore's the earlier results seem to validate the use of median incomes as a proxy for individual income in their earlier analysis.

Perhaps the most striking thing about the urban analysis was the result that did not arise. As mentioned earlier, there are many reasons to think that disparity among casualties would be greatest in large urban areas. If such a large disparity in fact existed, the analysis by block group would surely have reflected it. The disparity statistics obtained in and of themselves call into question the popular perceptions about the casualties of the war, even without considering how these urban patterns fit into the overall national pattern.

Rural Analysis

The random sample of every hundredth name provided evidence of rural inflation as expected. Table 2 breaks down the 489 primary addresses from the random sample by type of address and size of town. "P.O. Box Only" indicates that only a P.O. Box was available for the casualty. Rural addresses include all addresses such as "RFD 2" and "Rural Rt. 1." There were also a few addresses that listed only a town.

It is believed that the Rural Type addresses unambiguously indicate that the casualty lived in a rural area outside of any town limits. Although the majority of the street addresses are likely to be within towns, it is also possible that these figures are subject to some additional rural inflation; as well as what would more appropriately be classified as the suburban inflation observed in the larger cities.

⁹These figures are for the city of Chicago only. Compare with the figures for the entire Chicago SMSA found in Appendix B.

Population of Town	Type of Address				Total	% Rural†
	PO Only	Town Only	Rural	Street		
100,000>	0	0	1	143	144	0.7
50,000-100,000	0	0	2	50	52	3.9
10,000-50,000	0	0	11	92	103	10.7
2,500-10,000	5	0	27	50	82	33.0
1,000-2,500	4	0	18	13	35	51.4
< 1,000	19	7	29	18	73	24.7
Total	28	7	88	364	489	18.0

†This figure represents the rural column as a percentage of the total column.

Table 2: Evidence of Rural Inflation

Using those addresses classified as "Town Only" and "Rural Type" as a first approximation of how many casualties were from rural areas, indicates that 18.0% of the sample should be considered as rural. This compares to a figure of 26.5% for the entire population of the U.S. Based on the patterns observed in Table 2, we estimated that 33% of the casualties from towns with populations between 2,500 and 10,000 should be considered as actually living in the rural area surrounding the town. Likewise, 11% of the casualties from towns between 10,000 and 25,000 should be considered as rural.

Wealthy Analysis

The goal of the analysis of the sample of casualties from wealthy towns was to determine if casualties from these towns were truly representative of these communities. This analysis presented some special problems. Most of these towns had populations between 2,500 and 25,000 and therefore had only a few casualties each. A disparity statistic for each town would therefore have little meaning. We therefore developed a scheme that would provide essentially the same information. The census tracts that comprised each of these communities were ranked according to their median incomes. Each casualty was then assigned a percentile of the income distribution based upon the tract in which he lived.

For instance, suppose a wealthy town consisted of two census tracts of equal population. Suppose also that one casualty lived in the poorer of the two tracts and two casualties lived in the wealthier of the two tracts. The casualty from the poorer tract would

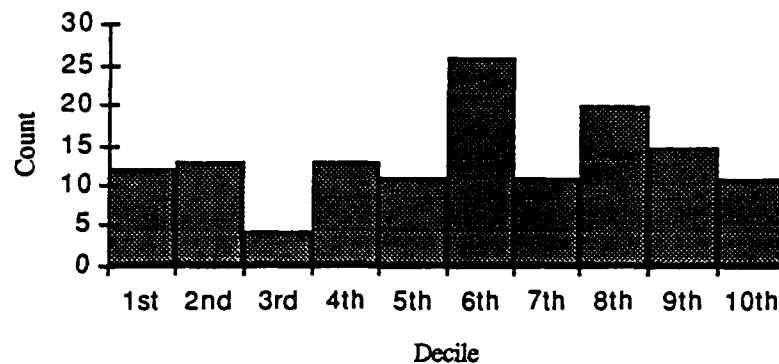


Figure 2: Percentiles Assigned to Casualties from Wealthy Towns¹⁰

Misreported HOR:	
a. Wealthy Sample	7.4%
b. Random Sample	14.9%
Tracts Identified for Wealthy Sample	92.6%
Tract within Limits of Town Indicated	92%

Table 3: Misreporting of Wealthy HOR's

be placed at the 25th percentile of the income distribution. The two casualties from the wealthier tract would be placed at the 75th percentile.

A histogram of all the percentiles computed in this manner is shown in figure 2. The histogram reveals no tendency for the casualties from these towns to come from the less wealthy parts of the town. In fact, 50% came for the wealthiest half of the town; 34% from the wealthiest quarter.

Table 3 shows the results of comparing the casualty's listed HOR and the city of his address. It shows no tendency for the counts for these towns to be inflated by servicemen who actually lived elsewhere. In fact, as shown by the analysis of the urban sample, the opposite is probably true. Since the vast majority of these towns were in the suburbs of a large city, they probably had their casualty counts lowered by servicemen listing the nearby large city as their HOR.

¹⁰Note that the count for the fifth decile is skewed upward since 15 casualties were from towns that consisted of only one tract. These casualties were automatically assigned the 50th percentile. Without these, the count for the fifth decile is 11.

For instance, one of the towns in our wealthy sample was Towson, Maryland. Two casualties listed Towson as their HOR. These two casualties, in fact, lived in Towson. In our 33% sample of Baltimore casualties, we found two additional casualties with Baltimore addresses who also resided in Towson.

Examining the files of individual casualties provided additional evidence that casualties from wealthy towns were genuinely from wealthy families. The files often contained letters from family members, newspaper clippings, inquiries from congressional representatives and the like. Information of this type is impossible to quantify but none-the-less provided often poignant evidence of the sacrifice made by many Americans.

In most cases the only useful information in a file was an address for the serviceman's parents. Occasionally, however, stronger evidence of a person's background was found. In the urban sample, for instance, we sometimes found indicators that a casualty was from an unambiguously underprivileged background. In the sample of casualties from wealthy towns in particular, we occasionally found evidence that the casualty came from an affluent family. One casualty was the son of a lawyer, and another was the son of an ambassador. Yet another was the son of a very well known movie star. The agreement which allowed us to view the files, as well as respect for the families involved, prevents us from commenting more fully on evidence of this nature.

