AN ECONOMIC ANALYSIS OF THE GI BILL EDUCATIONAL BENEFITS: A STUDY OF KOREAN AND POST-KOREAN VETERANS

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CHAPTER I

INTRODUCTION

Since World War II, billions of dollars in government subsidies have been dispersed to veterans for the purpose of furthering their educations. Three programs designed to aid veterans of WWII, Korea, and the post-Korean era respectively were implemented to "provide vocational readjustment and to restore educational opportunities lost due to service in the Armed Forces" (26, p. 19). Those veterans returning to college faced somewhat lower private rates of return on educational investment than before their service due to a shortened time span over which benefits would accrue. But more importantly in the minds of Congress, there would be increased difficulty for the veteran in financing a college education due to the facts that: (1) younger brothers and sisters were now of college age, thereby placing additional strain on family budgets; and (2) many veterans now had families of their own to support. A third goal of "making service in the Armed Forces more attractive" (26, p. 19) was included in the supporting rationale for the post-Korean (Vietnam Era) GI Bill.

The WWII GI Bill of Rights covered veterans with service between September 16, 1940, and July 25, 1947. The Korean Conflict legislation applied to veterans who served between June 27, 1950, and January 31, 1955; while the post-Korean Bill became effective

June 1, 1966. The eligibility period for the latter extended through December 31, 1976.[1]

The Korean and post-Korean GI Bills differed from the WWII GI Bill in that the former were true voucher systems. Payments, varying only according to the number of dependents, were made directly to the veteran; whereas under the WWII Bill, direct costs (tuition, fees, books) to a maximum of $500 annually were paid to the colleges by the Veterans Administration. An additional subsistence allowance of $50 a month was paid to the veteran under the WWII Bill.

There is a general consensus among those writing on the subject of GI Bill educational benefits that benefit availability has significantly increased the educational attainment of veterans. The proposed relationship between benefit avilability and post-service attainment has firm foundations in human capital theory. Previous attempts to verify the relationship empirically have suffered from data constraints which prohibited investigators from accurately gauging the nature and strength of any correlation.

The initial purpose of this thesis is to use human capital theory to develop hypotheses which will, in turn, permit an assessment of any influence benefit availability has on educational investment by veterans. The second purpose is to empirically test those hypotheses by multiple regression analysis of data relating to the educational attainment of veterans.

Chapter II presents a review of past literature dealing specifically with the influence of GI Bill benefits on educational investment. The

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[1]The magnitude of these programs and the increasingly larger proportion of participants who have used the benefits to support training at the college level can be determined from (Table V, Appendix A).

principal shortcoming of prior studies is the unavailability of a control group with which to compare the attainment of veterans having GI Bill benefits. Consequently, the majority of these studies rely exclusively on data drawn from hypothetical questionnaires submitted to veterans. Their conclusions must, therefore, be viewed with considerable caution.

The thesis proceeds with an investigation of human capital theory in Chapter III. Tenets are derived from the literature in order to develop a theoretical model in Chapter IV which identifies the nature of the relationship between benefit avilability and educational investment by all veterans. The model also predicts the relative influence of benefit availability on investment by groups of veterans differentiated according to their socioeconomic backgrounds.

Hypotheses are formulated in Chapter V to test the predictability of the theoretical model and assess the influence of benefit availability on investment decisions by: (1) all veterans, and (2) racial subgroupings of veterans. The hypotheses evaluated are:

1. Availability of the GI Bill educational benefits has increased the post-service college educational attainment of veterans.

2. The GI Bill educational benefits have caused a greater increase in post-service college educational attainment for black veterans than for nonblack veterans.

The hypotheses are tested by applying a stepwise multiple regression technique to data recounting the post-service educational attainment of Korean and post-Korean veterans. The data are drawn from a survey conducted in 1967 by the Bureau of the Census on behalf of the Veterans Administration. The survey is a stratified area sample selected from the Bureau's Current Population Survey/Monthly Labor Survey (CPS/MLS)

sample of October, 1966. The survey contains data on veterans whose periods of military service ranged from the Spanish-American War through 1966. Responses were secured from 11,839 veterans. The copy of the data tape employed in the present study was obtained from the Center for Human Resources Research of the Ohio State University.

The completed survey questionnaires provide detailed information on education, income, and other personal characteristics. Specific information is contained regarding the amount of education acquired between separation and the survey date. Post-service attainment is categorized according to the number of months acquired with and without GI Bill assistance.

The present study restricts attention to the data relating to Korean and post-Korean veterans only. The Korean and post-Korean veterans differed systematically in that the Korean veterans were eligible for GI Bill benefits while the post-Korean veterans did not become eligible until June, 1966. Restricting the analysis to include Korean and post-Korean veterans only insures that all characteristics other than benefit availability are as similar as possible among members of the sample group.

Multiple regression analysis allows the researcher to determine whether or not suggested variables are significant in explaining the behavior of a dependent variable. The number of months of post-service education attained by veterans in the sample group is specified as the dependent variable in the regression model. Nine potential explanatory variables, including one representing the availability of GI Bill benefits, are entered into the regression equation one at a time. The

stepwise technique employed retains only those variables which significantly increase the explanatory value of the equation.

The veterans in the sample are then divided into two groups, blacks and nonblacks. The black group serves as a proxy for those veterans evolving from relatively disadvantaged socioeconomic backgrounds. Separate regressions are run on each group. This facilitates a determination of the relative influence of the suggested variables on each group. An evaluation of the regression results is conducted in Chapter VI, and the conclusions of the thesis are presented in Chapter VII.

The approach of the thesis offers several advantages over the methodology of previous studies. First, a theoretical model is developed, based upon human capital literature, that yields direct implications regarding the influence of benefit availability on veterans' educational investment decisions. Second, a data base is developed that permits an empirical evaluation of the theoretical implications of the model. The testing procedure focuses on the actual investment behavior of two groups of veterans whose primary difference is the fact that one group had benefits available while the other did not.

The application of multiple regression techniques to actual investment data allows conclusions regarding the significance of benefit availability to be drawn with a specified degree of statistical confidence. Previous studies, based upon hypothetical questionnaires distributed to student veterans, are unable to do this.

An empirical determination of the influence of benefit availability is especially important now that these benefits are being phased out.[2] The theoretical model developed in Chapter IV suggests that the availability of benefits is particularly important in influencing the investment decisions of individuals from relatively disadvantaged socioeconomic backgrounds. It follows that these same individuals will suffer a disproportionate burden if benefits are withdrawn without government implementation of other programs designed to provide aid in financing higher education.

The extension and modification of the Basic Educational Opportunity Grants (BEOG) program in October, 1978, marks a major effort by the federal government to provide financial assistance to individuals seeking college level education. An empirical evaluation of the significance of the GI Bill in raising educational attainment by socioeconomically disadvantaged veterans yields important implications regarding the probable impact of the BEOG program.[3]

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[2]Veterans entering the service after December 31, 1976, are not eligible to receive benefits under the Vietnam Era GI Bill. Inductees after this date do have the option of setting aside between fifty and seventy-five dollars of their monthly pay in an educational assistance fund. The Veterans Administration will then match every dollar contributed with two dollars in federal funds, with the stipulation that the money be applied toward tuition and expenses incurred while the veteran is enrolled in an educational or training program.

[3]The primary differences between the GI Bill educational benefits program and the BEOG program are: (1) the BEOG program is not restricted to veterans, and (2) the level of payments under the BEOG program is inversely related to the level of family income. The 1978 modifications extended eligibility upward to include students from families earning as much as $25,000 annually.

CHAPTER II

LITERATURE ON THE GI BILL

In spite of the massive expenditures made under the GI Bill educational programs ($5.7 billion in fiscal 1976 alone [24, p. 166]), very few empirical investigations of the GI Bill(s) have been conducted. The first studies were the product of social psychologists, interested in assessing the adjustment of veterans to college life, and their relative academic performance (4, p. 3). Norman Frederiksen and W. B. Schrader (5), and R. J. Strom (20) conducted surveys of college WWII veterans in which the veterans were asked whether they would have attended college had the subsidy not been available. The response in both surveys was that some 20% of the veterans would not have attended without the subsidy.[1]

In 1956, the President's Commission on Veterans' Pensions (the Bradley Commission) published twelve volumes of staff reports reviewing all federal programs established to provide benefits for veterans. The study was largely based on a survey of 7,900 veterans performed by the Census Bureau in October, 1955. However, the ability to draw definitive conclusions about the success of such readjustment programs as the GI Bill educational benefits is severely constrained because most of the data combine WWII and Korean veterans.

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[1] Twenty percent in Frederiksen (5), and 22% in Strom (20).

> Since Korean Conflict veterans have not yet had time to realize the (full) benefits of post-war training, the combined totals tend to understate the success in readjustment that has been achieved by the WWI group (25, p. 108).

Another Census Bureau survey conducted in the same year (1955) showed that annual earnings for those veterans who had returned to school under the GI Bill were approximately the same as those veterans who had not returned to school (14, p. 147).[2] In spite of these results, most of those writing on the subject of GI Bill educational benefits remained convinced that the net impact of the benefits on educational levels and earnings was in fact significant. H. P. Miller concluded that the results of the latter Census Bureau survey suffered from the same bias confronted in the Bradley Commission study: i.e., "conceivably the full impact of the additional training was not yet reflected in 1955" (14, p. 147).

Another problem inherent in both surveys is that no allowance is made for differences in ability, educational level, or social background. Thrainn Eggertsson (4, p. 9) correctly concludes that comparisons of incomes or occupational distributions of veterans and nonveterans reveal little of interest when no allowance is made for other explanatory factors.

A few authors, especially C. B. Nam (15), remained unconvinced of the effectiveness of the GI Bill in raising educational attainment. In an article published in 1964, Nam concluded that the impact of the GI Bills on the educational levels of the male population was insignificant (pp. 26-32). It was his judgment that even though war interrupts the

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[2] Veterans who returned to school had average annual earnings of $4,400, vs. $4,200 for veterans who had not returned to school after separation.

educational investment plans of many individuals, these same individuals return to school after the war and complete, on average, the same amount of schooling as the typical individual who did not join the service.

Nam (15) relied heavily on data contained in the Bradley Commission Report, to which he initially applied the 20% difference in educational enrollment by veterans due to benefit availability previously estimated by Frederiksen and Schrader. He finds that a "substantial minority of the veterans who attended college after the war would not have attended if the GI Bills had not been available" (p. 28). He contends, however, that many of the enrollees did not increase their educational attainment when measured as "completed years of formal schooling leading toward a diploma or degree (p. 29). Drawing on the Bradley data and other sources,[3] he concludes that:

> . . . even if the benefits of the GI education and training programs had not been available, the sharply rising trend in formal educational composition of the male population observed before the war would have continued at substantially the same general level (p. 32).

The estimate Nam derives of the educational attainment resulting from the availability of benefits may contain a downward bias if: (1) data from the Bradley Commission Report do not fully reflect the total increment in attainment for veterans; (2) the 20% differential in enrollment drawn from the Frederiksen and Schrader (5) study underestimates the true difference in attainment; or (3) the use of years completed toward a diploma or degree as a measure of attainment results in significant underestimation by excluding partial years of full time equivalency

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[3]The President's Commission on Veterans Pensions, Staff Reports I-XII; U. S. Bureau of the Census, U. S. Census of Population for 1950; and various studies on the educational status of servicemen by the U. S. Army and the Veterans Administration at the end of WWII. For a detailed breakdown, see reference (14, pp. 27-28).

completed, and education completed by those veterans not studying toward a specific degree or diploma. Nam's conclusion regarding the impact of the GI Bill educational benefits is at variance with majority opinion, perhaps best typified by R. A. Wolks (29, p. 2) contention that the GI Bill "paved the way for the most dramatic enrollment explosion in the history of higher education".

Further attempts to measure the significance of GI Bill educational benefits did not occur until 1972 when Thrainn Eggertsson (4) completed a dissertation study of higher education taken under the WWII GI Bill of Rights. Based on data drawn from a national survey of veterans conducted by the Census Bureau in 1967, Eggertsson estimated the overall magnitude of educational investment under the WWII GI Bill and computed a social rate of return on that investment of 9.7% for a high school graduate who attended four years of college. Availability of GI Bill benefits for the same veteran was estimated to increase his private rate of return from 10.9% to 14.8% based on projected earnings functions (p. 133, 140). These findings are consistent with economic theory as a reduction in opportunity cost via the subsidy would be expected to increase the private rate of return.

Eggertsson (4, p. 145) finds a difference in educational investment by WWII veterans attributable to the availability of GI Bill benefits of $4.6 billion. His analysis, however, is (with the exception of the overall magnitude of investment) based upon an estimated 26% differential in investment resulting from the availability of benefits. This estimated average (mean) differential is, in turn, based on Strom's survey of WWII college veterans.

Eggertsson (4) multiplied his estimate of the total post-service stock of education acquired by veterans (college years x $3,300) by the mean of 26% to arrive at the estimated differential of $4.6 billion. He readily admits that Strom's (20) results (and therefore his own) "must be treated with some caution because of the hypothetical nature of the questions posed to the veterans" (p. 55). Eggertsson's estimate of the differential in post-service educational investment due to the GI Bill may be low because it does not allow for increases in education by those veterans who would have gone to school without the benefits, but attended longer because the benefits were available. In addition, the estimated percentage differential would only be representative for the 1947 school year in which the Strom survey was conducted.

One of the earliest efforts to empirically assess the impact of GI Bill educational benefits on various racial and socioeconomic subgroups of veterans was a study in 1971 by Griliches and Mason (7). Their investigation, based on a 1964 Current Population Survey by the Census Bureau, was intended to estimate the bias in the education coefficient produced by a regression of income on education, without controlling for differences in ability. A relatively strong correlation was observed between schooling completed before military service, and mental ability (measured by Armed Forces Qualification Test scores, AFQT) and personal background factors. A much lower correlation was found between schooling completed after entry into the Armed Forces and the same variables.[4]

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[4] A conceptual problem with this approach may lie in the use of AFQT scores as a proxy for ability. The AFQT is an achievement test as opposed to an IQ test; thus it is not merely a measure of ability. See reference (11).

Eggertsson (4, p. 86) found lower earnings for veterans who completed one or more years of college after discharge, relative to the earnings of veterans of the same age and educational attainment who completed their educations before separation. He cites the Griliches and Mason findings as support for his hypothesis that the earnings differential may exist because the group containing those who attended college after military service included a greater proportion of individuals from socioeconomically disadvantaged backgrounds. It was Eggertsson's contention that:

> . . . the veterans who would not have come to college without the GI Bill subsidy were more likely to have been relatively disadvantaged in terms of such things as social and economic background and intelligence (p. 67).

The only test of this proposition is the observed difference between the earnings of "trainees" (those who acquired part of their education after discharge) and "nontrainees". Eggertsson fails to consider that part of the earnings differential may be due to less experience on the part of trainees at the same skill (education) level. While the differential in earnings may, in reality, largely be the result of disadvantaged backgrounds, he does not attempt to determine whether a systematic difference in backgrounds exists.

