PARENTAL FINANCIAL CAPACITY AND THE COSTS OF POSTSECONDARY EDUCATION

Stephen P. Dresch
Peter S. Stowe
Adair L. Waldenberg

May 1984
PP-84-2

S. P. Dresch is a research scholar, International Institute for Applied Systems Analysis, and chairman, Institute for Demographic and Economic Studies.
P. S. Stowe is staff economist, National Center for Education Statistics, U.S. Department of Education.
A. L. Waldenberg is assistant to the vice president for planning and administration, Northwestern University, and senior research associate, Institute for Demographic and Demographic Studies.

INTERNATIONAL INSTITUTE FOR APPLIED SYSTEMS ANALYSIS
2361 Laxenburg, Austria

ACKNOWLEDGEMENTS

Numerous individuals have contributed directly or indirectly to development of this study. Most notably, especially useful comments and criticisms were received from a number of staff members of the U.S. Department of Education to a seminar held at the Department on 2 November 1983, at which Dresch presented the preliminary results of the study. Marie Eldridge, director of the National Center for Education Statistics (NCES), Victor Wenk, former deputy director, David Sweet, assistant director in charge of the Divison of Multilevel Education Statistics, and Dennis Carroll, chief of the Longitudinal Studies Branch provided continuing counsel and assistance.

Prior to its initiation and/or over the course of the study significant influences (frequently unintentional) have been exerted by W. Lewis Hyde, executive director of the Connecticut State Technical Colleges; Ira Burney, economist with the Office of Legislation, Health Care Financing Administration, U.S. Department of Health and Human Services; Jon K. Peck, currently with SPSS and formerly director of the Social Science Computational Laboratory at Yale University; Sal Corrallo, head of the Postsecondary Education Section of the Office of Planning Budgeting and Evaluation, U.S. Department of Education; Carl Kaysen, director of the Program on Science, Technology and Society, Massachusetts Institute of Technology, and former director of research of the Sloan Commission on Government and Higher Education; Joseph Froomkin, curmudgeonly consultant on the economics of education; W. Allen Wallis, Under Secretary of State for Economic Affairs and former chancellor of the University of Rochester; Dietrich Goldschmidt, emeritus director of the Max Plank Institut fur Bildungsforschung; Linda N. Dresch, freelance critic of the ostensibly scientific; the late Derek de Solla Price, professor of history of

science, Yale University, William J. McKinstry, professor of economics, Miami University, and John A. Humbach, professor of law, Pace University, all directors of the Institute for Demographic and Economic Studies; Robert B. Hawkins, Jr., and Kurt Corriher, both with the Sequoia Institute; and Erno Zalai, Wolfgang Schopp and Anatoli Smyshlyaev, all associated with the International Institute for Applied Systems Analysis, in addition to numerous others whose influence was unrecognized.

Primary financial support for this study was provided by the National Center for Education Statistics through Contract Number 300-82-0307 to the Institute for Demographic and Economic Studies. In addition, the study received substantial financial support from unrestricted funds of the Institute for Demographic and Economic Studies and incidental support from the Academy of Political Science and the International Institute for Applied Systems Analysis.

None of the foregoing individuals or institutions is, of course, responsible for errors, whether of omission, commission or interpretation, which remain solely the responsibility of the authors.

For the authors,

Stephen P. Dresch
Laxenburg, Austria
27 May 1984

Chapter 1

THE ASSESSMENT OF PARENTAL FINANCIAL CAPACITY: AN OVERVIEW OF THE STUDY

Measurements of "financial capacity" or "financial status" are made continuously for a variety of purposes. For example, a potential lender (e.g., a bank) assesses the capacity of a would-be borrower to meet the repayment conditions of a loan, a prospective parent-in-law assesses the financial prospects of a child's suitor, a thief assesses the likely financial capacity of a potential victim in deciding whether or not to undertake the risks of appropriating the victim's property, and a government assesses the financial capacities of its citizens both in levying taxes and in distributing the benefits of governmental programs.