VI. APPLICATION OF FINDINGS TO ORIGINAL SAMPLE

Given the results for the examination of the data gathered from the files of individual casualties, the obvious question is: How do all these trends work together to affect the overall disparity statistic computed earlier? In order to answer this question we decided to reassign incomes to the casualties in Barnett and Shore's original random sample based on the trends observed in the data collected at the National Archives. In many cases the income assigned to a casualty differed from the income Barnett and Shore initially assigned to the casualty. We believe that the affect of these reassignments, though, was to enhance the overall accuracy of the national disparity statistic.

We then compared the adjusted incomes of the sample to an estimated national income distribution. Both the method for assigning an income to a casualty and the estimation of the national income distribution are briefly described here. A full explanation of all calculations can be found at Appendix D.

Assignment of Incomes to Casualties

In order to properly reflect rural patterns in the National Archives data, randomly selected casualties were assigned the median income of the rural population of the county in which they lived. Only casualties whose HOR had a population under 50,000 were considered for this designation as rural. The percentage of casualties reassigned as rural varied with the size of the HOR. A total of 377 casualties (25% of the total sample) were assigned rural incomes in this manner. The remaining casualties from towns and cities with population below 100,000 that were not assigned rural incomes were assigned the median income of their HOR.

The casualties from cities with populations over 100,000 were assigned incomes in a manner to reflect the pattern observed among urban casualties. First, a representative income was estimated for each quartile of each large city's family income distribution. These incomes could be viewed as the median incomes for the city's poorest, lower middle class, upper middle class, and wealthiest families. Rather than simply assigning 25% of a city's casualties to each level, casualties were assigned an income based on the patterns observed in the data collected in St Louis. Additionally a percentage of each large city's casualties were considered to actually belong to the suburbs and were thus assigned the median income of the Urban Balance of the SMSA.

Estimation of National Income Distribution

The 1970 Census provides a count of the nation's families in various income brackets. This information is not useful as a national income distribution for the purposes of this study. For instance, while there is a significant number of families in the \$1,000 to \$1,999 income bracket, no town or county has a median income in this range. In order to maintain consistency with the incomes assigned to casualties, we needed a distribution of the population by the median incomes of the place in which they lived. The Census provides no such distribution. It was therefore necessary to estimate one.

We estimated this national income distribution by first creating five separate distributions and then adding them together after weighting by the appropriate factor. These five distributions represented the populations of towns, small cities, large cities, the "urban fringe" or suburbs of large cities, and the rural populations of counties.

Results

National Disparity Statistic

The disparity statistic based on the entire national community income distribution and adjusted casualty income figures was 0.069. This compares to Barnett and Shore's original national disparity statistic of .12. The overall affect of the inclusion of rural casualties, replication inner-city disparities, and the proper inclusion of suburban casualties was to actually lower the disparity statistic. This is most likely a result of the adjustment for wealthier suburban casualties that had been misclassified as living the inner city.

Regional Disparity Statistics

Barnett and Shore observed that higher casualty rates in the southern states coincided with incomes generally lower than the national average for these same states. Likewise the wealthier northeastern states had generally lower casualty rates. To what extent the participation in the military is due to economic factors and what extent it is due to cultural factors should certainly be considered when interpreting the disparity statistic for the entire nation.

In order to examine these regional differences, we estimated a disparity statistic for nine different regions of the country. An income distribution for each of these regions was computed by extracting the appropriate states' data from the national distribution computed

earlier. A disparity statistic was then computed for each region. These statistics, as well as the proportions of casualties in each decile by region, are shown in Table 4. By weighting the results from each region by the percentage of casualties it suffered, we arrived at an adjusted national disparity statistic of .045.

We can not be certain that these regional differences in casualty patterns are not, in fact, due to economic differences between regions. The results, however, do correspond well with common notions of regional attitudes about military careers; namely that a military career is held in higher esteem in the south. The 35% drop (from .069 to .045) would therefore seem to indicate that the unweighted national figure overstates the role of economic factors on casualty patterns.

Decile	Wt:	0.049	0.176	0.247	0.064	0.127	0.065	0.092	0.048	0.133	Wt Rgns	US
		New Eng	Mid Atl	EN Cent	WN Cent	South Atl	ES Cent	WS Cent	Mnt	Pac		
1st		12.3	11.2	10.8	12.1	7.8	10.0	12.5	9.2	8.3	10.3	9.6
2nd		7.3	10.1	11.5	14.9	6.1	4.9	9.7	21.4	11.0	10.4	13.1
3rd		7.6	9.1	10.9	4.7	11.4	13.7	11.2	8.8	15.0	10.7	11.2
4th		24.7	7.3	10.1	13.0	10.4	8.1	14.1	7.6	16.0	11.4	11.6
5th		12.0	10.0	11.0	9.9	9.2	13.3	12.6	10.4	8.7	10.5	9.4
6th		9.5	7.9	9.7	14.4	17.2	13.3	9.9	11.4	6.8	10.6	11.0
7th		10.7	10.0	8.1	9.9	8.0	7.8	7.7	12.0	10.2	9.1	9.1
8th		1.5	12.4	10.7	8.8	10.4	16.4	8.3	8.1	9.0	10.2	9.2
9th		12.3	12.3	10.3	8.1	9.8	7.2	8.0	3.8	11.3	10.0	8.0
10th		2.0	9.7	6.9	4.2	9.6	5.2	8.0	7.2	3.5	6.7	7.8
Disparity Statistic		0.14	-0.03	0.05	0.11	-0.04	0.01	0.11	0.12	0.09	0.05	0.07

Table 4: Percentage of Casualties in Each Decile by Region
and Weighted National Results

Regions:

New England: CT, ME, MA, NH, RI, VT
Mid Atlantic: DE, DC, MD, NJ, NY, PA
East North Central: IL, IN, KY, MI, MN, OH, WV, WI
West North Central: IA, KS, MO, NE, ND, SD
South Atlantic: GA, FL, NC, SC, VA
East South Central: AL, AR, MS, TN
West South Central: LA, OK, TX
Mountain: AZ, CO, ID, MT, NM, NV, UT, WY
Pacific: AK, CA, HI, OR, WA

VII. OTHER ISSUES

Although the disparity statistic is of central interest, other data collected from the records of individual casualties and trends which can be observed among all casualties can help interpret this statistic. Some of these are discussed below.