Eggertsson's (4) calculations also indicate that the earnings differential between blacks and nonblacks was lower among veterans with college educations than among veterans having only a high school education. Annual earnings of blacks were 53% of average nonblack earnings among high school graduates, and 75% of nonblack earnings among college graduates (p. 101). He cautions that these results may be questionable because of the low number of black college graduates in the sample.

The most significant work toward evaluating the impact of the GI Bill educational benefits on blacks was recently completed by David O'Neill and Sue Goetz Ross (17) at the Center for Naval Analysis. Their study of Vietnam era veterans focuses on education and earnings data of those enrolled in vocational post-service education. They omit part time users of the GI Bill benefits from their examination, as well as former officers.

O'Neill and Ross (17, p. 56) found that "black veterans participate more than nonblack veterans within every AFQT/prior education cell . . . and utilize more entitlement per participant than similar nonblack veterans". Based on estimated earnings functions, they found that before training the earnings of blacks were 15% lower than those of nonblacks. Earnings functions estimated after training revealed no significant black/nonblack earnings differential. This lead the authors to conclude that "a voucher-type system (such as the post-Korean GI Bill) can be relied on to help blacks participate in the labor market on an equal footing with other segments of society" (17, p. 39).

The O'Neill and Ross (17) study found that black veterans were more apt to use GI Bill educational entitlements and to use them for longer periods than nonblack veterans having similar AFQT scores and prior education. Their study does <u>not</u> show that this larger propensity for post-service education by blacks results solely from GI Bill benefit availability. It is conceivable that black veterans obtained more post-service education than similar nonblacks for reasons other than the availability of benefits. For example, the average black veteran may have been relatively unexposed to people, places, and ideas outside of a restricted environment prior to his service experience. The opportunity

to travel and become familiar with the economic and other advantages of further education may have produced a relatively strong impact on the attitudes of heretofore underexposed veterans foward further attainment. Also, the relatively high unemployment rate among blacks meant that their implicit costs of education were lower than those of nonblacks.

It has proven difficult to show what portion, if any, of the differential in post-service attainment is due to the availability of benefits. A useful step in this direction would be to show that the differential in post -service attainment is reduced when benefits are not available.

Difficulty incurred in attempting to separate the effects of the GI subsidy from those of the service experience led Eggertsson to observe that:

> . . . although it is a fairly common belief that the Bill was responsible for a great deal (of schooling), nobody has estimated statistically the extent of this influence, using some form of supply and demand analysis (4, p. 44).

There is general support in the literature for the propositions that the GI Bill has had a significant impact on the total quantity of education obtained by veterans, and that the effect on attainment has been particularly strong for blacks. The testing of these hypotheses, however, has suffered from a lack of data that would enable the user to separate the effects of the subsidy on post-service education from those of the service experience.

CHAPTER III

HUMAN CAPITAL THEORY AND LITERATURE

Much of the pioneering work in human capital theory is the product of Gary Becker (1) (2). The theory is designed to explain the way the labor market operates, and is based on the assumption that labor is treated by employers as an economic good. It is capable of explaining much of what has been observed empirically regarding relationships between earnings, experience, unemployment, education and skill level.

A crucial assumption in human capital theory is that individuals make investment decisions by comparing the present value of expected benefits and costs. The costs of human capital investment are classified as explicit expenditures such as tuition, books, and fees, and implicit costs, primarily foregone earnings. Benefits to the individual include higher earnings, and the monetary equivalent of psychic benefits. Benefits to society from these investments are defined in such terms as increased worker productivity, a better citizenry, a lower crime rate, and improved race relations.

Human capital theory maintains that a significant contribution toward narrowing income differentials will result from efforts successful in increasing the educational attainment of individuals from lower socioeconomic backgrounds. The human capital approach to earnings determination is based on the premise that the principal characteristic differentiating members of the labor force from each other is their skill

level (13, p. 241). It emphasizes the pivotal role of formal education in raising the productivity of workers. Accordingly:

> . . . a natural consequence of the acceptance of human capital theory by many labor economists in the 1960's was to emphasize education as an important policy instrument for raising the productivity, and hence the earnings, of low income individuals (13, p. 243).

It also follows from neo-classical economic theory that increasing the "value of marginal product" (VMP) of a resource, such as labor through education, will result in an increase in overall welfare, provided the increase in the VMP_L exceeds the VMP foregone when resources are withdrawn from alternative uses in order to provide that increment in education.

In terms of human capital theory, the availability of GI Bill educational benefits will lower the private opportunity cost of further education for eligible veterans. This reduction in opportunity cost increases the private rate of return on additional investment, inducing more veterans to enroll in post-service programs than would otherwise be the case. Additionally, those veterans who would have attended schools without GI Bill benefits will be inclined to attend longer as a result of the higher private rate of return on further investment. For example, Eggertsson found that availability of the GI Bill benefits raised the private rate of return on four years of college from 10.9% to 14.2% (4, p. 133, 140).

In attempting to evaluate the social desirability of any government program such as the GI Bill educational benefits, the first step must be to compare the social rate of return on educational investment directly resulting from the availability of the benefits with the next best alternative. Studies by Becker (1, p. 78), Hansen (9, p. 149), and

Hanoch (8, p. 71) have found private rates of return on investment in a four year college education to be in the range of 11% to 14%, with social rates of return on the same investment yielding at least 10%. The social rate of return on alternative investments by government is generally regarded to be 10% at most. In his study of WWII veterans who acquire college training after separation from the Armed Forces, Eggertsson found social rates of return comparable to Becker's once allowances were made for differences in background.[1] It is generally agreed among the authors that there is no evidence of serious under-investment in higher education when the average social rate of return on investment in college is compared with the social alternative rate of return.

While there does not appear to be a severe educational underinvestment problem in the aggregate, a problem does exist for those potential students whose social rates of return justify investment in higher education, but are unable to make that investment because they come from disadvantaged backgrounds. Recent studies have shown that among the most able high school graduates, 95% of those from high socioeconomic groups attended college, while only 50% of those most able originating from low socioeconomic groups attended (1, p. 134). These findings, when coupled with the demonstrated correlation between low earnings and low educational attainment, suggest that some programs to assist poor students in financing their education may be warranted in order to

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[1] Becker (1, p. 20) estimated a social rate of return from investment in 4+ years of college to be 10% to 13% depending on the student's ability and social background, with the rate to the typical high school student on a college degree being 10%. Eggertsson (4, p. 142) estimated the social rate of return on 4 years of college to veterans who were high school graduates to be 9.7%.

(1) break the circle of poverty and reduce income differentials, and (2) increase the efficiency of educational investment and thereby raise net national product.

Hanoch (8, p. 63) and others have assumed that, on average, a college student earns enough working part time to cover the direct private costs of college. Therefore, the GI benefits may be viewed as serving to increase the private rate of return on educational investment by partially offsetting the opportunity cost to veterans of attending college. Gary Becker (1, p. 77) first noted "the dominance of foregone earnings and the relative unimportance of tuition," in determining educational investment. Becker concludes that eliminating tuition only increases the private rate of return for a college education from approximately 14.5% to 15.5% for white males. Thus:

> . . . good economic reasons may prevent poor high school graduates from attending even tuition free colleges. Elimination of foregone earnings should have a much greater effect on their incentive to go to college (1, p. 77).

By Becker's reasoning, voucher programs such as those used in the Korean and Vietnam Era GI Bills should have a significant impact on educational investment by disadvantaged veterans through reduction of their opportunity costs.

The reader will recall that Eggertsson (4, p. 67) reached a similar conclusion in attempting to explain the earnings differential he observed between veterans who obtained all of their education before separation from the service, and those veterans with the same educational attainment who acquired part of their education after separation. He proposed that this earnings differential results at least in part from the higher proportion of individuals from disadvantaged backgrounds in

the post-service group. Those veterans who would not have gone to school without the subsidy were more likely to come from relatively disadvantaged backgrounds.

If Eggertsson is correct, it is likely that the post-service group in his study contains a relatively large proportion of individuals from racial/ethnic minorities. Assuming this to be the case, they would be expected to receive lower earnings as a result of current and past discrimination.

This explanation is in line with what would be expected on the basis of the Becker analysis. There are, however, factors which must be controlled in order to evaluate the proposition that earnings among veterans having equal educational attainment differ because of systematic differences in their socioeconomic backgrounds. To lend support to Eggertsson's explanation of earnings differentials, it must first be established that the socioeconomic backgrounds of trainees and non-trainees differ systematically. As previously noted, Eggertsson does not attempt to evaluate this hypothesis, beyond observing that it would be consistent with his findings on earnings differentials.

Potential students from disadvantaged backgrounds will, on average, have lower foregone earnings. The GI Bill subsidy will reduce the foregone earnings of attending school by an equal amount for each user. For disadvantaged students who have relatively low foregone earnings, the percentage reduction in costs will be greater. It is also probable that veterans from disadvantaged backgrounds will receive a larger increase in their expected private rates of return on educational investment as a

result of the subsidy.[2] Thus it might be expected that a higher proportion of veterans from socioeconomically disadvantaged backgrounds will participate in these educational programs.

The second, and most important, factor tending to increase the relative participation of socioeconomically disadvantaged veterans in GI Bill subsidized educational programs results from the impact of such programs on financing costs. According to Becker (1, p. 107), the most important cause of differences in opportunities is differences in the availability of funds. Socioeconomically disadvantaged individuals will, on average, have to borrow more funds in order to finance a given amount of education (beyond some minimal amount) than their counterparts from higher socioeconomic backgrounds. According to theory, an individual will want to undertake further investment in education if his expected rate of return on said investment exceeds that available from his next best alternative. For the non-borrowing student, the correct alternative rate (marginal cost of funds for financing) is that which could be earned by him as a result of investing funds in a project of similar risk and duration. For the student who must borrow funds in order to finance

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[2] It is possible that the opposite is true in certain cases, e.g., if the increment in earnings is very small. One can make simplifying assumptions to insure that this does not occur. For example, if it is assumed that the increase in earnings from the increment in education is twice as high for nonblacks, but that nonblacks also have opportunity costs that are twice as high, then, nonblacks and blacks have equal rates of return on investment. If opportunity costs are then reduced by equal absolute amounts, the rate of return for blacks will increase more than the rate of return for nonblacks.

In order to empirically investigate the impact of the subsidy on rates of return, one can apply the $3960 basic subsidy entitlement under the Korean GI Bill as a reduction to 1959 opportunity costs for whites and nonwhites (a black/nonblack breakdown is not given in the Census data). In this case, the increase in the rate of return is higher for nonwhites than whites. It appears likely that this result is typical.

education, the applicable opportunity cost is the interest rate he must pay on borrowed funds.

As a result of a lack of homogeneity in the capital market and variations in risk, the alternative rate for borrowing students exceeds that of non-borrowing students. Differences in the interest rates for internal and external funds will cause "the wealthier person to purchase more human capital than the poorer person, despite the fact they are of equal ability," according to Marshall, Cartter, and King (13, p. 252). Becker (1) and Perlman (18) also theorize that the borrowing student faces a higher alternative rate than the self-financing student; therefore, the "economic motivation for investment in education is weaker for the poorer student who must borrow to pay for his schooling" (18, p. 57).

It is the social rate of return for the marginal students attracted by the subsidy that must be compared with the social alternative rate of return in attempting to evaluate the social desirability of the GI Bill programs. Perlman and Eggertsson both note that the marginal students attracted by a subsidy will have lower rates of return (private and social) than the average student (18, p. 108). Additional educational investment via a subsidy cannot be justified on rate of return criteria unless the rate of return on investment for marginal students attracted by the subsidy exceeds the alternative social rate of return. However, this type of analysis assumes equality of opportunity for all potential students. If some students experience the effects of discrimination on potential earnings, their private and social rates of return will be biased downward.

A second shortcoming of rate of return analysis when applied to educational investment is that many of the benefits derived from increased

education are non-quantifiable, e.g., consumption benefits. Perlman and others refer to the need to deal with more than just the increased financial earnings resulting from education in any attempt to evaluate social and private returns to investment in education.

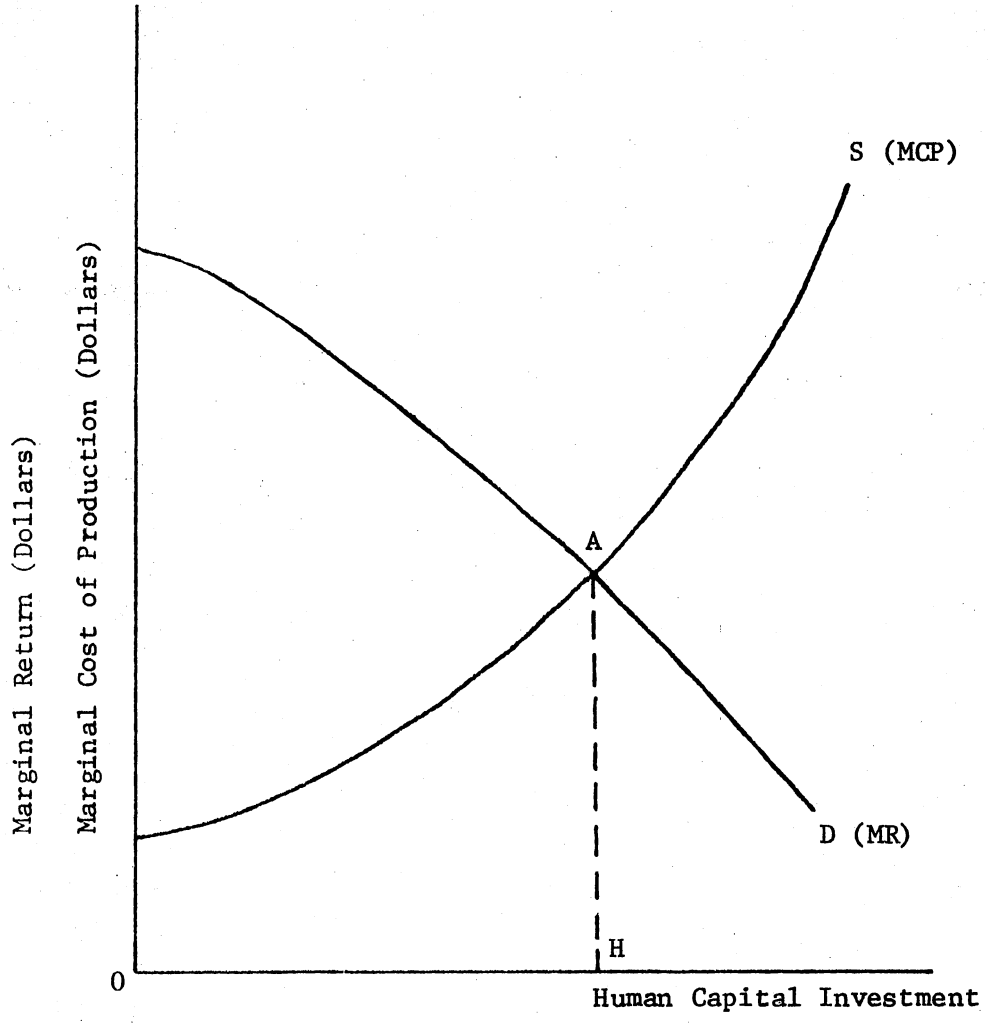
> If public policy is directed to the maximum welfare of the population in the broadest sense of the term . . . then consumption benefits derived from education should be considered as an addition to financial returns in evaluating social returns to educational investment . . . [Also, a broader concept of returns would include] other social goals such as improved race relations and poverty reduction through schooling (18, p. 43).