While the foregoing list of examples is arbitrary, it clearly indicates one central point: Precisely how financial capacity should be assessed depends critically on the purposes at hand. Thus, an individual with substantial, temporarilly illiquid but pledgeable assets may be a good candidate for a short-term loan, but if he has poor long-term prospects, he may not be a good candidate as a prospective son-in-law. Similarly, a wealthy individual with excellent credit in the community (permitting her never to carry cash) may be a very uninspiring target for a thief but may be an excellent choice as a spouse. In short, a measure which is appropriate for one purpose may be not only inappropriate but totally misleading for some other purpose.

Unfortunately, this dependence of the appropriate method of measurement on the objectives to be served by that measurement is frequently given substantially less serious attention than it warrants. This is the case, in part, because the ambiguities associated with specification of a measure of financial capacity are often not

superficially obvious. To say that taxes or program benefits should be distributed on the basis of income seems, superficially, to be an unambiguous statement. Only when one goes a step further and attempts to specify what is meant by "income" does the awareness of ambiguity begin to emerge. As the history of the U.S. Internal Revenue Code over the past half century demonstrates, ambiguities associated with the measurement of income only increase as one confronts and attempts to resolve them.

In the present study the charge, as set forth by the National Center for Education Statistics (NCES), was to assess the capacity of *parents* to finance the postsecondary educational activities of their children. That charge is simultaneously narrowly confining and extremely broad. The narrowness and confinement stems from the emphasis on parental financial capacity, when it can be argued that parental finances may be of only derivative relevance, positively or normatively, to the issue of the financing of a child's education. However, given the focus on parental finances, the charge is remarkably broad in that no restrictions are placed on those aspects of parental financial capacity which are to be addressed. While it would certainly be easier to answer a much more narrowly framed question, a narrowly focused study would be less interesting. Of course, in the absence of infinite resources it has been necessary for us to impose limits, but we have attempted to do this in such a manner as to retain interesting possibilities.

Our response to the general charge has been determined, in some measure, by a subsidiary condition imposed by NCES, that the study was to include empirical implementation and, moreover, that this implementation was to be based principally on the "parent survey" undertaken by the National Opinion Research Center as part of the High School and Beyond (HS&B) longitudinal study of 1980 high school sophomores and seniors, sponsored by NCES. Fortunately, the HS&B parent survey is significantly more inclusive and detailed than any other source of which we are aware which provides data on the finances of parents of college-age children. Nonetheless, this source

is, perhaps inevitably, less than ideal. Most notably, it provides information at only one point in time for parents of two closely-spaced cohorts of high school students. Thus, we are able to say nothing about the stability of parental financial characteristics over time (as a result of business cycle fluctuations and/or secular trends) and to say little about changes in these financial characteristics over the parental lifecycle. In addition, the data are themselves complex, in some cases seriously ambiguous, and frequently incomplete and/or erroneous.

Together, the general charge and the subsidiary restriction have largely determined our approach to the study. While we question the relevance of parental financial capacity to the financing of what is essentially an investment, we accept the parental focus and attempt to clarify the alternative grounds on which parental finances can be viewed as relevant to the child's educational investment, emphasizing the very different implications of the conception of parental finances as the basis for a "tax" for the support of the child's schooling versus the conception of the parents as capital suppliers to the child in a situation in which external capital markets are imperfect.

We have taken as the starting point for the analysis the manner in which parental financial capacities are in fact measured in existing postsecondary student assistance programs (notably in Federal Pell Grants). Implicitly, these programs indeed view parental financial capacity as constituting the base for a tax (albeit voluntary) levied for the support of the child's postsecondary schooling. We then raise a series of questions concerning the established procedures by which financial capacity is conventionally measured.