The Draft and Race

The issue of fairness and service in Vietnam is inextricably linked in the public mind with the issue of the draft. It is not the purpose of this paper to examine this subject in detail. There undoubtedly are better sources of data for studying the issues involved in the Selective Service System more directly. But since the draft is most often cited as the source of disparity among casualties of Vietnam, it is important that we at least address this issue.

One must be careful when drawing conclusions about the draft based on the data we collected from casualties' records. It should be noted that just because a person volunteered for military service does not always mean that he served willingly. An estimated 50 to 70% of the personnel who voluntarily entered the service between 1966 and 1968 only did so because they felt that they would not be able to avoid the draft.¹¹ Even with this caveat in mind, the data we collected does shed some light on the issue of the draft; with some surprising results.

From the records examined at the National Archives, we determined which casualties in our sample were drafted and which volunteered for military service. Thirty-one percent of all casualties whose records were examined were drafted. This is about the figure we would expect to see. In 1970 it was estimated that 32% of the casualties up until that time had been draftees.¹²

Table 5 shows the disparity statistics for the four cities in our urban sample computed for draftees only. The disparity statistic for draftees is surprisingly lower than the statistic for all casualties in three of the cities. This runs counter to the notion that the rich were not likely to die in Vietnam because they were better able to avoid the draft.

¹¹Senate Subcommittee Hearings and Report on the Selective Service System; Hearings pp. 31-33, Report p. 90.

¹²Senate Subcommittee Hearings on the Selective Service System, Hearings p. 25.

City	All Casualties	Drafted Casualties
Baltimore	0.02	-0.05
Chicago	0.04	-0.03
Portland	0.05	-0.09
San Antonio	0.21	0.32

Figures are adjusted of military age population.
Table 5: Disparity Statistics Based on Draft Status

While in St Louis, we learned from workers at the National Center for Personnel Records that maintain the files that personnel who were drafted were assigned a service number that began with a five. Restricting attention to enlisted personnel in the grades of E-4 and below with a social security/service number with fewer than nine digits,¹³ our sample indicated that this rule identified 68% of the draftees and only misclassified 2% as drafted. To estimated the total number of E4 and below who were drafted, we applied this rule to all casualties and adjusted the resulting figures based on the results of applying the rule to our sample. The results are shown in Table 6.

Category	Total E4 and Below	Estimated E4 and Below Drafted	% Drafted
Black	5,727 (14.5%)	1,904 (12.2%)	33.2%
White	33,218 (84.3%)	13,541 (86.9%)	40.8%
Wealthy Towns	2,130 (5.4%)	864 (5.5%)	40.5%
Total	39,401 (100%)	10,768 (100%)	39.5%

Table 6: Estimated Draft Casualties in the Paygrades E4 and Below

The inequity of the draft is most often mentioned with respect to the way in which it affected different racial groups. Much has been said and written on this subject, both at the time and subsequent to the war. It has been noted that blacks were both more likely to enlist than whites and more likely to reenlist once in the service. It has also been asserted that blacks were more likely to be drafted than whites. In addition to these factors, blacks tended to have lower aptitude scores which made a higher percentage of them ineligible for

¹³Personnel in higher paygrades would almost always have fulfilled their initial service obligation and thus their presence in the service would indicate that they were actually willingly in the military. If the casualty tape showed a nine digit number for the service number we considered this to be a social security number and therefore it gave no indication of draft status.

service than whites. This trend also created patterns within the services with blacks likely being overrepresented among riflemen and other low skill jobs. While Table 6 provides evidence of some of these trends, we can not hope to separate the effects of all these issues with data based solely on casualties. We can say, however, that the net result of these trends is that blacks, 13.5% of the military age population in 1970, suffered 12.5% of all Vietnam casualties.

It has also been repeatedly asserted that the system of draft deferments favored the wealthy. Table 6 reveals that the projected draft figures for casualties from towns with a family median income of \$12,500 or more are virtually indistinguishable from the figures for all white casualties.

It should be emphasized that these figures are for E4 and below. Draftees from more affluent communities were more likely to have higher aptitude scores that made them eligible for officer candidate school and other advanced training. As we will show later, casualties from wealthy communities were, in fact, more likely to be officers.

Opting Out Analysis

If, in fact, the wealthy suffered more in Vietnam than is commonly believed, one reason might be that casualties among the wealthy were suffered disproportionately in the early years of the war before the war became widely unpopular. A trend that showed casualties from wealthy towns decreasing as the war progressed would tend to confirm the notion that the rich could opt out of the war when they desired, leaving the poor to bear the burden of the war.

Using the list of all casualties who listed HOR's with a median income over 12,500, the percentage who died in each year is shown in Table 7. There appears to be no evidence of an "Opting Out" pattern.

Participation in Force vs. Casualties

An examination of the casualties by the paygrade in which they served does provide evidence of a trend among the casualties from wealthy communities. Again using the casualties from all towns with a median income of \$12,500 or higher in 1969, we compared the percent serving in each grade to the same figures for all other U.S. casualties. See Table 8.

Time Period	Total Number of Deaths from Wealthy Communities [†]	Previous Column as a Percentage of All Deaths in the Same Period
Before '64	16	8.3
'64	14	6.8
'65	71	3.9
'66	309	5.1
'67	653	8.5
'68	941	5.7
'69	705	6.1
'70	350	5.8
After '70 ^{††}	257	6.0
Total	3,316	5.8

Table 7: Casualties from Wealthy Communities Over Time

[†]Total deaths in wealthy communities is likely to be under-stated due to the misreporting of suburban casualties as belonging to large cities. See Section V, Urban Analysis.

^{††}The high number of deaths after 1970 is partly due to the reclassification of former MIA's.

	Wealthy Communities	All Others	Risk Factor
Jr. EM	5.1	94.9	2.1
Sr. EM	3.4	96.6	0.9
Total EM	4.8	95.2	1.9
Jr. Officer	10.1	89.9	2.6
Sr. Officer	6.3	93.6	0.1
Total Officer	8.8	91.2	2.1
Total	5.8	94.2	1.9

Figures are expressed as a percentage of projected total force.