CHAPTER IV

A THEORETICAL MODEL

Gary Becker was the first to view human capital educational investment decisions in terms of supply and demand analysis. It is this framework that is perhaps best suited for viewing the effects of the GI subsidy on different socioeconomic groups. It has been contended thus far that the GI bill will serve to increase the private rate of return on educational investment for all veterans through a reduction in opportunity costs, and will have a particularly strong influence on investment decisions by those veterans from disadvantaged backgrounds through a reduction in the amounts they must borrow. Becker's (2, pp. 9-10) approach to human capital investment involves a more detailed breakdown of financing sources than is employed here. Rather, the present development begins with a more generalized approach to supply and demand for educational investment, similar to that used by Reynolds (19, pp. 299-304).

In Figure 1, human capital investment in terms of cost is measured along the horizontal axis for an individual. Anticipated monetary benefits from educational investment plus the monetary equivalent of psychic benefits determine an individual's demand for education. The approach developed here emphasizes the direct monetary returns from education. Thus, the demand function in Figure 1 shows how much each increment in educational investment will yield in the form of increased



Source: The graphic analysis of supply and demand for human capital investment was first developed by Gary Becker. See reference (1, p. 98).

Figure 1. Supply and Demand for Human Capital Investment

earnings, measured in dollars along the vertical axis. The total increase in earnings[1] from a given level of educational investment is indicated by the area under the demand curve up to that level of investment.

The demand curve for human capital investment is downward sloping, indicating that as the amount invested increases, the anticipated increment in earnings from additional investment declines. This results primarily from diminishing returns to fixed human capacities.[2] Also, the reduction in time remaining for benefits to accrue as more years are spent in capital formation contributes to a negatively sloped demand curve.

The supply curve in Figure 1 shows the private marginal cost of producing an additional unit of human capital, including tuition, fees, financing costs, and foregone earnings. The private marginal cost of producing each increment in human capital investment is measured along the vertical axis in dollars. The supply curve is upward sloping throughout, showing that each increment in investment is more costly in terms of earnings foregone and financing. The individual is assumed to initially employ the cheapest source of financing funds, moving to increasingly expensive sources as it becomes necessary to do so. As the investor moves to external sources of financing, he finds he must pay increasingly higher interest rates on each additional dollar borrowed in order to compensate for the increasing risk to his lenders. This means

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[1] Represents increase in earnings over and above an earnings base, the base representing what could be earned by a completely uneducated and untrained individual. Thus the area under the demand curve shows the increase in earnings attributable to human capital investment.

[2] If diminishing returns set in at an increasing rate, the demand function will be concave when viewed from the origin. The assumption of a concave demand curve is not essential for the analysis that follows, though it is consistent with the Reynolds presentation.

that the marginal cost for funds, and thus the marginal cost (private) of producing additional units of human capital, rises increasingly as the investor turns to outside sources. Thus the slope of the supply function for human capital investment reflects both increasing foregone earnings and increasing financing costs as investment is increased.

The total private production costs for any given level of human capital investment is given by the area under the supply curve up to that level of investment (summation of the marginal costs of production). The optimal amount of investment occurs at the level where the supply and demand functions intersect, Point A in Figure 1. The amount of investment is labeled OH. At this level the marginal benefits in terms of increased earnings from the last unit of investment is equated with marginal costs of producing that unit. This insures maximization of the difference between benefits derived from human capital investment and private production costs.

Marshall, Cartter, and King (13, pp. 250-251) have proposed that if one follows Becker's definition of ability in terms of an individual's capacity to profit from human capital investment, the demand schedule of a more able person for human capital investment will lie to the right and above the demand curve of a less able person. In terms of the present graphic analysis, higher demand curves show that the same amount of investment yields larger increments to earnings. In a study of rates of return to investment in higher education, Greer (6, p. 64) found that private rates of return for whites on "investment in college in both 1960 and 1970 were much greater than nonwhite returns, using both common white

and nonwhite opportunity costs and opportunity costs for nonwhites."[3] Greer states that the differences in the internal rates of return may be attributed to the effects of past discrimination. Perlman (18, p. 64) also concludes that there are lower returns from college for nonwhites, which outweigh their lower direct and indirect costs.

Based upon these findings and an implicit assumption that blacks are more likely to suffer the effects of discrimination than nonblacks, separate demand functions are located to indicate increases in earnings for blacks and nonblacks (see Figure 2). The demand function for nonblacks lies to the right and above that for blacks, indicating that nonblacks receive higher increases in earnings from any given increment in human capital investment. An examination of Census data for 1960 and 1970 reveals that there is consistently an absolute differential in incremental earnings between blacks and nonblacks resulting from each increment in educational attainment.[4] There is, therefore, empirical justification for locating the demand functions to reflect greater increases in earnings from human capital investment for nonblacks.

Within his egalitarian approach to human capital investment, Becker (2, p. 13) has theorized that individual investments in human capital will vary because of differences in such factors as family wealth

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[3]Greer also found that the disparity in white and nonwhite rates of return to investment in college education diminished from 1960 to 1970.

[4]Incremental changes in annual income for various educational attainments were computed from data contained in reference (23, pp. 2-3).

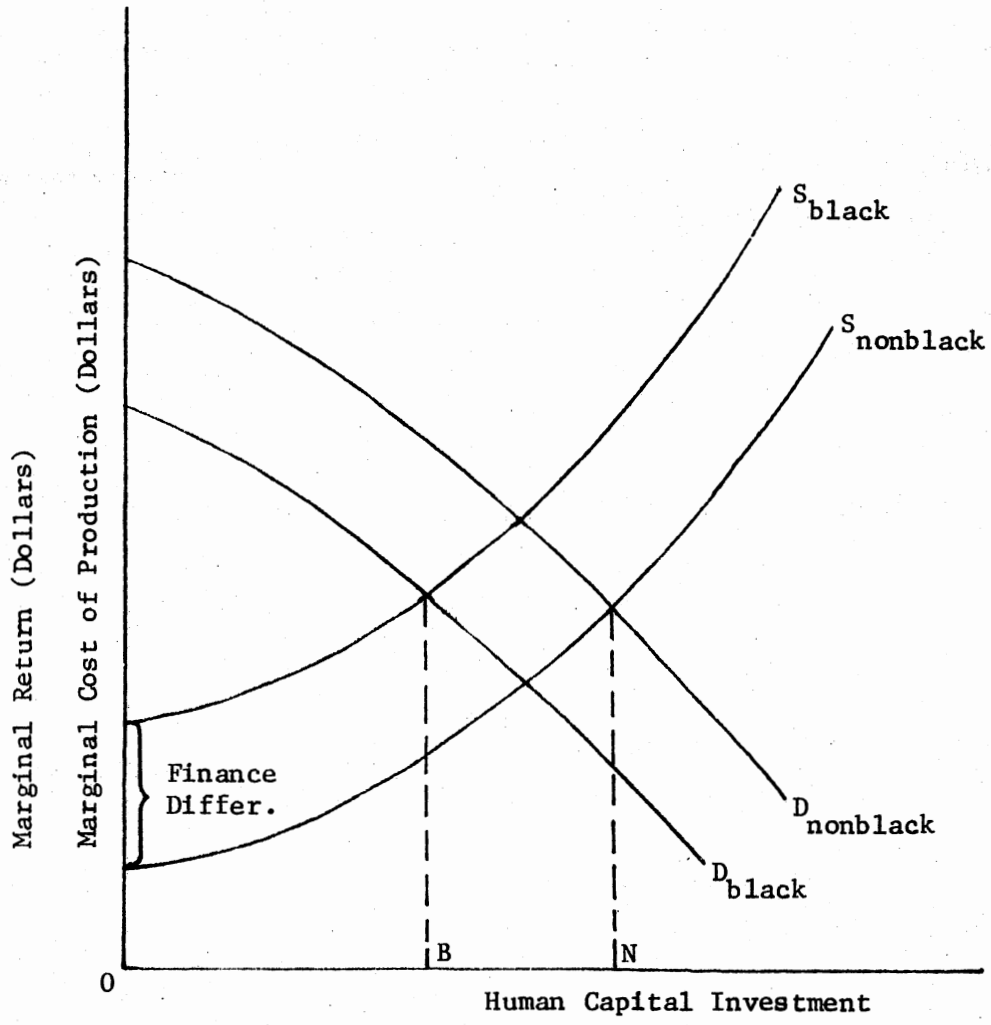

Figure 2. Black and Nonblack Supply and Demand for Human Capital Investment

and subsidies which give some individuals greater opportunities to invest than others.[5] Elimination of these environmental differences would tend to equate opportunities for investment among individuals, thereby eliminating major differences in investment and earnings. In his more generalized approach to human capital investment, Reynolds (19, p. 300) also depicts variations in investment attributable to differences in access to financing, though establishment of equal access to funds would not bring about equality of investments and incomes due to variations in individual demand functions. However, the degree of inequality would be less than if differences in financing opportunities were also present (19, p. 301).

These environmental differences can be shown graphically by depicting separate supply (private marginal cost of production) schedules for individuals from socioeconomically disadvantaged backgrounds, and individuals who do not come from socioeconomically disadvantaged backgrounds. If it is assumed that blacks are more likely to come from disadvantaged backgrounds than nonblacks, the supply function for nonblacks will lie to the right of and below the supply function for blacks (see Figure 2). The graphic presentation assumes that the foregone earnings costs of additional human capital investment are the same for blacks and nonblacks. Although it is recognized that, on average, blacks will have lower foregone earnings, the assumption of equal foregone earnings makes it possible to isolate the effects of differences in financing opportunities between blacks and nonblacks.

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[5] The egalitarian approach assumes that demand conditions are the same for everyone, and that the only reason for variations in human capital investments and earnings is differences in the supply side.

This assumption is consistent with Reynolds' analysis of supply and demand for human capital investment, wherein he states that the most plausible explanation for differences in supply curves is differences in access to financing (19, p. 300).[6]

The vertical distance between the supply curves measures the differences in financing costs of producing each increment in investment. The optimal amount of investment for blacks is labeled OB in Figure 2, while that of nonblacks is labeled ON. The model implies that nonblacks will, on average, make larger investments in human capital than blacks due to differences in both supply and demand. Differences in investment due to differences in demand may be related to past discrimination, particularly in the quality of schooling. Differences in investment resulting from differences in supply are attributable to financing opportunities. Earnings differentials between blacks and nonblacks result from differences in the amount of human capital investment (personal optimum), and discrimination (differences in demand). This tends to extend the black/nonblack differentials into the future.

The model is now assumed to relate specifically to black and nonblack veterans, and indicates their respective supply and demand for human capital investment. There is empirical evidence indicating that among veterans the differential in earnings between blacks and nonblacks declines as the level of educational investment increases. In his study of WWII veterans, Eggertsson (4, p. 101) found that annual earnings of blacks are 53% of those of nonblacks among high school graduates, and

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[6] Changing the relative positions of the supply curves to reflect differences in opportunity costs does not appreciably effect the analysis that follows. Allowing for differences in foregone earnings merely complicates the graphic presentation.

75% of those of nonblacks among college graduates. This led Eggertsson to contend that there may be less discrimination, in relative terms, in occupations requiring college education. The O'Neill and Ross (17, p. 39) study of Vietnam era vocational trainees revealed that prior to training, earnings of blacks were approximately 15% lower than earnings of similar nonblacks. After training, there was no significant racial earnings differential. The results of both studies must be treated and applied with caution, especially the latter as it relates specifically to vocational training. Nonetheless, the empirical evidence on veterans' earnings which is available suggests that the variation between blacks and nonblacks in marginal returns on further investment declines as the amount of investment increases. Therefore, the demand functions indicating incremental earnings for human capital investment by black and nonblack veterans are shown as converging with additional investment (see Figure 3).[7]

The effect of the GI Bill educational subsidy will be to reduce the foregone earnings cost and the financing cost of each increment in investment. This may be shown graphically by a shift of the supply function (marginal cost of production) for each veteran to the right. The reduction in foregone earnings will be the same dollar amount for each veteran. However, the reduction in financing costs will be greater for those veterans who prior to the subsidy had to borrow more funds to finance a given increment in investment. Based on the assumption

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[7]The analysis and conclusions which follow are not dependent upon the demand functions converging with additional investment. The demand function for nonblacks is given a steeper slope because the empirical evidence on veterans' earnings at various levels of attainment suggests that this is the case.

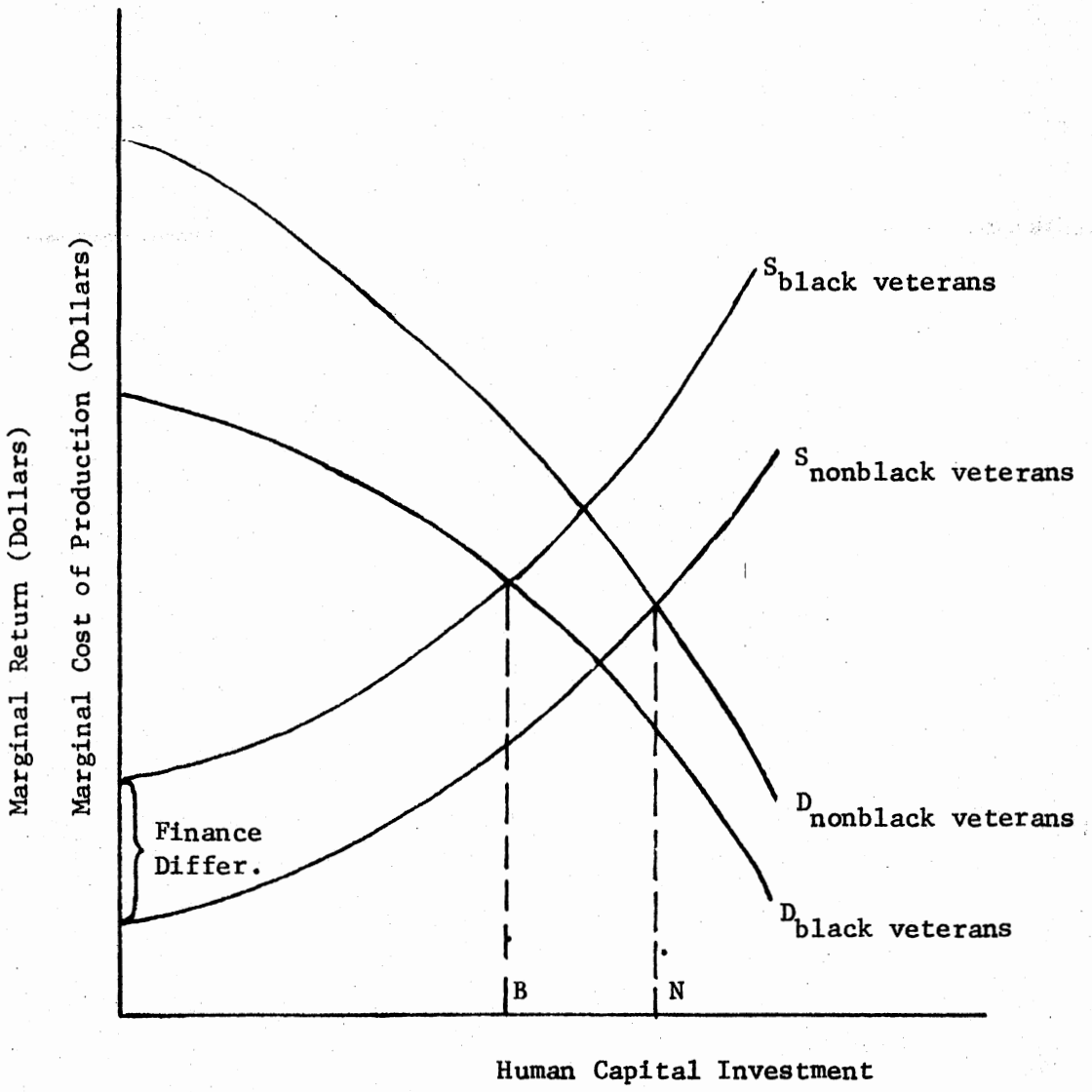

Figure 3. Supply and Demand for Human Capital Investment by Black and Nonblack Veterans

that black veterans will, on average, come from lower socioeconomic backgrounds than nonblack veterans, the subsidy produces a larger relative shift in the black veterans supply function (see Figure 4). The larger shift is due to the relatively large reduction in the black veterans financing cost. Because the supply functions of black and nonblack veterans inclusive of the subsidy are closer together, a narrowing of the financing costs between the two groups results.