One of the most important issues which we address in this study concerns the *tradeoffs* between the elements entering into the programmatic measurement of financial capacity. As reflected in the existing Pell Grant formula (and in conventional "needs analysis" generally), financial capacity can be viewed as the combined

result of taxes levied at specified rates on the *income* and *wealth* of the parents, with gross income and wealth each subject to specified deductions in the derivation of "taxable" income and wealth. However, the appropriate relationship between the respective tax rates (on income and wealth) is not subject to objective determination. Rather, political determinations in this domain rest upon more or less well-founded perceptions of the consequences of alternative tax rate configurations for the level of program outlays and for the distribution of program benefits. To provide a firmer basis for these essentially political decisions, we address the issue of the degree to which one tax rate could be lowered if the other were increased, holding outlays constant. Similar *iso-outlay* analyses are then conducted in other dimensions of political determination, with specific reference to "asset reserves" (untaxed proportions of wealth) versus the rate of wealth taxation, to the deductibility of employment expenses (deductible proportion of earnings and maximum deduction) versus the income tax rate, and to family size deductions versus income and wealth tax rates.

We identify one dimension in which financial capacity as currently measured for programmatic purposes arbitrarily but very substantially benefits one class of parents at the expense of another. Specifically, we demonstrate that measured financial capacity is highly sensitive to portfolio composition, i.e., that simultaneous acquisition of assets and liabilities will significantly increase financial capacity as conventionally measured, as will a systematic shift in the composition of assets from owner-occupied housing to other assets. Thus, home-owners are rewarded at the expense of renters, while those without liabilities are rewarded at the expense of those with liabilities. To rectify this dependence of assessed financial capacity on portfolio composition, we develop a comprehensive measure of net (or adjusted) income, a measure inclusive of implicit rental income on owner-occupied housing and net of interest on liabilities which is, therefore, invariant with respect to portfolio composition.

More speculatively, we question the incentives with which even a portfolio-neutral

system confronts parents to modify lifecycle labor-force-participation and savings behavior, or equivalently, the social equity of the rewards offered for what would otherwise be particularly "unrepresentative" patterns of lifecycle behavior. This leads to the development of a series of alternative measures which adjust parental income and wealth for observed deviations of current and past labor-force-participation and savings behavior from norms for the population of parents of college-age children.

Finally, as previously suggested, we question the basic appropriateness of the conception of parental support for postsecondary schooling as a "tax" levied in accordance with a politically-determined conception of "ability to pay," especially in view of the voluntary nature of this putative tax. As an alternative to this "taxation" approach to parental financial capacity, we develop a very different investment-oriented measure of parental financial capacity, which we characterize *parental loanable funds* (suggesting the possibility that the capacities of parents to compensate for limited capital market access of their children may have greater relevance than more general income-cum-wealth measures).

In the following chapter of this report, a series of "accounting systems" required to support the foregoing analyses are developed and implemented empirically. Chapter 3 then examines the consequences of the alternative accounting systems for the distribution of the population of parents of college-age children in the financial capacity dimension, focusing on marginal distributions. Differential implications of the alternatives for different classes of families (shifts in the central tendancies of conditional distributions) are analyzed in Chapter 4. Implications of changes in legislative formulae and in accounting systems of the Pell Grant program are examined in Chapter 5.

Chapter 2

ALTERNATIVE ACCOUNTING SYSTEMS

Limitations of data relevant to the assessment of the financial capacities of parents of actual or potential postsecondary students have led to a virtually total disregard of the complex issue of precisely how parental financial capacity is to be measured. Confronting severely limited data, any conceivable, operational measures (e.g., wages and salaries, total "money income," children's casual perceptions of socioeconomic status) were better than none at all, and if only one measure was possible, there was little to be gained from an effectively academic consideration of the possible implications of alternative measures.