Jr. EM: E1 - E5

Sr. EM: E6 - E9

Jr. Officer: O1 - O3, W1, W2

Sr Officer: O4 - O10, W3, W4

Table 8: Participation Of Casualties from Wealthy Communities in Different Paygrades

The calculations of the national disparity statistic suggest that we would expect approximately 6% of the casualties in each paygrade to be from these wealthy towns. In fact, about 5% of the casualties in the junior enlisted grades were from these towns. About 10% of the junior officers were from these same towns. It should also be noted that junior officers performed some of the most dangerous jobs in Vietnam such as helicopter pilots and infantry platoon leaders.

In order to estimate the risk of serving in a particular paygrade, we used the ratio of the number of servicemen killed in each grade to the projected force level in the same grade. Using this figure we estimated that servicemen from the wealthy communities tended to be at about a 10% higher risk than other servicemen.

The figures of percent serving in each paygrade also reveal a tendency for servicemen from wealthy backgrounds to be less likely to make a career of the military. This disparity in senior grades undoubtedly contributes to the overall disparity. Unlike disparity in junior grades, however, disparity in the senior ranks is not likely to be reduced by any of the solutions normally suggested for reducing disparity among those serving in our military.

VIII. CONCLUSIONS

The conclusion that we draw from these analyses is that while there is evidence of disparity among the casualties of Vietnam, it is nowhere near the degree of disparity that one would conclude from much of that which has been written about this issue. The disparity statistics for large cities as well as the national and regional statistics are consistently around 0.1 or below.

If we accept these figures as a true representation of the degree of disparity among Vietnam casualties, the next logical question is how large is a national disparity statistic of 0.069? The answer necessarily depends on a person's prior perceptions of the issue. The characterization of Vietnam as a "class war", though, suggests that casualty rates among the poor were much higher than those among the rich. A hypothetical situation with casualty rates among the poorest 30% of the nation five times that of the richest 30% and the middle 40% ranged proportionally between these extremes¹⁴ yields a disparity statistic of nearly 0.4. It is likely that even those who would not have considered Vietnam to be a class war would be surprised at a figure closer to 0.05, the regionally adjusted national figure.

As we have seen, the figure of 0.05 corresponds to casualties spread almost equally across the entire population with the only discernable drop off in casualty rates in the wealthiest 10% of the nation. As we have also seen, the wealthiest communities in the nation certainly were not immune to the dangers of the war.

In the face of results that run so counter to the public perception, one must consider how the public came upon this perception in the first place. Historically the perception is fed by the fact that the enlisted ranks of armies have often been manned by society's less fortunate. Wellington commented of his army that "they are the scum of the earth." During the American Civil War a man of means conscripted into the service could legally pay some one else to go in his place.

The standard by which most would judge the Vietnam era, however, is that of World War II; a war in which it is widely perceived that everyone "did his part."¹⁵ Unlike World War II, Vietnam was very unpopular among much of the American public. Why, it is reasoned, would anyone willingly risk death for a cause in which he did not believe?

When contemplating this issue, one must consider peoples' attitudes about the war at the time and not how we have subsequently come to view the war. The most thorough

¹⁴It has in fact been suggested that the actual disparity was of approximately this magnitude. See Baskir and Strauss p. 10.

¹⁵Between 1940 and 1946 draftees comprised approximately 60 to 65% of all personnel entering the service. Source: Senate Subcommittee Report on the Selective Service System, Hearings pp. 22 and 82.

study of public opinion conducted during the war showed that people's attitudes about the war were complex and, to some extent, run counter to what we now remember as public opinion about the war. The study found that in 1967, while public opinion was fairly consistent across social status categories, blacks were more likely to oppose escalation and better educated members of society were more likely to support escalation.¹⁶ Many have seen this as a symptom of the inequity in the system. Stanley Karnow noted in his study of Vietnam that "endorsement of the war was strongest among the college-educated, upper-income middle classes whose sons were least likely to be conscripted for combat under the deferment system."¹⁷ This may in fact be the case, but it may also be that a less cynical interpretation could help explain some of the results of this study.

As mentioned earlier, the question of fairness and Vietnam is closely linked to beliefs about the draft. Some researchers have claimed that the vast majority of military age young men during the Vietnam war, regardless of social or economic status, sought ways, both legal and illegal, to avoid the draft.¹⁸ In their study of the Vietnam generation, L.M. Baskir and W.A. Strauss examined the characteristics for those who did not serve in Vietnam at great length. They conclude that the entire system for determining who served was extremely discriminatory and unfair. The obvious question is how can one accept the conclusions of our study without rejecting point by point the arguments of their study?

The answer to this question is that we looked at those who actually died; we did not look at those who did not serve and extrapolate to those who did. In fact, there are many reasons to suppose that inequities in the selective service system did not transfer directly to the casualty lists.

A major source of the charges of unfairness was the availability of deferments; particularly student deferments. From the sheer number of student deferments granted, though, it is obvious that they were not utilized primarily or even predominantly by the rich. Baskir and Strauss also noted that in 1966, hardship, fatherhood, and marital deferments, deferments rarely associated with wealth, outnumbered student deferments by two to one. It is also true that deferments were often granted for a wide range of jobs, most of which are indicative of neither wealth nor high social position.

It has also been noted that the safest and most effective way to avoid the draft was to simply not register.¹⁹ Non-registration, however, forced one to lead a anonymous life

¹⁶Verba et al., "Public Opinion and the War in Vietnam", American Political Science Review, June 1967, pp.317-333. The study found that the vocal anti-war sentiment associated with college students of the period was centered to some extent in leading "prestigious" institutions. Opinion of most students at less fashionable schools tended to be closer to that of the general public.

¹⁷Vietnam: A History, Stanley Karnow.

¹⁸Baskir and Strauss, p. 30-31.

¹⁹Baskir and Strauss, pp. 85-86.

for fear of being detected and prosecuted. Consequently, very few middle and upper class youths failed to register. On the other hand, it is believed that among the poor and underprivileged non-registration, (both intentional and unintentional) was not uncommon.

It is also true that youths from poor and underprivileged backgrounds were much more likely to be found ineligible for military service due to low mental test scores. Once in the military low test scores of the underprivileged undoubtedly contributed to observable patterns across services, military specialties, and paygrades. In many cases these patterns worked against the arguments for disparity among casualties since those with low scores were never assigned to many of the dangerous jobs noted earlier.