The new equilibriums indicate an increase in educational investment by all veterans, with a larger absolute increase among blacks. The subsidy increases the educational investment of the average black veteran from OB_1 to OB_2 in Figure 4. The increase in investment for a nonblack veterans is from ON_1 to ON_2. The increased investment in both cases results from reductions in foregone earnings and financing costs. The comparatively large increase by blacks is due to the relatively strong impact of the subsidy in reducing their financing costs.

The increase in earnings for black and nonblack veterans resulting from the subsidy are indicated by the shaded areas. While it appears from the graph that the increment in earnings will be greater for blacks, this is not necessarily the case. Assuming comparable foregone earnings for both groups, comparative increases in earnings depend on the position and slope of the respective demand curves, and the difference in supply curve shifts resulting from the subsidy. However, the increase in educational investment resulting from the subsidy will always be greater for blacks unless the demand functions diverge with increasing investment, which one would not expect.[8] Since the supply effects are

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[8]If the demand functions did diverge, the relative increments in investment would also depend on the position and slope of the respective demand curves, and the difference in supply curve shifts.

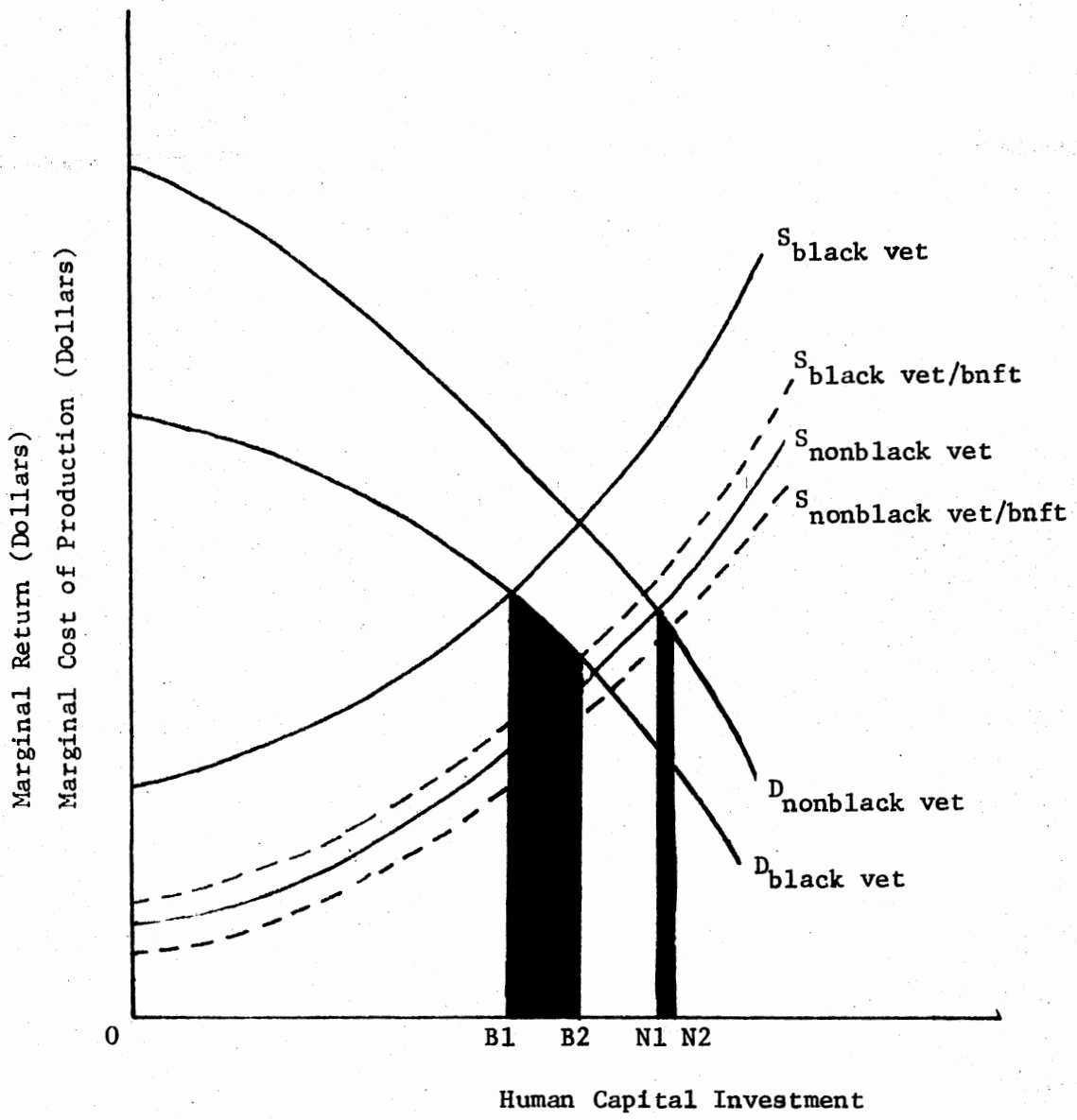

Figure 4. Increases in Investment and Earnings Due to Benefit Availability

greater for blacks, so too will be the increment in their investment. The relative increase in earnings for each group is not predictable from the model.

In terms of theory and the model presented here, it can be concluded that the availability of GI Bill educational benefits increases educational investment by all veterans, and has a particularly strong impact on investment decisions by socioeconomically disadvantaged veterans, primarily blacks.

Perlman (18, p. 93) says that if there is inequality of opportunity, then on efficiency and equity grounds government should pursue a selective policy to provide education for those "who would profit from schooling and who currently curtail their education because of lack of opportunity or resources." A general voucher program such as the GI Bill will, in part, subsidize educational investment that would have occurred anyway. The impact, however, will be on the marginal student attracted as a result of the subsidy, and the additional attainment per student resulting from the expenditures.

Thus while a selective policy to assist potential students from disadvantaged backgrounds might be preferable, it may well be that the GI Bill has been effective in providing educational opportunities for many socioeconomically disadvantaged American veterans. If this is in fact the case, arbitrary elimination of the benefits, without some new program(s) designed to increase educational opportunities for those individuals from disadvantaged backgrounds, will create particular difficulties for minority groups as they strive to increase their educational attainment and thereby narrow existing income differentials.

> The poor are discriminated against, not by the wealthy, but by their poverty and their consequent inability to purchase good schooling with borrowed funds . . . they are condemned for life to second-rate jobs and second-class citizenship by their inability to finance a better education (18, p. 119).

CHAPTER V

DATA AND METHODOLOGY

The purpose of this chapter is to test empirically some of the tenets of human capital theory developed in the preceding chapter. Initially, data on post-service educational attainment by Korean and peacetime post-Korean veterans will be utilized to evaluate the following hypothesis:

> Availability of the GI Bill educational benefits has increased the post-service college educational attainment of veterans.

The peacetime post-Korean veterans with no active service prior to February 1, 1955, are unique in that they were not eligible for GI Bill educational benefits during the immediate years following separation from the Armed Forces. Nor was there any way for them to foresee that they would eventually become eligible for such a subsidy under the Vietnam Era GI Bill (effective June 1, 1966). O'Neill and Ross (17, p. 43) state that a comparison of total education and training acquired by peacetime post-Korean veterans with that acquired by veterans having benefits would "shed some light on the broad question of whether the GI Bill subsidy increases investment in education and training or replaces investment that would have taken place anyway." By comparing college level educational attainment of post-Korean veterans during the period they were ineligible for benefits with post-service attainment by veterans who enjoyed benefit eligibility during that same approximate

period (Korean veterans), the initial hypothesis can be tested and any differential in investment estimated.

The second hypothesis to be evaluated is:

> The GI Bill educational benefits have caused a greater increase in post-service college educational attainment for black veterans than for nonblack veterans.

By comparing the post-service college educational attainment of black veterans of the Korean Conflict who were eligible for benefits to that of black post-Korean veterans who were not eligible for benefits, it is possible to determine whether benefit availability was a significant determinant of investment, and measure the extent of any differential in investment. A parallel comparison of post-service attainment by nonblacks with benefits and nonblacks without benefits will yield similar information regarding the influence of benefit availability on educational investment by nonblack veterans. After developing this information for both black and nonblack veterans, the relative influence of benefit availability on post-service investment by each group can be determined.

The Data

Data generated from a random survey of veterans conducted in 1967 by the Bureau of the Census on behalf of the Veterans Administration are employed to evaluate the hypotheses. A total of 11,839 veterans were surveyed, with detailed information obtained concerning education, income, and other personal characteristics.[1] Specific information is provided regarding the amount of education attained between separation

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[1] A copy of the survey questionnaire is included in Appendix B.

and the date of the survey (March 15, 1967), as well as a breakdown of post service attainment by number of months acquired with and without GI Bill assistance.

The present analysis is restricted to the survey data relating to Korean and post-Korean veterans only, who had at least a high school education at the time of their separation (a total of 2,316 veterans).[2] The restriction limiting the analysis to Korean and post-Korean veterans is made so that the post-service time frame under investigation and other factors aside from the availability of GI Bill benefits will be as similar as possible for all veterans included in the study. The minimum prior education constraint is included in order to better define the relevant population base; i.e., those veterans who would consider an investment in post-service college education.[3]

While the data do not permit a view of the total (life-time) post-service attainment by two groups differing only with regard to benefit availability, the data do enable a determination and comparison of educational investment by veterans over a period of years during which one group had benefits and one did not.

Methodology

In order to evaluate the first hypothesis, a stepwise multiple regression technique employing both continuous and dummy independent

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[2] All veterans with any service prior to the Korean War are eliminated from the sample group.

[3] Although veterans who acquire a high school diploma after separation then go on to college are eliminated from further consideration, the number of such cases is relatively small. In any event, their omission will not effect the analysis as long as their incidence (and amount of investment) is distributed in approximately the same manner among those veterans with benefits, and those without benefits.

variables is used to estimate an equation of the general form:

$$Y = B_0 + B_1X_1 + B_2X_2 + \ldots + B_nX_n + E \qquad (5.1)$$

where Y is equal to the number of months of post-service college educational attainment, and X_1 through X_n represent the variables which are statistically significant in explaining the observed variation in Y among the veterans in the sample group. The Ordinary Least Squares (OLS) regression technique is used to estimate the individual beta values which denote the relationship between the dependent variable (Y) and each of the explanatory variables entered. The error term (E) connotes variation in the dependent variable not attributable to variation in the explanatory variables. This unexplained random variation is due to the influence of unknown factors on the dependent variable.

Parameters estimated by the OLS regression method have the properties of Best Linear Unbiased Estimators. The least squares estimators are "best" in the sense that their variance is a minimum, and unbiased since the expected value of the estimated parameter is equal to the true value.[4]

The use of dummy variables allows the researcher to measure the impact of qualitative variables (such as marital status) on the dependent variable. The technique consists of assigning the value "one" to indicate the presence of a particular attribute believed by the researcher to have an impact on the dependent variable. The absence of the attribute is reflected by a "zero" in each case. When using a zero/one dummy variable technique and an intercept term, it is essential that "the number of dummy variables be one less than the number of different ways

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[4]For a full discussion of OLS estimators, see reference (3, pp. 49-64).

the attribute under consideration is expected to affect the dependent variable" (3, p. 162). Otherwise the observation matrix will have linearly dependent columns (will be singular), and the matrix cannot be inverted. The usual procedure to avoid this "dummy variable trap" is to drop a dummy term for each attribute when performing OLS estimation.[5] When interpreting the estimated function, the influence of the dummy variable omitted for each attribute is contained within the intercept term (B_o).

The stepwise regression method recursively constructs a prediction equation one independent variable at a time. The first step involves choosing the single variable which is the best predictor of the dependent variable. The second independent variable to be added to the equation is that which best increases the predictive power in conjunction with the first. Further variables are added as long as their inclusion makes a significant contribution to the explanatory power of the equation (16, p. 180).

The selection process for inclusion of variables utilizes two pieces of information. The first is the normalized beta coefficient that the variable would have if included in the equation. The significance of beta is determined by the F statistic. A variable is not included unless the computed F exceeds a predetermined critical value.

The second criterion employed is the tolerance, the value of which may fall anywhere from zero through one. If the tolerance is small, then

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[5] For example if one sought to include as a determinant of the dependent variable the attribute "race" for which there were two possible categories (black and nonblack), only a single dummy variable would be included as opposed to including one dummy variable for each of the two groups.

the variable in question is nearly a linear combination of those variables already in the equation. Higher tolerance values suggest the variable adds a new dimension to the equation (16, p. 180). Prospective variables are not included if the computed tolerance falls below the critical value specified in the program. The amount of additional variance explained by adding a variable to the equation is the product of the regression coefficient (beta) squared and the tolerance. Thus, variables are eliminated "whenever their addition would produce little increase in the coefficient of multiple determination, R^2" (12, p. 335).