Again I would like to emphasize that we draw no conclusions about the draft, nor do we dispute the findings of studies such as that done by Baskir and Strauss that the selective service system had many weaknesses. Rather we dispute the tone of their conclusions; that these weaknesses led to a wide disparity among those who died in Vietnam. We look at the bottom line. How did the sum effects of deferments, non-registration, voluntary enlistments, draft induced enlistments, career accessions, and countless other factors work together to determine who died in Vietnam. We can only speculate on what the pattern of casualties would have been had circumstances been different. What is clear is that we should not base future policy decisions on the assumption that there was massive disparity among the casualties of Vietnam.

Americans are a people who are often rightly concerned with issues of fairness in our society. The concern over the casualties of the war demonstrates this. The issue of fairness will surely continue to play a role in decisions about how we man our military. A persistent belief, however, that a small portion of our society bore the brunt of a long war, if untrue, serves no one.

It has not been our intention in this study to belittle the sacrifice of American's poor and working class. Rather it has been our intention to put the sacrifice of an entire nation into its true perspective. We hope we have achieved this goal.

APPENDIX A: COLLECTION OF NATIONAL ARCHIVES DATA

The military records of all former servicemen are maintained at the National Personnel Records Center in St. Louis, Missouri; a branch of the National Archives and Records Administration. Although the National Archives maintains the files, the individual services retain authority over the files. For this reason it was necessary to secure the permission of each of the services separately before we could make arrangements to see the files.

Once we secured this approval, we submitted a list of the social security numbers or service numbers of every casualty in our sample to the National Personnel Records Center several weeks in advance of the viewing the records. Since maintaining the records of everyone ever to serve in our armed forces is obviously no small operation, we did not have the flexibility to change our sample or request additional records based on the records we had observed.

Of the 1,445 records we initially requested, we were able to examine 1,253 of them. There were several reasons that we were unable to view all the records that we requested. The primary reason was that many simply could not be found. During the period in which we were interested, the late '60's and early '70's, the services changed from maintaining records by service number to maintaining them by social security number. The electronic tape with casualty information contained only one of these two numbers for each serviceman. If this did not happen to be the number by which the Archives referenced the file, the file could not be found. Also some of these files were still in the possession of the respective service or "charged out", i.e. they had been requested by another individual or federal agency and had not yet been returned. The breakdown of the records that were not examined can be found at Appendix D.

The files that were examined varied in condition and completeness. We were able, however, in almost every case to find the type of information that we needed for our analysis. The following is a brief description of the forms that provided the vast majority of the information we needed.

DD Form 4.²⁰ This form was completed for all enlisted personnel that volunteered for military service. Block 6. of this form listed the service member's address at the time of enlistment. Block 24.c. indicated his education level and block 41 the date of enlistment.

²⁰All Department of Defense forms start with two letters indicating which service uses the form. DD stands for Department of Defense and indicates that the form is used by all the services. DA indicates Department of the Army.

DD Form 47. This form was completed at the time of induction for personnel who were drafted. Block 3. and 3.a. listed the Home of Record (HOR) and address at induction. Block 9.a. listed present civilian trade; block 10, education level; and block 24.a. the date of induction.

DD Form 1300, Report of Casualty. Block 7. of this form listed the addresses of interested persons at the time of death. In almost every case this was the serviceman's parents and wife. Other forms that listed similar information were DA Form 2204, Survival Assistance Report and AGPZ Form 80.

DD Form 398, Statement of Personal History. Although not every file had this form, when present it was particularly helpful. When properly complete this form contained the names and addresses of all immediate family members, all previous addresses with dates, names and locations of all schools attended with dates, and the names and addresses of previous employers. For Marine casualties in particular this form was almost always present and complete.

Other forms that could be used as alternate sources of data or to confirm the data in other forms were DA Form 66, Officer Qualification Record; Enlisted Qualification Record; and Report of Medical History.

If more than one address was available for an individual, all were recorded, and one was designated as the primary address. Generally these addresses fall into four categories; address during high school, address of serviceman at entry into service, address of parents at entry into service, and address of parents at death. When several addresses were available the designation of one as the primary address was fairly subjective. In general we tried to select the address that best reflected the serviceman's background regardless of the HOR listed in the Directory of Names or on the electronic tape. Preference was generally given to addresses during high school and the address of parents over the address of the individual at entry into service when these differed. It was felt that these addresses better reflected the opportunities available to the individual. If, however, it appeared that the individual had been living on his own for some time and was fairly independent of his parents, the address of the individual at entry was used.

The addresses for career military personnel presented more of a problem. So many former addresses were available for these individuals that it was difficult to determine which was the best indicator of their personal background. We still used the same guidelines for these individuals as for noncareer military.

An analysis of the number and variation of addresses can be found at Appendix D.

APPENDIX B: CENSUS TERMS AND PRODUCTS

This Appendix explains the census terms and acronyms that appear in this paper and describes the different census products that were used in the analysis.

All large urban areas in the United States are designated as Standard Metropolitan Statistical Areas (SMSA). An SMSA includes the densely populated area around a city as well as the city itself. Therefore all SMSA's include many smaller towns, communities, and even other smaller cities.

Each SMSA is broken down into census tracts. Tracts vary in size but generally contain a total population of between 2,000 to 10,000. For instance, in 1970 the Chicago SMSA was split into 1,389 tracts, each with an average population of 5,022.

Each tract is further broken down into many blocks. Each block covers an area of about one city block, although in less densely populated areas it may cover significantly more area. The blocks are grouped together into either block groups or enumeration districts. Each tract contained from one to nine of these block groups. Block groups are the smallest area for which income data is available. In 1970 the 1,389 tracts in the Chicago SMSA were broken down into 5,372 block groups and 829 enumeration districts. The average population of a block group for the Chicago SMSA was 1,173.

The area outside of an SMSA is slightly more complicated. Income information is available for places, towns, and cities with a population of 2,500 or greater. For smaller towns and rural areas we had to rely on data for counties. The county income and population counts are broken down into two categories; rural nonfarm and rural farm counts.

Another census unit that we occasionally encountered was the Minor Census Divisions (MCD) or Civil Census Divisions (CCD). Counties were usually divided into approximately five MCD/CCD's. Urban areas also had MCD/CCD's overlapping the tract and block areas. These MCD/CCD's often described an area that contained no identifiable town or community and were therefore of little use. In certain instances, though, an address in a predominantly rural area corresponded to the name of an MCD/CCD.

The census data is available in two forms; printed reports and electronic tapes. The printed Census Tract Reports and State Summary Reports can be found in any large library. These reports contain the median and mean family income for every census tract in the country as well as the median and mean incomes for all other towns and cities and rural farm and nonfarm populations as discussed above. Income information for block groups is only available on computer tapes from the National Archives Center for Electronic Records.

The only disadvantage of using the computer tape is that it only has the mean income information for block groups; it does not have median income information. Since in computing the disparity statistic only the rank ordering of block groups by income mattered, and not the level of income, the advantage of disaggregating down to block groups out-weighed the disadvantage of using the income mean rather than the income median.

Perhaps the most critical problem we faced was in identifying the exact tract and/or block group for over 2,000 addresses. We did this in two ways. For the five large cities from which we sampled a third of the casualties, we obtained the GBF/DIME file on computer tape. GBF/DIME stands for Geographic Base File/Dual Independent Map Encoding. Essentially it contains the information necessary to draw the block statistic maps for the SMSA in question, (but unfortunately not the software to actually draw the maps with the encoded information.) This file contains every street in the SMSA broken down into segments between intersections. Each of these segments comprises a single record of the file with the address ranges for the right and left hand sides of the street as well as the appropriate tract and block for the right and left hand side of the street. For instance, suppose a serviceman listed 156 S. Maple Street as his address. We first would first locate the records in the file for South Maple Street and then the specific record for 156. The record might look something like this.

<u>Street</u>	<u>Type</u>	<u>Left</u> <u>Rng</u>	<u>Trct</u>	<u>Blk</u>	<u>Right</u> <u>Rng</u>	<u>Trct</u>	<u>Blk</u>
S. Maple	St	100-198	8012	302	101-199	8012	208

From this we would conclude that 156 South Maple Street is located in block 302 of tract 8012.

For addresses in SMSA's other than the five for which we obtained the GBF/DIME files, we obtained the Street-Tract Index on microfiche. The Street-Tract Index contained essentially the same information as the GBF/DIME files except that it only went down to tract level; not block.

It should be noted that neither the GBF/DIME tape nor the Street-Tract Index was available for the 1970 census. We therefore had to use the 1980 census GBF/DIME and Street-Tract Index. We felt that it was safe to assume that for these large, established cities the addresses would not have changed during the ten year period between the censuses. It was not safe to assume, however, that the tract and block boundaries had not changed. Once we had identified the tracts and blocks for each address in 1980 we had to add the extra step of converting the 1980 tracts/blocks to 1970 tracts/blocks. For tracts this was

fairly easy. In the front of each Census Tract Report is a compatibility table that shows which tracts changed between the censuses.

There was no such compatibility table for blocks. To convert 1980 blocks to 1970 blocks, we therefore had to physically compare the block statistic maps for the two censuses. Fortunately there was very little change between the two censuses. When differences did arise, the 1980 blocks and tracts were usually formed by splitting a 1970 block or tract. There was therefore no confusion when stepping back to the 1970 block or tract.

Once the block for an address was identified, the conversion from blocks to block groups was immediate. All block numbers had three digits. The block group number was the first of these three digits.

Significant use was made of one other census product. The Master Enumeration District List (MEDLIST) was required to convert the codes on the computer tapes to a town or area name. It was also useful for determining all the various small towns and communities contained within any given SMSA.

APPENDIX C: ADJUSTMENT OF ORIGINAL SAMPLE

This Appendix describes in detail the steps used to compute the adjusted disparity statistic for the entire nation. This process consisted of two steps. First, it was necessary to assign an income to each casualty in the sample in a way that would reflect the trends observed in the data collected in St Louis. The next step was to estimate the national income distribution. Each process is described in some detail below.

Assignment of Incomes to Casualties

We had two purposes in deviating from strictly using a serviceman's HOR median income as a proxy for his income. The first is the inclusion on casualties from lower income rural areas and correction of the inflation of town casualty counts by rural residents. The second purpose is to appropriately reflect the range of incomes observed in large urban areas.

Rural Casualties

In order to adjust for the rural inflation of small towns and cities the following rule was applied. All casualties from towns with a population below 2,500 were assigned the median income of the rural population of the county in which they lived. One third of the casualties from towns with a population between 2,500 and 10,000 were likewise assigned the rural median income of their county. One tenth of the casualties from cities with population between 10,000 and 50,000 were assigned a rural income in the same manner.²¹ Thus, 25% of the casualties were considered to live in rural areas. This compares to 18.0% of the sample examined in St Louis and 26.5% of the entire U.S. population.

The remaining casualties from towns with population between 2,500 and 50,000 and all casualties from cities with population between 50,000 and 100,000 were assigned the median income of their town or city.

²¹In both cases the casualties were listed alphabetically by the state and city of their HOR. In the first case every third name was designated as rural; in the second case every tenth name.

Urban Casualties

For cities with population over 100,000, we were interested in reflecting both the true percentage which actually resided in the suburbs and the distribution of casualties across the cities' income distribution. We based these decisions on the results of the analysis of the urban sample examined in St Louis. The following describes in detail how we arrived at each figure.

The percent of each sample which listed an address in the city that was physically located outside the city's limits are shown below. The figure for Columbia, SC was 68.8%. Since there were so few casualties in our sample left within the city limits of Columbia, we omitted Columbia from the all these calculations in the interest of consistency.

Baltimore	Chicago	Portland	San Antonio	Average
27.5	6.9	35.5	12.9	20.7

Table 9: Percentage of City Casualties Actually Living in Suburbs

Based on these figures, we concluded that 20% of the casualties that listed the central city of an SMSA as their HOR should actually be considered as living in the city's suburbs.

Quartile	Baltimore	Chicago	Portland	San Antonio	Average
Poorest	32.2	28.5	26.9	38.5	31.5
Lower Middle	25.3	29.5	23.1	32.3	27.6
Upper Middle	23.0	23.5	30.8	20.0	24.3
Richest	19.5	18.5	19.2	9.2	16.6

Note that quartiles have equal total population but they do not have equal military age population. See correction below.

Table 10: Percentage of Casualties in Each Quartile of Income Distribution

Each of the quartiles above reflects 25% of the total population. No allowance is made for the number of residents in each quartile that were eligible for military service. In Barnett and Shore's original study they found little *inter-city* relationship between wealthy communities and percentage of population eligible for military service. This does not imply little *intra-city* relationship, though. For instance, one certainly would expect more young

men coming of military age (expressed as a percentage of the population) in Bensonhurst than on the upper east side of Manhattan.