The nature of the relationship between the dependent variable and each explanatory variable retained is specified by the corresponding beta coefficient. For those explanatory variables rejected as not proving significant at the 95% confidence level, the direction of variation with the dependent variable is determined from the matrix of correlation coefficients. The explanatory variables initially entered into the program and the expected signs are as follows:

X_1 = number of months out of service at the time of the survey. B_1 is expected to be positive (+) in sign. The longer the individual has been out of service, the more time he has had to acquire post-service education. Ceteris paribus, one would expect the veteran who has been out of service four years to have acquired more post-service education than the veteran who has been separated for only six months.

X_2 = age of the veteran (in months) at the time of separation. The opportunity cost of further education increases with age, and the benefits to be derived from such investment decrease due to a shorter time span over which benefits (in the form of additional earnings) can accrue. Both factors cause the private rate of return to be expected

from post-service education to decline as the age of the veteran increases. The sign of the B_2 coefficient is expected to be negative (-), reflecting an inverse relationship between age at separation and months of post-service attainment.

X_3 = highest year of schooling the veteran had completed at the time of his separation. Empirical studies by Becker (1), Perlman (18), Hanoch (8), and Hansen (9) have shown a declining rate of return on further educational investment as the level of education increases, due to rising opportunity costs. Becker (1) states that:

> since nobody can use his time at any activity without taking with him all of his human capital, the latter enters as an input along with his time in the production of additional capital . . . as he continues to invest . . . the capital accumulated becomes increasingly valuable, and so too does his time (p. 7).

However, Becker also finds that the expected rate of return from completing the last two years of college is much higher than that to be expected as a result of merely completing the first two years. In point of fact, O'Neill and Ross (17, p. 63) found in their study of Vietnam Era veterans and their usage of GI Bill benefits that "veterans with relatively low prior educational attainment do not use their entitlements at as high a rate as those with higher attainments." Since the present investigation is restricted to college level investment by veterans with a minimum high school prior attainment, one would expect the "diploma effect" to produce a positive association between the amount of post-service investment and the level of attainment at separation. B_3 is expected to be positive in sign.

X_4 = gap (in months) between the end of pre-service schooling and entry into the Armed Forces. A negative correlation between the

dependent variable and the schooling/entry gap is expected. This prediction is based on the assumption that the longer the individual has been out of school prior to entry into the service, the less likely he is to return to school following separation, other factors held constant. The veteran with the longer schooling/entry gap is likely to have more work experience. Therefore, his opportunity costs associated with additional investment are apt to be higher.

X_5 = dummy variable indicating whether or not the veteran was eligible to receive GI Bill educational benefits. The X_5 variable takes a value of one if benefits were available, zero otherwise. The value of the coefficient is expected to be positive. Human capital theory suggests that this will be the case since the availability of benefits increases the expected private rate of return on post-service educational investment. In terms of the model developed in the preceding chapter, the availability of benefits shifts the supply curve (marginal cost of production) of the individual veteran to the right, thereby increasing his optimum amount of investment. The shift occurs because the availability of benefits reduces the cost of foregone earnings and reduces financing costs associated with investment in human capital.

X_6 = dummy variable reflecting the region where the veteran resides. Specifically, the X_6 variable takes a value of one if the veteran lives in the northeast or north central region of the country, zero otherwise. States vary widely with respect to the private direct costs of obtaining higher education in a public institution. Since a majority of those veterans attending college do so at public institutions, variation in their tuition levels have recently led to charges that the voucher system of equal payments discriminates against veterans from areas where public

subsidization is low and tuition payments are correspondingly high. Specifically, it has been alleged that the present GI Bill discriminates against Vietnam Era veterans in Northeastern and Midwestern states, and favors those who live in the South and West. In 1973, the Educational Testing Service found that "analysis of participation rates indicate a high correlation between participation and the availability of low-cost easily accessible institutions of higher learning" (26, p. 11). A breakdown of participation rates by state for fiscal year 1976 is illustrated by Figure 5.

In a separate analysis prepared for the National League of Cities and the United States Conference of Mayors in 1976, it was concluded that the use of the GI Bill is highest in the states of the West and Southwest where tuitions are lowest. The report finds that between 1968 and 1976:

> Sunbelt states with almost the same number of veterans used 45.6% or $3.6 billion more in federally financed GI Bill scholarships that did Eastern and Midwestern states. What apparently makes the GI Bill more attractive in some states than in others is that when tuition is low it means that there will be more money left to apply toward living expenses (21, p. 23).[6]

It appears that differences in interregional direct private costs have contributed to interregional variation in participation rates under the present GI Bill. One would expect to find the same approximate variation with respect to tuition charges between regions during the period under consideration in the present study. Therefore, veterans in

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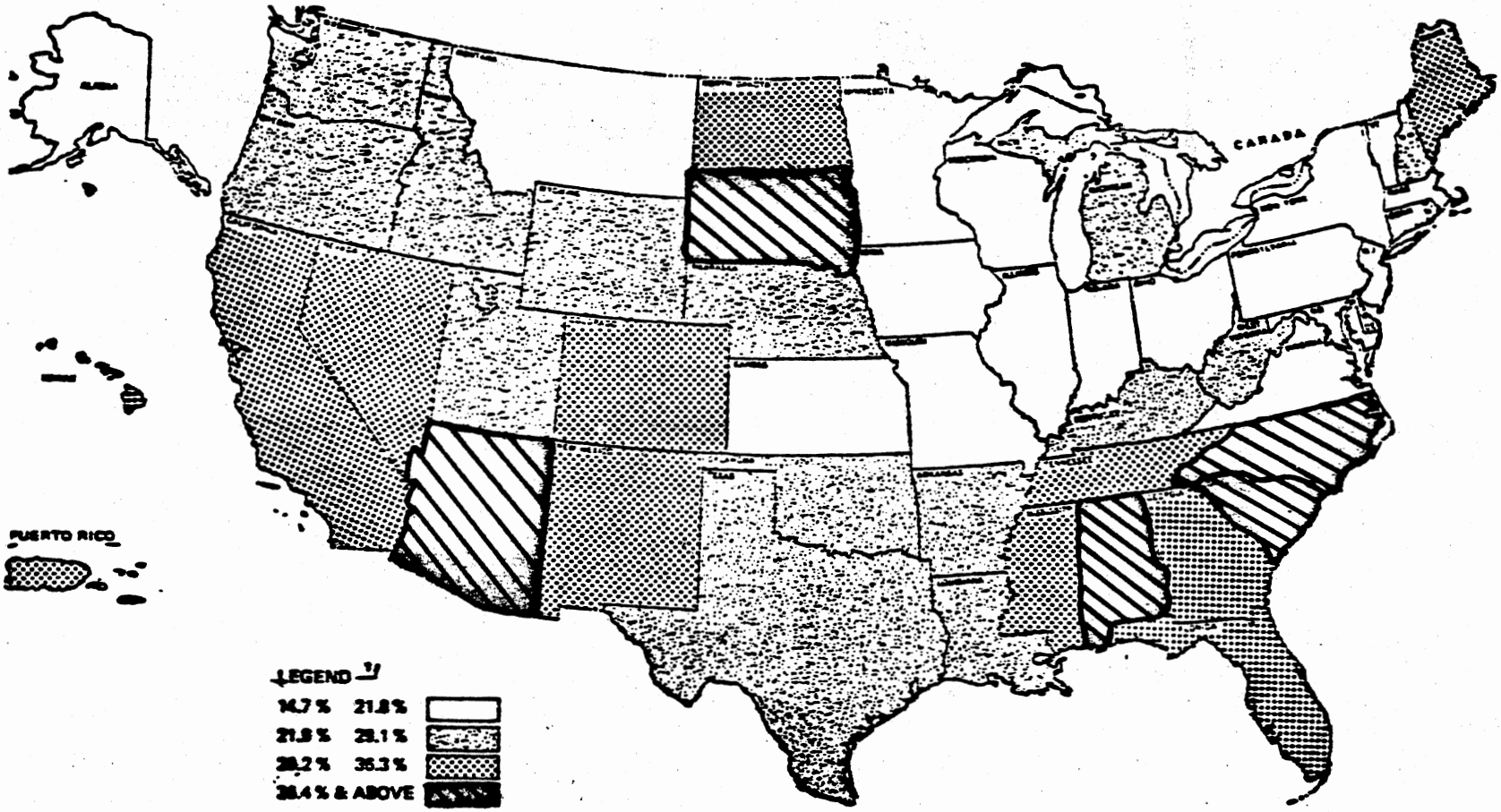
[6]The report cites the example of a veteran attending San Francisco State University who would have 85.9% of the GI Bill allotment remaining after paying educational costs, while a Philadelphia veteran attending Temple University would be left with only 43% of the grant after paying college expenses. See reference (21, p. 23).



Source: Reference (28, p. 17).

Figure 5. Participation Rate for Vietnam Era Veterans by State

the Northeast and North Central sections of the country will likely obtain less post-service education than their counterparts residing in the South and West, ceteris paribus. B_6 is expected to be a negative value.

X_7 = dummy variable indicating whether or not the veteran is disabled. The X_7 variable takes a value of one if the veteran has a service connected disability, zero otherwise. A positive correlation between disability and post-service education taken is expected because of lower opportunity costs due to lower foregone earnings for diabled veterans vis-à-vis those veterans who are not disabled. As a result of his impediment, the disabled veteran may also desire more education than his non-disabled counterpart in order to qualify for an employment position where his disability will not severely affect his performance. In addition, the disabled veteran ordinarily will be eligible for other government programs that serve as further incentives to increase his education. For these reasons, the sign of the B_7 coefficient is expected to be positive.

X_8 = dummy variable taking a value of one if the veteran was married at the time of the survey, zero otherwise. The relationship is expected to be negative, based on the premise that marriage increases the need for the veteran to obtain and maintain employment in order to support his household. The increased financial responsibility associated with marriage thus acts as a deterrent to the attainment of further education. Recall that this was cited as a rationale for adoption of the Korean GI Bill (see page 1). Therefore B_8 is predicted to be negative in value.

X_9 = dummy variable reflecting whether or not the veteran is black. The variable takes a value of one if the veteran is black, zero otherwise.

Blacks will have lower private rates of return on educational investment due to the effects of discrimination. Perlman (18), Becker (1), and Hanoch (8) have all found that the lower opportunity costs for blacks are outweighed by lower earnings resulting from discrimination, producing lower rates of return on educational investment. Furthermore, blacks are more likely to come from socioeconomically disadvantaged backgrounds, and are therefore more likely to require borrowed funds in order to finance further education. Since they must, on average, borrow more, they face greater costs in financing any given amount of further education than nonblack veterans.

In terms of the theoretical model of the preceding chapter, the supply function for black veterans lies further to the left (a lower supply) than that of nonblacks due to differences in financing costs, while the demand function for black veterans lies to the left and below that of nonblacks as a result of the effects of discrimination. Both supply and demand differences contribute to a lower "optimum" investment for black vis-à-vis nonblack veterans.

However, many of the veterans in the sample had GI Bill educational benefits available to them, and one would predict that the availability of benefits will have a larger impact on blacks than nonblacks with respect to post-service investment. It is expected that any differential in the propensity of blacks and nonblacks to acquire post-service education will narrow as a result of the availability of benefits to some veterans. One would not predict that the impact of benefit availability to the Korean veterans is large enough to offset an otherwise expected negative correlation between black veterans and post-service attainment. Therefore, the expectation is that B_9 will be negative in sign.

The omitted reference category for the dummy variables contain all the dummy terms which were dropped (one for each qualitative attribute) so that the determinant of the observation matrix will be nonsingular. Given the preceding suggested explanatory variables, the omitted reference category consists of a veteran who: (1) is not eligible for benefits; (2) resides in the south or west; (3) is not disabled; (4) is not married at the time of the survey; and (5) is nonblack. The influence of these omitted variables is contained within the intercept term (B_0). Examination of the coefficient for the benefit variable (entered as X_5) provides the basis for accepting (or rejecting) the first hypothesis.

In order to evaluate the second hypothesis, the veterans are first divided into two groups, blacks and nonblacks. A stepwise multiple regression of the type employed to test the first hypothesis is then run on each of the two groups. Thus an equation of the following general form is estimated for blacks and for nonblacks:

$$Y = B_0 + B_1X_1 + B_2X_2 + \ldots + B_nX_n + E \qquad (5.2)$$

where Y is once again equal to the number of months of post-service educational attainment, and X_1 through X_n denote the variables which prove to be statistically significant in explaining the observed variation in Y among the veterans in each sample group. The suggested explanatory variables entered into the regression program for each group are the same as those entered into the first regression, with the exception of the X_9 variable which is now eliminated. The expected signs of the variable coefficients remain the same as before.

The deletion of non-high school graduates from the data base, as noted earlier, becomes particularly important now that one seeks to determine the relative impact of benefit availability on black and nonblack investment. The Veterans Administration has for some time recognized that the propensity to use available educational benefits is positively associated with prior educational attainment. In their final report on educational assistance to veterans submitted to the Senate Committee on Veterans Affairs, the Educational Testing Service concluded that "educationally disadvantaged Vietnam Era veterans . . . participate in educational programs at a much lower than average rate" (26, p. IV).

In order to avail himself of college educational benefits, the veteran must first be a high school graduate. Because blacks, on average, have lower prior attainment levels, one will find a higher proportion of non-graduates from high school among blacks. The inclusion of veterans who are not high school graduates in the present analysis could bias the results regarding the relative effect of benefits on blacks and nonblacks by including a relatively high proportion of ineligible blacks in the sample.[7]

A comparison of the beta coefficients for the benefit variable (entered as X_5 in each group) and their significance will enable an evaluation of the second hypothesis. In the event the availability of benefits proves a significant determinant of post-service attainment by blacks and does not prove a significant determinant for nonblacks, the second hypothesis will be accepted. If the availability of benefits

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[7]It was in order to deal with such bias that O'Neill and Ross divided veterans according to prior education and AFQT scores in seeking to ascertain relative benefit usage by black and nonblack Vietnam Era veterans (17, p. 53).

proves significant for nonblacks and fails to prove significant for blacks, the second hypothesis is rejected. Any other combination of significance/nonsignificance with regard to the benefit variable[8] will necessitate further statistical procedures in order to evaluate the second hypothesis.

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[8]For example, if benefit availability were to prove a significant determinant for both blacks and nonblacks.

CHAPTER VI

EVALUATION

The initial regression was performed on the data relating to all veterans. The most important variable in explaining the variation in post-service college attainment was the availability of GI Bill benefits. Benefit availability alone explained just 3.74% of the total variation in Y. Other explanatory variables which proved to be significant were (in order of decreasing importance) the highest year of schooling the veteran had completed at separation, the veteran's age at separation, the gap between the end of pre-service schooling and entry into the Armed Forces, and the region where the veteran resides. Details of the regression results appear in Table I.

The beta coefficient is of the expected sign for each variable listed. The data indicate that post-service attainment by veterans increases significantly when benefits are available, and varies directly as well with the level of attainment of the veteran at separation. There is an inverse relationship between the dependent variable and age at separation, the pre-service schooling/entry gap, and residency in the northeast or north central region of the country.