The difficulty in measuring this trend directly is complicated by the fact that young men of military age are also beginning to move away from where they grew up and thus the census counts for males in this age group are often distorted. We tried, therefore to observe this trend without looking directly at the percentage of 19 to 26 year old males in each quartile. Instead, several counts were examined; males in the age groups 0 to 13, 14 to 18, and 30 and above; and two, three, four, five, and six person families. For each of these, the count for each quartile was expressed as a percentage of the city's total. In each city (with the exception of Portland, see below) these counts indicated that the wealthy parts of a city consistently had fewer males of military age.

The number of 15 year old males reflected this trend well in each case. In order to maintain consistency with Barnett and Shore's earlier work we used the number of 15 year olds in each quartile as a proxy of the percentage of the population that was eligible for military service. The figures are shown below.

Quartile	Baltimore	Chicago	Portland	San Antonio	Average
Poorest	28.2	29.9	20.6	28.4	26.8
Lower Middle	28.1	24.1	28.5	23.5	26.0
Upper Middle	23.2	23.2	23.8	23.8	23.5
Richest	20.5	22.8	27.1	24.3	23.7

Table 11: Percentage of Each City's 15 Year Old Males in Each Quartile of Income Distribution

Using these figures we computed an adjusted percentage of casualties for each quartile. For instance, in Baltimore the poorest 25% of the population had 32.2% of the casualties but 28.2% of the city's 15 year olds. We therefore figured that the poorest quartile of the Baltimore income distribution effectively had $32.2 \times (25/28.2) = 28.5\%$ of the city's casualties. The figures for each city are shown below.

Quartile	Baltimore	Chicago	Portland	San Antonio	Average
Poorest	28.5	23.8	32.6	33.9	29.7
Lower Middle	22.5	30.6	20.3	34.4	26.9
Upper Middle	24.8	25.3	32.4	21.0	25.9
Richest	23.8	20.3	17.7	9.5	17.8

Table 12: Percentage of Casualties in Each Quartile of Income Distribution, Adjusted for Military Age Population

Combining these results, we determined the percentage of casualties listing a large city as their HOR we would expect to find in each category.

Suburban	.20 = .200
Poorest	$(.297)*(.80) = .238$
Lower Middle	$(.269)*(.80) = .215$
Upper Middle	$(.259)*(.80) = .207$
Richest	$(.178)*(.80) = .142$

Table 13: Average Percent Casualties in Each Category

In order to reflect this pattern the 481 casualties in the sample from cities with a population over 100,000 were divided as follows.

	Casualties	Percentage
Suburban	96	20.0
Poorest	114	23.7
Lower Middle	103	21.4
Upper Middle	100	20.8
Richest	68	14.1
Total	481	100.0

Table 14: Division of Sample Casualties Between Categories

To ensure that the assignment of casualties to these categories was done in a random manner, we first alphabetized the 481 casualties by state and HOR. We then assigned each casualty to a category using the last two digits of the bottom right number on each page of the phone book according to the following rule.

Suburban	00 - 19
Poorest	20 - 43
Lower Middle	44 - 65
Upper Middle	66 - 84
Richest	85 - 99

Table 15: Telephone Book Rule for Randomization

The result was the following break down.

Suburban	104
Poorest	120
Lower Middle	99
Upper Middle	92
Richest	66

Table 16: Initial Results of Randomization

In order to get the desired number in each city we cross leveled as follows. The 104 assigned to the suburbs were listed alphabetically by state and city. Using the phone book again starting on page 1, the first 8 numbers with the last three digits indicating a number 104 or less were recorded. The corresponding casualties on the suburban list were changed to upper middle. Likewise, the 120 casualties assigned to the poor were listed. The first four selected by the same rule were reassigned to the lower middle. The next two were reassigned to the rich. The result was the desired number of casualties in each category.

Estimation of National Income Distribution

This national income distribution estimated by first creating five separate distributions and then adding them together after weighting by the appropriate factor. These five distributions were for rural population of counties, towns, small cities, large cities, and the "urban fringe" or suburbs of large cities.

For the rural distribution, every tenth county of each state was sampled. The Census provides a median income figure for both the rural farm population and the rural nonfarm population. For the distribution we considered the entire rural population, farm plus nonfarm, to be at the median income of the more numerous rural segment. In actuality

this distinction made little difference since the two median incomes were usually very similar. Three hundred and twenty nine counties were sampled in this manner, comprising slightly over 10% of the entire rural population of the U.S.

Towns with population between 2,500 and 50,000 were sampled in a similar manner. Seven hundred and twelve towns were sampled, again comprising just over 10% of the entire population living in towns of this size. Each town was assigned its median income.

The distribution of cities with population between 50,000 and 100,000 was tabulated using 100% of the cities in this range. Again each city was assigned its median income.

The distribution of cities with population over 100,000 was computed in different manner in order to reflect the pattern of disparity observed in large cities. Each city was in effect considered to be four smaller cities, each with 25% of all the city's families. These smaller cities could be viewed as dividing the city into the poor, the lower middle class, the upper middle class, and the rich. Using the family income distribution for the city and assuming that all families within an income bracket were uniformly distributed across the bracket, the income for the 12.5 percentile was computed. The poorest 25% of the city's families were considered to be at this income. Likewise the 37.5, 62.5, and 87.5 percentiles were computed for the lower middle class, upper middle class, and rich respectively. This was done for the all cities with populations over 100,000 in 1970.

The next step was to consider what percentage of the city's population the 25% of the families in each quartile represented. Again considering the four cities in our urban sample as representative of the nation, we computed the percentage of each quartile's families that were two, three, four, five, and six plus member families. By weighting each family size by the percentage of families of that size within each quartile we were able to estimate what percentage of each city's population was included in each quartile. The figures for each city are shown below.

Quartile	Baltimore	Chicago	Portland	San Antonio	Average
Poorest	27.3	28.0	24.3	26.3	26.5
Lower Middle	25.6	24.6	25.1	27.8	25.8
Upper Middle	23.6	23.9	25.0	23.5	24.0
Richest	23.4	23.5	25.6	22.4	23.7

Table 17: Percent of Each City's Population in Each Quartile of Family Income Distribution

Finally for each city with population over 100,000 we assigned 26.5% of the city's population to the 12.5 percentile of the family income distribution. Likewise 25.8, 24.0, and 23.7 percent of the population was assigned to the 37.5, 62.5, and 87.5 percentile respectively.