The nature of the relationship between Y and each of the variables omitted from the equation is determined from the matrix of correlation coefficients. With the exception of the marriage variable, the sign of the coefficient is as predicted in each case. The relationships, however,

TABLE I

REGRESSION OF MONTHS OF POST-SERVICE ATTAINMENT ON SUGGESTED VARIABLES

Variables	Data Including All Veterans	Data on Black Veterans Only	Data on Nonblack Veterans Only
Constant	-7.3579	2.6290	-8.8560
BNFT	4.6555 (6.8879) a	9.9164 (4.3068) a	N.S.
HYSC	1.5934 (8.4665) a	N.S.	1.4761 (7.7730) a
AGE	-0.0241 (3.3944) a	N.S.	-0.0166 (2.3380) a
GAP	-0.4585 (2.8549) a	N.S.	-0.6131 (3.8657) a
RES	-1.4236 (2.4923) a	N.S.	-1.6293 (2.7667) a
NMOS	N.S.	N.S.	0.0370 (5.7813) a
R^2 (Adj.)	.0761	.1514	.0721

BNFT = Benefit availability; HYSC = Highest year of schooling completed upon separation; AGE = Age at separation; GAP = Gap between end of pre-service schooling and entry into Armed Forces; RES = Region resided in at time of survey; NMOS = Number of months out of service at the time of the survey. "a" indicates significance at the 99% level of probability, "b" indicates significance at the 95% level. N.S. means the variable did not prove to be a significant determinant at the 95% confidence level. The stepwise regression program produces coefficients only for those variables which prove significant determinants at the specified level (95%). N = 2316 observations in first regression; N = 106 in second regression; and N = 2210 in third. The figures in the parentheses are t-values.

did not prove to be significant at the 95% confidence level. The fact that the disability variable failed to register as significant is probably due to the small number of disabled veterans in the survey group. The lack of significant association between the number of months of post-service attainment and the number of months out of service may lend some support to the proposition that veterans will tend to acquire the bulk of their post-service attainment soon after separation (within two to three years). Such a conclusion would be consistent with economic theory as the rate of return on investment declines as the time over which earnings can accrue decreases.

The insignificance of the racial variable may partially reflect the relatively strong influence of GI Bill availability (to Korean veterans) in offsetting the otherwise negative association between post-service attainment and the fact that a veteran is black. As predicted, benefit availability was not a strong enough influence to change the negative correlation, though it was expected to be sufficient to reduce the significance of that (still negative) association. The fact that black veterans comprised a small percentage of the total sample population (4.5%) may also have served to restrict the significance of the racial variable.

Perhaps the most interesting of the variables which failed to prove significant is marital status. The sign of the coefficient (positive) was the opposite of that hypothesized, though the variable failed to register as a significant determinant at the 95% confidence level. It is conceivable that as more women enter the labor force marriage actually increases the veteran's capacity for financing additional education. The lack of significance either way makes it impossible to draw definitive

conclusions from these results. It can be said that the rationale (previously developed) that a GI Bill was desirable because veterans having families to support face particular financial difficulties was not necessarily valid in the late 1950's and early 1960's.

Separate regressions were run on black veterans, and on nonblack veterans. The details of these regressions are also recorded in Table I. Among black veterans, the only variable which proved to be a significant determinant of post-service educational attainment was the availability of GI Bill benefits. Benefit availability explained 15.14% of the variation in the dependent variable.

Among nonblack veterans, benefit availability was not a significant determinant of post-service attainment. Those variables which did prove to be significant at the 95% confidence level were, in order of importance, the number of months since separation from the service, the highest year of schooling completed at separation, the gap between completion of pre-service schooling and entry into the Armed Forces, the region of residence, and age at separation. All variables have coefficients of the expected sign.

The most important results to be derived from the regressions on black and nonblack veterans are (1) the highly significant role of benefit availability in black veteran educational investment decisions and (2) the insignificance of GI Bill benefits as a determinant of nonblack veteran investment. These results lend direct support to the hypothesis that GI Bill benefits have produced a greater increase in post-service college attainment for black veterans than for nonblack veterans. Thus the influence of benefit availability appears to occur mainly through its role in reducing the financing costs for veterans from relatively disadvantaged socioeconomic backgrounds.

It is true that "the rate of participation (under the GI Bill) among black veterans is substantially below that of white veterans and the overall participation rate" (26, p. 5) as critics of the program claim. Much of the differential in participation can be attributed to differences in prior educational attainment as O'Neill and Ross have shown.[1] Even after correcting for such differences in prior attainment, one would still expect a relatively high optimal level of investment for nonblack veterans due to the effects of discrimination and differences in financing costs when GI Bill benefits are not in force. Though benefit availability produces a relatively large shift of the supply function for black veterans in our model, one would not necessarily expect the difference in supply function shifts between blacks and nonblacks to be large enough to push the optimal amount of investment for a black veteran up to the optimal level for a nonblack veteran.[2]

The point of the analysis at hand is that the increase in the optimal amount of investment resulting from the availability of benefits will be greater for blacks than nonblacks when at least high school equivalency has been achieved. This will be partially reflected by a relatively large increase in post-service participation by blacks when benefits are available. The survey data reveals that only 24.19% of the black veterans ineligible for benefits attended college during the survey period, while 43.18% of black veterans eligible for benefits attended.

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[1] For a synopsis of the O'Neill and Ross findings, see Chapter II, pp. 13-14.

[2] In terms of the theoretical model (see Figure 3, Chapter IV), the availability of benefits would actually need to shift the supply function for black veterans beyond and to the right of the supply function for nonblacks in order to offset the differences in the demand functions and result in an equal optimal level of investment for blacks and nonblacks.

Among nonblack veterans, those without benefits participated at a 20.57% rate, while participation among those with benefits was 34.68%.

One would also expect the difference in the impact of benefit availability will be reflected in figures indicating the average amount of attainment for black and nonblack veterans with and without benefits. On this point, the data reveal that the average attainment among black veterans who acquired any post-service education was 157% higher for those with benefits than for those without. Among nonblack veterans, those with benefits attended (on average) 33.5% longer than those without benefits.[3]

The fact that the number of months out of service was a strongly significant explanatory variable for nonblacks but insignificant in the regression performed on all veterans may be due in part to intercorrelation between this variable and the availability of benefits variable. Veterans with benefits will tend to have been out of the service longer at the time of the survey. It was partly in order to deal with such correlation among the explanatory variables that the stepwise regression technique was employed.

In order to further pinpoint the influence of benefit availability by reducing the influence of months out of service, additional regressions

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[3]Among black veterans, those without benefits attended an average of 10.5 months while those with benefits averaged 27 months of attainment. Among nonblack veterans, attendance averaged 21 months among those without benefits and 27.9 months for those with benefits. The fact that within the survey group black veterans attended in greater proportion and for approximately the same average duration as nonblack veterans when benefits were available closely parallels the results obtained by O'Neill and Ross. Their correction for prior educational attainment led to their findings that with regard to benefit usage "black veterans participate more than nonblack veterans within every AFQT/prior education cell . . . and utilize more entitlement per participant than similar nonblack veterans." See reference (17, pp. 55-57).

were performed on a subsample population consisting only of veterans who were out of the service at least three years at the time of the survey. One regression was run on all veterans so classified, and separate regressions were run on black veterans and on nonblack veterans so classified. The results of these regressions appear in Table II.

The regression results in Table II are similar to those obtained from the first regressions (Table I) with two exceptions. First, benefit availability has supplanted the number of months out of service as a significant explanatory variable among nonblacks. However, it should be noted that the addition of benefit availability only adds .53% to the explanatory value of the equation for nonblack veterans. Thus the results do not appear to contradict the hypothesis that benefit availability is a more important determinant of investment for black veterans than for nonblack veterans.

The second factor of note emerging from this set of regressions is the appearance of the marriage variable in the equation estimated for blacks. It is especially interesting because of the positive nature of the relationship. This lends some support for the previously discussed premise that marriage actually increases the ability of veterans to finance further education.

No attempt was made in the regressions thus far to differentiate between full time and part time attendance in calculating the number of months of post-service attainment. The survey data were not collected and recorded in a manner which allows a breakdown of attainment by number of months of full time attendance and number of months of part time attendance. A potential problem arises in the analysis <u>if</u> the breakdown of total attainment between full time and part time attendance is not

TABLE II

RESULTS OF REGRESSIONS PERFORMED ON VETERANS SEPARATED A MINIMUM OF THREE YEARS

Variables	Data Including All Veterans	Data on Black Veterans Only	Data on Nonblack Veterans Only
Constant	-6.3793	-8.5355	-5.9596
BNFT	3.5147 (4.2082) a	11.3807 (4.2229) a	3.1049 (3.5970) a
HYSC	1.6748 (7.3488) a	N.S.	1.6629 (7.1338) a
AGE	-0.0264 (2.9011) a	N.S.	-0.0258 (2.8043) a
GAP	-0.5143 (2.5988) a	N.S.	-0.5674 (2.7814) a
RES	-1.7628 (2.5299) a	N.S.	-1.9708 (2.7471) a
MRRD	N.S.	11.2319 (2.4799) a	N.S.
R^2 (Adj.)	.0543	.2038	.0522

BNFT = Benefit availability; HYSC = Highest year of schooling completed upon separation; AGE = Age at separation; GAP = Gap between end of pre-service schooling and entry into Armed Forces; RES = Region resided in at time of survey; MRRD = Married at time of survey. "a" indicates significance at the 99% level of probability, "b" indicates significance at the 95% level. N.S. means the variable did not prove to be a significant determinant at the 95% confidence level. The stepwise regression program produces coefficients only for those variables which prove significant determinants at the specified level (95%). N = 1857 observations in first regression; N = 82 in second regression; and N = 1775 in third. The figures in the parentheses are t-values.

roughly proportionate between veterans with benefits and veterans without benefits.

It is possible to deal with this potential problem by restricting the dependent variable to include only those months attained by veterans who attended college on a full time basis only. The dependent variable is then computed in a manner which excludes (1) all part time months of attainment and (2) all full time months of attainment by all veterans who ever attended part time. A regression was run on all veterans in the sample group with the dependent variable restricted to include only those months obtained by veterans who never attended college on a part time basis. Separate regressions were run on black veterans only, and on nonblack veterans only with the dependent variable restricted in the same manner. The results of these regressions appear in Table III.

The only noteworthy variation between these results and those obtained from the first set of regressions (Table I) is the replacement of benefit availability as an explanatory variable by number of months out of service in the regression performed on all veterans (blacks and nonblacks). It would be erroneous to conclude from this additional information that benefit availability was an insignificant determinant among the veterans in the sample. Rather, these results illustrate a continuing pattern among all regression sets: the highly significant impact of benefit availability for black veteran investment, and the insignificance or near insignificance of benefit availability as a determinant of nonblack investment. Because black veterans constitute such a small percentage of the sample population, benefit availability explains a much smaller percentage of the variation among the total population than it does among the black subpopulation.

TABLE III

REGRESSION RESULTS WITH DEPENDENT VARIABLE RESTRICTED TO ATTENDANCE BY FULL TIME STUDENTS

Variables	Data Including All Veterans	Data on Black Veterans Only	Data on Nonblack Veterans Only
Constant	-4.3098	1.3065	-4.3147
BNFT	N.S.	8.4208 (4.0258) a	N.S.
HYSC	1.0171 (6.4414) a	N.S.	1.0263 (6.3785) a
AGE	-0.0178 (3.0169) a	N.S.	-0.0172 (2.8667) a
GAP	-0.3838 (2.9569) a	N.S.	-0.4057 (3.0481) a
RES	-1.3605 (2.8261) a	N.S.	-1.5059 (3.0484) a
NMOS	0.0265 (5.0962) a	N.S.	0.0246 (4.5556) a
R^2 (Adj.)	.0511	.1348	.0507

BNFT = Benefit availability; HYSC = Highest year of schooling completed upon separation; AGE = Age at separation; GAP = Gap between end of pre-service schooling and entry into Armed Forces; RES = Region resided in at time of survey; NMOS = Number of months out of service at time of survey. "a" indicates significance at the 99% level of probability, "b" indicates significance at the 95% level. N.S. means the variable did not prove to be a significant determinant at the 95% confidence level. The stepwise regression program produces coefficients only for those variables which prove significant determinants at the specified level (95%). N = 2316 observations in first regression; N = 106 in second regression; and N = 2210 in third. The figures in the parentheses are t-values.

It is imperative that one be mindful of factors aside from those specifically included in the regressions which may tend to bias the results. The most obvious of these outside factors relates to variations in economic conditions during the period under consideration. The majority of those veterans eligible for GI Bill benefits (Korean Veterans) separated from the service at a time when unemployment was relatively low.[4] Thus the opportunity cost of post-service education was comparatively high. Conversely, the majority of those veterans without benefits (post-Korean) separated in the late 1950's and early 1960's when unemployment ran as high as 6.5% (10, p. 62). Consequently, their opportunity costs associated with post-service education were relatively low. Therefore, the economic climate over the survey period tended to favor investment by those without benefits and this would lead to some underestimation of the influence of benefit availability. The impact of the variation in economic conditions has, however, been largely taken into account through the inclusion of the explanatory variable relating to the number of months the veteran had been out of service at the time of the survey. Any further attempt to incorporate some measure of variation in economic conditions into the regression would not appreciably alter the results.

A second factor tending to influence post-service attainment by veterans was the continuing trend toward more education among the entire U. S. population during the survey period. A 1973 study by the Veterans Administration found that veteran use of the GI Bill for college education

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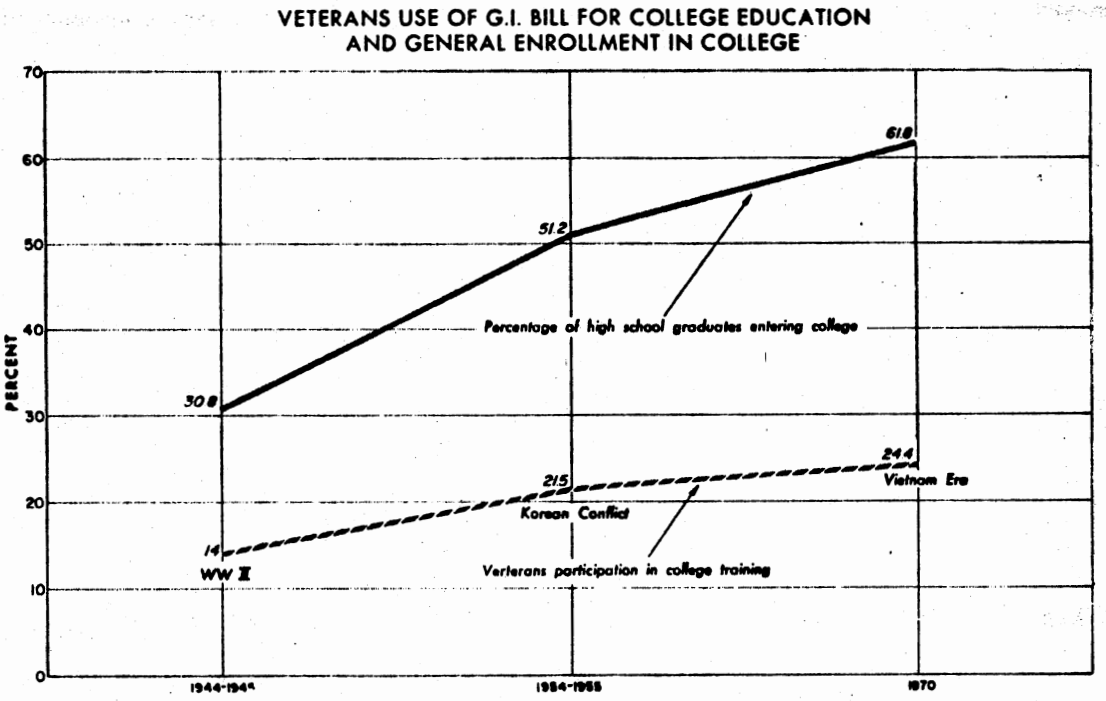
[4]Unemployment averaged 3% throughout the Korean Conflict and remained below 4.5% through September, 1957. See reference (10, pp. 60-62).

had not kept pace with the increasing enrollment in higher education by the general population (26, p. 143) as shown by Figure 6. However, if one were to include veterans' college attainment acquired without benefit of the GI Bill, the trend among veterans would possibly approximate that of the general population more closely.