The balance of the population of the U.S. were residents of urbanized areas but not inside any town of 2,500 or more. The number in this category for each SMSA was obtained from table 12 of the State Summary Reports. In each case this "Urban Fringe" was assigned the median income of the "Urban Balance" as listed in Table 89 of the same report. Although this Urban Balance also includes people in smaller towns of the SMSA, this was the best income figure we could find for this "Urban Fringe". This income figure did seem to be consistent with the incomes of tracts and block groups in this category observed in the analysis of the urban sample. In general this income corresponded roughly with the income assigned to the upper middle class division of the central city.

With each of the five distributions described above computed, we were ready to combine them all into one national income distribution. To do this, each distribution was weighted by the ratio of the population of the sample to the true population of each category in the U.S. We then added the weighted distributions together to obtain one distribution. The resulting national distribution is shown at Table 18.

Income Bracket	Population
2,000-2,999	2,077,438
3,000-3,999	10,787,986
4,000-4,999	5,763,279
5,000-5,999	8,229,678
6,000-6,999	12,366,581
7,000-7,999	23,110,623
8,000-8,999	28,104,863
9,000-9,999	23,709,907
10,000-10,999	27,952,870
11,000-11,999	16,458,755
12,000-12,999	12,761,580
13,000-13,999	10,392,258
14,000-14,999	3,359,730
15,000-15,999	3,272,706
16,000-16,999	9,505,122
17,000-17,999	2,692,987
18,000-18,999	1,423,246
19,000-19,999	205,328
20,000-24,999	889,153
Above 25,000	147,836
Total	203,211,926

Table 18: National Income Distribution

APPENDIX D: DATA COLLECTION RESULTS

This appendix details the results of the data collection performed in St Louis and the effort to identify the tracts and block groups for the addresses collected.

Tables 19 through 24 show the results for the five urban samples and Ann Arbor. Columbia and Ann Arbor are included for comparison even though they were not factored into the figures for adjusting urban casualties. In these tables, lines 4.a., 4.b., and 4.c. indicate the town or city of the primary address in relation to the SMSA of the HOR in question. Line 5 indicates how many times the city (or a town in the SMSA in the case of the second column) appeared as the primary address in all records examined; not just those whose HOR was the city indicated. Lines 5 a. to c. breakdown the figure on line 5 similar to the breakdown in lines 4 a. to c.

Table 25 gives the results for the random and wealthy samples.

	Baltimore	
	Central City	Remainder SMSA
1. Population	905,759	1,164,911
2. Total Times Listed as HOR	416	100
3. Total Records Examined	123	6
4. Primary Address of Line 3		
a. Central City	117	2
b. Remainder SMSA	1	4
c. Outside SMSA	5	0
5. Total Primary Addresses	119	5
a. In Central City	87	0
b. In Remainder SMSA	28	3
c. Unknown	4	2

Table 19: Data Collection Results, Baltimore

	Chicago	
	Central City	Remainder SMSA
1. Population	3,366,957	3,347,621
2. Total Times Listed as HOR	954	702
3. Total Records Examined	321	28
4. Primary Address of Line 3		
a. Central City	284	1
b. Remainder SMSA	19	27
c. Outside SMSA	18	0
5. Total Primary Addresses	285	46
a. In Central City	281	0
b. In Remainder SMSA	2	39
c. Unknown	2	7

Table 20: Data Collection Results, Chicago

	Portland	
	Central City	Remainder SMSA
1. Population	382,619	626,510
2. Total Times Listed as HOR	183	107
3. Total Records Examined	56	1
4. Primary Address of Line 3		
a. Central City	47	0
b. Remainder SMSA	2	1
c. Outside SMSA	7	0
5. Total Primary Addresses	47	3
a. In Central City	26	0
b. In Remainder SMSA	20	2
c. Unknown	1	1

Table 21: Data Collection Results, Portland

	San Antonio	
	Central City	Remainder SMSA
1. Population	654,153	209,861
2. Total Times Listed as HOR	287	15
3. Total Records Examined	83	0
4. Primary Address of Line 3		
a. Central City	78	0
b. Remainder SMSA	0	0
c. Outside SMSA	5	0
5. Total Primary Addresses	78	0
a. In Central City	65	0
b. In Remainder SMSA	9	0
c. Unknown	4	0

Table 22: Data Collection Results, San Antonio

	Columbia	
	Central City	Remainder SMSA
1. Population	113,542	209,338
2. Total Times Listed as HOR	67	31
3. Total Records Examined	18	0
4. Primary Address of Line 3		
a. Central City	16	0
b. Remainder SMSA	0	0
c. Outside SMSA	2	0
5. Total Primary Addresses	16	0
a. In Central City	3	0
b. In Remainder SMSA	11	0
c. Unknown	2	0

Table 23: Data Collection Results, Columbia

	Ann Arbor	
	Central City	Remainder SMSA
1. Population	99,797	78,808
2. Total Times Listed as HOR	28	42
3. Total Records Examined	21	0
4. Primary Address of Line 3		
a. Central City	19	0
b. Remainder SMSA	0	0
c. Outside SMSA	2	0
5. Total Primary Addresses	19	0
a. In Central City	16	0
b. In Remainder SMSA	2	0
c. Unknown	1	0

Table 24: Data Collection Results, Ann Arbor

	Random Sample	Wealthy Sample
1. Number of Records Requested	555	210
2. Number of Records Examined	479	174
3. Types of Addresses		
a. Street	370	167
b. Rural	89	6
c. PO Only	28	1
d. Town Only	8	0
4. Total Street Addresses	370	167
5. Total Inside Some SMSA		
6. Total Identified to Tract	227	151

Table 25: Data Collection Results, Random and Wealthy Samples

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Biographical Note

The author received his B.S. in civil engineering from the Virginia Military Institute in 1984. Upon graduation he accepted a commission in the Regular Army and served in various company and battalion level Infantry positions in the United States and Germany. After completion of his SM degree in Operations Research at MIT, he will be assigned as an instructor at the United States Military Academy.