There was certainly a trend toward more education during the survey period, both among veterans and the general population. Any such trend among veterans could again lead to an underestimation of the impact of benefit availability as the most recent group of veterans were those without benefits. In an attempt to restrict this particular source of potential bias, a regression was performed on veterans who were of the same approximate age (31 to 36) at the time of the survey. Once again, separate regressions were also run on black veterans and nonblack veterans who fell within this age cohort.

The results of these regressions were not conclusive. For example, in the regression run on black veterans none of the explanatory variables proved significant at the 95% confidence level. This can probably be attributed to the small number of cases in the subsample. The reader will recall that in each of the prior regressions the age of the veteran at separation was included as a suggested explanatory variable. Therefore, the influence of the trend toward more education will be partially accounted for in each of these other regressions.

Perhaps the most important source of downward bias regarding the impact of benefit availability on post-service attainment stems from an overlap between the time that benefits became available for post-Korean veterans under the Vietnam Era GI Bill (June 1, 1966), and the time of the survey (March 15, 1967). In the earlier regressions, the dependent



Source: Reference (26, p. 147).

Figure 6. Veterans Use of GI Bill for College Education and General Enrollment in College

variable for post-Korean veterans contains all education acquired by them during the survey period, including that obtained between June 1966 and March 1967. Thus there were included in the dependent variable for post-Korean veterans months of attainment they might not have acquired without the Vietnam Era GI Bill. Therefore the original regressions may well underestimate the impact of benefit availability because one overestimates the months of attainment by those without benefits (post-Koreans).

It is impossible to remove this source of downward bias. One can, however, manipulate the data to reverse the direction of the bias. This is accomplished by assuming that all of the months of attainment by post-Korean veterans after May 1966 with Veterans Administration assistance were due to the availability of benefits under the Vietnam Era Bill. Therefore, in the absence of the Vietnam Bill these same months of attainment would sum to zero.

When the educational attainment by post-Korean veterans with GI Bill benefits is assumed to be zero, an underestimation of what their educational attainment during the survey period would have been without the Vietnam Era Bill is obtained. By underestimating the attainment of those without benefits, one overestimates the influence of benefit availability on post-service investment. The regression results obtained when post-Korean attainment is so underestimated are recorded in Table IV. Once again additional regressions were run separately on black veterans and nonblack veterans employing the same criteria.

The results of these regressions exhibit very little variation from those obtained in the initial regressions (Table I). It appears that only a few of the nonblack veterans in the survey availed themselves of benefits under the Vietnam Era Bill during the survey period. There

TABLE IV

REGRESSION RESULTS WITH DEPENDENT VARIABLE BIASED TO FAVOR SIGNIFICANCE

Variables	Data Including All Veterans	Data on Black Veterans Only	Data on Nonblack Veterans Only
Constant	-7.3579	2.6290	-9.2525
BNFT	4.6555 (6.8879) a	9.9164 (4.3068) a	N.S.
HYSC	1.5934 (8.4665) a	N.S.	1.4939 (7.7848)
AGE	-0.0241 (3.3944) a	N.S.	-0.0162 (2.2817) a
GAP	-0.4585 (2.8549) a	N.S.	-0.6087 (3.8355) a
RES	-1.4236 (2.4923) a	N.S.	-1.6193 (2.7488) a
NMOS	N.S.	N.S.	0.0373 (5.8281) a
R^2 (Adj.)	.0761	.1514	.0722

BNFT = Benefit availability; HYSC = Highest year of schooling completed upon separation; AGE = Age at separation; GAP = Gap between end of pre-service schooling and entry into Armed Forces; RES = Region resided in at time of survey; NMOS = Number of months out of service at the time of the survey. "a" indicates significance at the 99% level of probability, "b" indicates significance at the 95% level. N.S. means the variable did not prove to be a significant determinant at the 95% confidence level. The stepwise regression program produces coefficients only for those variables which prove significant determinants at the specified level (95%). N = 2316 observations in first regression; N = 106 in second regression; and N = 2210 in third. The figures in parentheses are t-values.

was little time for these post-Korean veterans to become aware of the new program, complete all the certification requirements, and actually begin taking classes. Therefore, the impact of the Vietnam Era Bill on investment decisions by those veterans in the survey group was minute. Benefit availability continues to register as a significant determinant for the total sample population and for the black subpopulation. The availability of benefits again fails to prove a significant determinant of nonblack investment.

CHAPTER VII

CONCLUSIONS

This study is not intended to serve as an evaluation of the GI Bill, the merits of which should not be judged on the basis of educational outcomes alone.[1] The study does serve as a test of several tenets derived from human capital theory. The following conclusions may be drawn:

(1) The GI Bill has increased somewhat the amount of college education acquired by the veteran population. What is especially interesting is that the availability of benefits is capable of explaining at most 3.74% of the variation in post-service college attainment among all veterans surveyed. The average veteran with benefits acquired 5.56 months more post-service education than his counterpart without benefits. While one cannot specify how much of that differential is due to benefit availability, it appears to be well below previous estimates.[2] There is a need for caution to be applied in interpreting these results. It does appear, however, that earlier studies based on hypothetical questions

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[1] A true evaluation would be based upon the impact of the bill on veterans earnings. This would include not only the effect on earnings of college attainment resulting from benefit availability, but also the effects of vocational and correspondence training taken as a result of benefit availability.

[2] Prior estimates by R. J. Strom and by Frederiksen and Schrader (see Chapter II, p. 7) were in the area of a 20% differential on actual investment, or 1.96 months.

posed to WWII veterans attribute a greater impact to the influence of benefit availability for that group than was true in the case of Korean veterans. It is recognized that prior studies by Strom (20) and by Frederiksen and Schrader (5) were conducted on a group of veterans who served at a different time and under a different GI Bill from those in the present survey. Nonetheless, it seems that the impact of GI Bill benefits on college investment decisions by veterans has been considerably less than was heretofore believed.

(2) The GI Bill has been highly significant for black veterans in their attempts to acquire college education following separation. The regression results indicate that the availability of benefits explains a minimum of 15.14% of the variation in college attainment by black veterans.[3] Among black veterans without benefits, the post-service attainment per individual in the sample was 2.54 months. The average post-service attainment for black veterans with benefits was 11.66 months. The importance of benefit availability to black veteran investment is due in large part to the difficulty these individuals have in financing such investment when benefits are not available.

(3) Benefit availability has been relatively unimportant in the college investment decisions of nonblack veterans. The main regression results indicate that the effect of benefit availability on this group is, in fact, insignificant. One cannot, however, positively state that

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[3] It is recognized that in the regression restricting the dependent variable to exclude all months by any individuals who ever attended other than full time (Table III), the R^2 for benefit availability among black veterans is .1348. However, it is felt that the restriction imposed on the calculation of the dependent variable may have acted to bias the results for black veterans. It should be noted that only 17 blacks in the sample attended college on a full time basis only.

the impact is insignificant for nonblacks due to the results obtained when the dependent variable was restricted to include only attainment by veterans who were separated at least three years prior to the date of the survey (see Table II). The evidence does clearly show that the impact of benefit availability is far less for nonblacks than it is for blacks, and considerably less for the veteran population as a whole than commonly believed.

The results have important implications for present government policy. The recent decision to phase out the current GI Bill will not lead to the drastic decline in college enrollment that some had feared.[4] The present declining enrollment must instead be largely attributed to other factors such as the end of the military draft, a declining college age population, and changing attitudes regarding the worth of a college education.

Ceteris paribus, the elimination of benefits as presently constituted will impose particular hardship upon black veterans as they seek to improve their relative socioeconomic status through further education. The decision to phase out the Vietnam Era program becomes effective at a time when blacks comprise a rapidly increasing proportion of military servicemen (future veterans). The evidence suggests that a continuation of the Vietnam Era GI Bill would be highly effective in facilitating college education for a large number of Americans from socioeconomically disadvantaged backgrounds.[5]

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[4]There will be far fewer veterans in college, but this is due mainly to the declining number of individuals being separated from the service.

[5]On April 30, 1976, there were 178,283 veterans in training under the Vietnam Era GI Bill who were educationally disadvantaged at the time they entered training (had not completed high school). Of these, 89,375 were trained in college. See reference (27, p. 20).

The success of emerging programs designed to encourage savings for education by servicemen through matching government grants is uncertain. The phasing out of the current GI Bill surely removes a primary incentive for socioeconomically disadvantaged individuals to enter the service. This makes it necessary for the military to offer other inducements (e.g., higher pay) to secure necessary manpower. Any substitution of greater cash benefits for other "tied" or "in kind" benefits will leave the determination of the consumption mix in the hands of the individual veteran. Whether or not the socioeconomically disadvantaged veteran's welfare is enhanced as a result of such substitution depends upon the ratio at which cash benefits are offered in place of other "noncash" benefits.

Greater certainty can be attached to the probable impact of the Basic Educational Opportunity Grants (BEOG) program as a result of this study.[6] The regressions indicate that a program which reduces the financing costs of acquiring college level education will significantly increase the attainment of individuals from disadvantaged socioeconomic backgrounds.[7] It is unlikely that the extension of BEOG eligibility to higher income groups will significantly alter the amount of education that they acquire. Rather the thrust of the program will be to increase the optimal amount of investment for those individuals from relatively

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[6]The annual federal budget for BEOG's is about $2.44 billion. See reference (22, p. 5).

[7]An important feature of the BEOG grants is that they are available to both the veteran and nonveteran population. Therefore, it is likely that in the long run they will prove to be even more important than the GI Bill in increasing the educational attainment of individuals from disadvantaged backgrounds.

disadvantaged backgrounds up toward the optimal amount of investment for individuals from relatively advantaged backgrounds. Thus the BEOG program can be expected to improve the absolute and relative educational attainment status of individuals evolving from socioeconomically disadvantaged backgrounds.

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APPENDIXES

APPENDIX A

COMPARISON OF CUMULATIVE PARTICIPATION RATES UNDER THREE GI BILLS

TABLE V

COMPARISON OF CUMULATIVE PARTICIPATION RATES UNDER THREE GI BILLS

	WWII Veterans	Korean Veterans	Post-Korean Veterans
Total Number of Veterans Who Received Benefits for Training Under the Provisions of a GI Bill	7,800,000	2,391,000	5,797,143
Cumulative Participation Rate as a Percentage of Those Veterans Eligible for Benefits	50.5%	43.4%	63.6%
Total Number of Veterans Who Received Benefits for College Training Under the Provisions of a GI Bill	2,200,000	1,200,000	3,700,000
Cumulative College Participation Rate as a Percentage of Those Veterans Eligible for Benefits	14.4%	22.0%	36.1%

Source: Compiled from reference (27, p. 19).

APPENDIX B

THE QUESTIONNAIRE USED IN THE 1967 SURVEY OF VETERANS

The information contained in the following pages is taken from the survey sent to a random sample of veterans in 1967. For the ease of reading, graphical notation such as boxes and blanks have been omitted in this context. All questions are direct duplicates of those found in the original questionnaire.

Official Letterhead.

Dear Sir:

We have not yet received the questionnaire sent to you several days ago in connection with a survey we are making for the Veterans Administration. The results of this survey will be used to review Government programs which affect veterans and their families and to find ways in which these programs might be improved. You are one of several thousand veterans selected at random for inclusion in this survey. As noted in our earlier letter, this survey is based on a small sample of total veteran population, and it is important that every questionnaire be completed and returned.

Your answers will be treated as confidential by the Bureau of the Census and the Veterans Administration and will be used for statistical purposes only.

The questionnaire is divided into two sections:

Section A should be completed by ALL veterans

Section B should be completed by World War II and Korean Conflict veterans and veterans who entered the Armed Forces after January 31, 1955.

If you have already completed and mailed your questionnaire, please disregard this letter and accept our thanks for your cooperation. If not, please complete the appropriate section(s) of this questionnaire and mail it within three days in the enclosed envelope which requires no postage.

Thank you for your assistance in making this survey a success.

Sincerely yours,

(Signed)

A. Ross Eckler
Director
Bureau of the Census

Section A: TO BE FILLED IN BY ALL VETERANS

Please answer each question as accurately as possible. If you do not have exact information, enter your best estimate. If you cannot recall some of the information asked for and have no records from which to obtain it, write "Don't Know" in the answer space. ANSWER EVERY QUESTION, unless the instructions tell you to skip the question.

1. When were you born? (Month, Day, Year)

2. Check each period in which you served on active duty in the U. S. Armed Forces.

   1. Before World War I (before April 6, 1917)
   2. World War I (April 6, 1917-November 11, 1918, or April 2, 1920, if served in Russia)
   3. Between World Wars I and II (November 12, 1918-September 15, 1940)
   4. World War II: Check each period in which you served:
      1. September 16, 1940-December 6, 1941
      2. December 7, 1941-December 31, 1946
      3. January 1, 1947-July 25, 1947
   5. Between World War II And Korean Conflict (July 26, 1947-June 26, 1950)
   6. Korean Conflict (June 27, 1950-January 31, 1955)
   7. After the Korean Conflict (After January 31, 1955) [Answer 2a through h]

   If you checked 1. through 6. ONLY, go to 3a; if you checked 7., go to 2a.

2a. When did you (first) enter the Armed Forces? (Month, Day, Year)

b. How did you (first) enter the Armed Forces?
   1. Enlisted for _____ years
   2. Selective Service induction (drafted)
   3. Volunteered for Selective Service induction
   4. Reserve or National Guard trainee for _____ months
   5. Other (Explain)

c. Have you been awarded the Viet Nam Service Medal, the Viet Nam Combat award, or the Armed Forces Expeditionary Medal for service in Viet Nam?
   1. Yes
   2. No

d. Have you been awarded the Armed Forces Expeditionary Medal for service some place other than Viet Nam?
   1. Yes--for service in _____
   2. No

e. What was your pay grade when you were (last) separated from active duty in the Armed Forces? (For example: E-2; E-5; O-3; W-2)

f. What military occupation did you have for the longest time while you were in the Armed Forces? (Enter specialty title, or rating, or officer designator and check branch of service.)
   1. Army
   2. Navy
   3. Air Force
   4. Marine Corps
   5. Coast Guard

g. How long after you stopped going to school did you (first) enter the Armed Forces?
Years ____ or months ____ or weeks _____

h. What were you doing in the three months before you (first) entered the Armed Forces? (Check as many as applicable.)
1. Going to school
2. Working: Full time ___ Part time ____
3. Looking for work
4. Something else--Explain

3a. Were you in the Armed Forces five years ago, that is, on March 15, 1962, on regular (not Reserve or National Guard training) active duty?
1. Yes--Skip to 4a
2. No

b. Where were you living on March 15, 1962? (If you were on training duty, where was your home when you entered service for training?)
1. In this county
2. In this State but a different county
3. In a different State
4. Not in the U. S.

4a. Were you in the Armed Forces one year ago, that is, on March 15, 1966, on regular (not Reserve or National Guard training) active duty?
1. Yes--Skip to 5a
2. No

b. Where were you living on March 15, 1966? (If you were on training duty, where was your home when you entered service for training?)
1. In this county } Skip to 5a
2. In this State but a different county
3. In a different State } Go to c
4. Not in the U. S.

c. Why did you leave that State or country?
1. Transferred by my employer
2. A better job, business, or professional opportunity in another State (or in the U. S., if you were in another country)
3. For my or my family's health
4. To go to school
5. Moved away when I retired
6. Other reason--Explain

5a. Are you retired from the Armed Forces?
1. No--Skip to 6
2. Yes, as a 3. Reserve
4. Regular member of the Armed Forces

b. Were you retired for:
1. Disability?
2. Some other reason (years of service, age, etc.)?

c. When were you retired? Month, year

d. Are you entitled to Armed Forces retirement pay?
1. No--Skip to 6
2. Yes

e. Have you waived any or all of your retirement pay?
   1. None
   2. Part
   3. All

6. Do you have a Disability or Medical discharge from the Armed Forces?
   1. Yes
   2. No

7. Do you have a disability which has been rated as service-connected by the Veterans Administration?
   1. No--Skip to 8
   2. Yes, I have a compensation rating for a service-connected disability of (0%, 10%, 20%, ..., 100%) ____%

8. Do you receive a monthly VA pension for non-service-connected disability?
   1. Yes, I started receiving my VA pension in (month/year)
   2. No

9a. Since March 15, 1966, have you been a patient (stayed overnight or longer) in a hospital?
   1. No--Skip to 10
   2. Yes b. How many different times were you hospitalized? ____

GIVE THE INFORMATION FOR EACH TIME YOU WERE IN A HOSPITAL

c. What kind(s) of hospital(s) were you in; how many days; and, when did you enter and when did you leave?

For each time you were in a hospital, enter:

Days in hospital; Date admitted; Date discharged

Type of hospital (or patient) (Check one of the following for each time you were in a hospital)

VA Hospital or a VA patient in a non-VA hospital; Armed Forces hospital; Other hospital (public or private, answer d)

d. Who paid or will pay the hospital and doctor bill(s) each time you were in the hospital?

I paid all; I paid part; Social Security, Medicare paid part; Health Insurance paid all or part; Relatives or friends paid all or part; Public Assistance or Welfare paid all or part

10. Since March 15, 1966, have you applied to the VA for hospitalization but not been admitted as a patient?
   1. No--Skip to 11
   2. Yes, I applied in _____ (month/year) but was not admitted as a patient because:

1. My condition was not considered serious enough to require hospitalization
2. There were no beds available
3. I withdrew my application rather than sign the statement that I couldn't pay for private hospital care
4. Other reason--Explain

11. Since March 15, 1966, have you been a patient in a nursing home or some place in which you received nursing care (other than your own or a relative's or friend's home)?
    1. No--Skip to
    2. Yes
        1. In a VA nursing home or Husing Care Unit of a VA hospital for (dates)
        2. As a VA patient, in a nursing home not operated by VA for (dates)
        3. Not as a VA patient, in a non-VA nursing home for (dates)

12. What is your Social Security or Railroad Retirement Number?

13a. In 1966 (not counting time you were on active duty in the Armed Forces), in how many different weeks did you work either full or part time? (Include paid vacations and sick leave.)
    None -- Skip to 14a

b. Did you lose any full weeks of work because you were on lay-off from a job or lost a job?
    1. Yes--how many weeks?
    2. No

c. Were there any weeks (other than those mentioned above) when you spent time trying to find work?
    1. Yes--how many weeks?
    2. No

d. Do the weeks entered in 13a, 13b, and 13c add up to 52?
    1. Yes--Skip to e
    2. No
        1. What was the main reason you were not working or looking for work during those other weeks? Check one.
            1. I was sick or disabled and couldn't work.
            2. I was retired.
            3. No suitable jobs were available, wouldn't have done any good to look
            4. I was in school
            5. I was in the Armed Forces
            6. Other reason

e. When you worked, was it usually:
    1. Full time 2. Part time

f. What was the name of the company, business, organization, or individual employer for whom you worked or in which you were self-employed the longest time in 1966?

14a. Although you didn't work in 1966 at a civilian job, did you spend any time on lay-off from a job or trying to find work?
    1. Yes--how many different weeks?
    (Skip to 14c)
    2. No

b. What was the main reason you did not look for work?
   1. I was sick or disabled and couldn't work.
   2. I was retired.
   3. No suitable jobs were available, wouldn't have done any good to look.
   4. I was in school.
   5. I was in the Armed Forces.
   6. Other reason.

c. When did you last work (before 1966) at a regular full-time or part-time job or business?

   Month/year or Never worked--Skip to 16

   1. What was the name of the company, business, organization, or individual employer for whom you worked or in which you were self-employed when you last worked?

15a. What kind of business, industry, or organization was this? (For example, TV or radio manufacturer, retail shoe store, State Employment Service, hospital, church)?

b. Did you work for:
   1. A private company, business, organization, or individual for wages, salary, or commission?
   2. A government agency (Federal, State, county, or local)?
   3. Your own business, professional practice, or farm?
   4. A family business or farm without pay?

c. What kind of work did you do (for example, electrical engineer, salesman, accountant, laboratory technician, minister)?

16. In 1966, how many different weeks did your wife work either full- or part-time? (Include paid vacations and sick leave.)
   1. I was not married the entire year of 1966
   2. She didn't work
   3. She worked ____ weeks, usually: 4. Full time 5. Part time

17. Is the place where you live a:
   1. House which you own or are buying. When did you buy or build it? Month/year
   2. House owned by parents, in-laws, other relatives
   3. House which you rent
   4. Apartment or flat (include coops and condominiums)
   5. Other (for example, mobile home or trailer; rooming house)

18. How many relatives live with you? (Count all persons related to you by blood or marriage who usually live in your household, even though one or more may be absent while attending school or temporarily away working, or vacation, in a hospital or nursing home, etc.)
   Number of relatives _____ or None--Skip to 19
   1. Wife: What is her age? _____
   2. My children: How many: Under 6 years old 19-22 years old
      6-13 years old 23 and older
      14-18 years old
   3. Other relatives (for example, father, mother-in-law, sister, grandchildren). Number

19. In 1966, how much income did you and your wife receive from EACH of the following sources? Enter the amount in dollars, or check "None" if you or your wife had no income from any particular source--DO NOT LEAVE IT BLACK. Check "Yes" or "No" block as applicable in columns for each income source for you and for your wife. If you were not married for the entire year 1966, check here, ____, and disregard the column for reporting income of "Your Wife".
(Categories for sources of income are:)

a. Earned Income
   1. Wages or salary (including commissions, bonuses, tips). Do not include Armed Forces pay and allowances
   2. Business, profession, or farm net income

b. VA Payments
   1. Disability benefits
      a. Compensation (service connected)
         1) Present monthly amount is:
      b. Pension (nonservice connected)
         1) Present monthly amount is:
   2. Other VA benefits
      a. Education assistance
      b. Death (Compensation or pension)
      c. Other--specify:

c. Social Security (or Railroad Retirement)

d. Armed Forces payments
   1. Active duty pay and allowances (including training)
   2. Retirement pay

e. Retirement pay
   1. Federal, State, county, local, (Civil Service, teacher, police, etc.)
   2. Company or union pension

f. All other:
   1. Dividends from stocks and bonds, interest on savings, profits from sale of owned property, net rental income, and other investment income
   2. Public assistance or welfare
   3. Unemployment insurance, workmen's compensation, Armed Forces allotment, etc.

THIS IS THE END OF SECTION "A".

NOTE: World War II and Korean Conflict veterans and veterans whose Armed Forces service started after January 11, 1955, fill in Section B. All other veterans need not fill in the rest of the questionnaire. Please review Section A to make sure you have answered all the questions as best you can. Then mail the questionnaire in the preaddressed, postage-paid envelope. Thank you for your cooperation and assistance.

SECTION B -- TO BE FILLED BY WORLD WAR II AND KOREAN CONFLICT VETERANS AND VETERANS WHO ENTERED THE ARMED FORCES AFTER JANUARY 31, 1955.

20a. What was your Military Service Serial Number? (If you had more than one, give the number you had when you were last separated from active duty.)

b. Was this Service Serial Number assigned to you by:
1. Army?
2. Navy?
3. Air Force?
4. Marine Corps?
5. Coast Guard?
6. Reserve or National Guard organization? Name.

21a. How long did you serve in the Armed Forces? ___ months or (if 6 months or less) ____ days

b. How much of this service was for Reserve or National Guard training?
1. None
2. All
3. Part--How many months ___ or weeks ___ or days ____

c. Was all your service (other than for Reserve or National Guard training) continuous; that is, without a break in service?
1. Yes--When were you separated? (Month/year)
2. No--When were you first separated? (Month/year)
When were you last separated? (Month/year)

22. What grade or year of school had you FINISHED when you first ENTERED the Armed Forces?
1. Elementary 1 2 3 4 5 6 7 8
2. High school 1 2 3 4
3. College 1 2 3 4 5 6 or more

23a. While you were in the Armed Forces, did you receive any special training or take any courses at special military schools (for example, radio, aircraft mechanic, medical corpsman, cooks and bakers?)
1. No--Skip to 24
2. Yes

b. Have the skills you acquired through this special training been useful to you in your work since you were separated from the Armed Forces?
1. Essential
2. Quite useful
3. Fairly useful
4. Not useful
5. Have not worked

24. While you were in the Armed Forces, did you have any regular schooling (full time or part time or by correspondence) USAFI, CED, or other, by which you earned your high school or college credits or did you pass the CED High School Equivalency Test?
1. No--Skip to 25

2. Yes--Check as many as are applicable and enter the number of college credits, if any
   3. Passed High School Equivalency Test (CED)
   4. Received high school diploma
   5. Earned high school credits, but not diploma
   6. Earned college credits: _____ semester credits
      _____ quarter credits

25. What was the highest grade or year of school you had finished or had obtained an equivalency certificate for when you were first SEPARATED from the Armed Forces? (Circle the highest grade or year.)
   1. Elementary 1 2 3 4 5 6 7 8
   2. High school 1 2 3 4
   3. College 1 2 3 4 5 6 or more

26a. After your Armed Forces service, did you have any counseling and guidance to help you make plans for vocational training, education, or work?
   1. Yes
   2. No--Skip to 27a

b. Did the VA arrange for counseling and guidance?
   1. Yes
   2. No

c. Where did you receive counseling and guidance? (Check as many as applicable.)
   1. VA Regional Office or Guidance Center
   2. VA hospital
   3. High school or college
   4. U. S. or State Employment Service
   5. Other--Specify:

d. In your opinion was the counseling or guidance helpful in making plans for education, training or work?
   1. Very helpful
   2. Somewhat helpful
   3. Not helpful

27a. After your Armed Forces service, did you go to school (high school, college, vocational, technical or business school) or take training (on-the-job, on-farm, or apprentice)?
   1. Yes
   2. No--Skip to 28

b. How long did you go to school or take training? (Answer in months.)
   1. Under the G. I. Bill
   2. Under the VA Vocational Rehabilitation program for service-disabled veterans
   3. Without VA financial assistance
      1. When did you stop going to school or training without VA financial assistance? (Month/year)
         a) Haven't stopped

c. What kind of schooling or training was it and did you generally go to school or train full time or part time? (Check as many as are applicable.)
   1. On-the-job training
   2. Apprentice training
   3. Institutional on-farm training
   4. Vocational, technical, or business school
   5. High school
   6. Junior college
   7. College, undergraduate
   8. College, graduate school
   9. College, professional school

d. Did you FINISH a course of training or schooling and receive a certificate of completion or license, a diploma, or degree?
   1. Yes--Check as many as are applicable:
      1. On-the-job
      2. Apprentice
      3. Vocational, technical, or business school
      4. Institutional on-farm training
   5. High school diploma
   6. Junior College, certificate or degree--What kind?
   7. College, undergraduate degree--What kind?
   8. College, graduate degree(s)--What kind?
   9. College, professional degree(s)--What kind?
   X. No--What was the MAIN reason you didn't finish?
      1. I'm still in training or going to school
         1) When do you expect to finish? (Month/year)
      2. Financial problems
      3. Difficulty with my studies or training
      4. Family problems interfered or didn't leave me enough time
      5. Other reason--Specify:

28. What is the highest grade or year of school you have finished or have an equivalency certificate for now? Circle the highest grade or year.

1. Elementary school	1	2	3	4	5	6	7	8
2. High school	1	2	3	4				
3. College	1	2	3	4	5	6	or more	

29a. After your Armed Forces service, did you buy or build a house in which you lived? Do not count seasonal homes, investment properties, etc.
   1. No--Skip to 30
   2. Yes, I have bought or built _____ home(s), (the first one) in _____ year

b. Did you ever get a GI or VA home loan?
   1. No
   2. Yes (Check as many as are applicable.)
      3. For the first home I bought or built
         1) Do you still live in it? 1. Yes 2. No
      4. For the second home I bought or built
         1) Do you still live in it? 1. Yes 2. No

30. Do you expect to buy or build a home (whether or not you already own or are buying one new) within the next two years?
    1. Yes, I expect to buy it:
        2. Within the next 6 months
        3. Within the next year
        4. Within the next 2 years
    5. No

END OF SECTION "B".

NOTE: Please review Sections A and B to make sure you have answered all the questions completely and accurately. Then mail the questionnaire in the preaddressed envelope. Thank you for your cooperation and assistance.

VITA

Carl Curtis Brown

Candidate for the Degree of

DOCTOR OF PHILOSOPHY

Thesis: AN ECONOMIC ANALYSIS OF THE GI BILL EDUCATIONAL BENEFITS: A STUDY OF KOREAN AND POST-KOREAN VETERANS

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