In this study, however, it is possible, in principle and to a significant extent in practice, to derive a range of alternative measures of parental financial capacity. Thus, it is necessary to consider the conceptual issue of the accounting system to be employed in the assessment of financial capacity. In this chapter we develop several variants of two essentially different accounting systems. The fundamental distinction is between *actual* and *potential* financial capacity. Within each of these conceptual frameworks, two components of financial capacity are identified: *income* and *wealth*. In the case of the actual financial capacity assessments one measure of wealth (actual current net worth) and two measures of income (money income versus adjusted current income) are derived. With reference to potential financial capacity, two additional measures of wealth and five additional measures of income are derived, in each case adjusting for observed deviations of a family's income-generating and wealth-acculumlating behavior from norms for the population of parents or for an appropriate subpopulation. An alternative to these income/wealth-based accounting systems

is then developed, assessing the capacities of parents to act solely as "capital suppliers" to children undertaking investments in postsecondary education. The chapter concludes with a discussion of alternative actual postsecondary-expenditure and sources-of-funds accounting systems.

1. Actual Financial Capacity

1.1. Current Money Income

Gross current money income is perhaps the most conventionally employed measure of an individual's or family's financial capacity.[1] Thus, for example, gross current money income is the only income measure which can be derived from the various statistical series of the U.S. Bureau of the Census, e.g., the decennial Censuses of Population and the Current Population Surveys. In the case of the HS&B survey, gross current money income can be obtained quite directly from responses to the various financial items in the Parent Questionnaire.[2]

In anticipation of the subsequent elaboration of alternative accounting systems and relationships, a relatively refined and disaggregated accounting of gross current money income is employed. This accounting system is outlined in Table 2.1. The principle distinctions are between (a) labor income (further decomposed into wages and salaries versus selfemployment income of the mother and of the father), (b) income from financial assets (interest and dividends), (c) income from real assets (rent), and (d) transfer payments (differentiating receipts from public and private sources).

---

[1]The pervasiveness of current money income as a measure of financial capacity should not be interpreted as an indication of conceptually desirable properties, as will be discussed. Rather, it would appear to reflect the relative ease with which necessary information can be acquired from economic units. , regardless of the economic meaningfulness of that information.

[2]In this report various difficulties associated with the survey data are ignored, i.e., the exposition proceeds *as if* there were no ambiguities in the returned questionnaires. In fact, this is far from true, as will be documented in a related Technical Report. However, in most cases it was possible, through the imposition of internal consistency checks, etc., to derive what appear to be reasonably accurate assessments of the respondent family's financial status. Fewer than 20 percent of all observations had to be dropped from the analysis because of "uncorrectible" errors or inconsistencies in the data.

Gross current money income is simply the sum of these various elements.

Table 2.1
Gross Current Money Income and Components

	Y1.	Father's wage and salary income
	Y2.	Father's selfemployment income
Y13.		Father's total gross labor income [= Y1 + Y2]
	Y3.	Mother's wage and salary income
	Y4.	Mother's selfemployment income
Y14.		Mother's total gross labor income [= Y3 + Y4]
Y12.		Total selfemployment income (mother & father) [= Y2 + Y4]
	Y5.	Interest income
	Y6.	Dividend income
Y15.		Total gross income to financial assets [= Y5 + Y6]
	Y7.	Rent
Y16.		Gross property-type income [= Y5 + Y6 + Y7]
	Y8.	Social Security, pensions, etc.
	Y9.	Other "public" transfer payments
Y17.		Total "public" transfer payments [= Y8 + Y9]
	Y10.	Private transfer payments
Y18.		Total transfer payments [= Y8 + Y9 + Y10]
	Y11.	Miscellaneous income
Y19.		Gross current money income [= Y1 + ... + Y11]

Several serious deficiencies of gross current money income as a measure of parental financial capacity can be identified. First, and perhaps most seriously with reference to important subpopulations of college-age children, this measure of income seriously understates the incomes of homeowners relative to renters, as can be easily demonstrated. Assume two identical families (identical, that is, apart from home ownership). One invests in a home, foregoing the interest or other property-type income which it could receive on the amount invested in the home were that amount invested instead in other assets. The other rents its home, investing its

assets in property (e.g., bonds, equities, real estate) generating observed current money income. Assuming that the net rent of the latter is identical to the foregone interest income of the former (i.e., deducting from rent that component attributable only to current maintenance and/or depreciation on the rented dwelling), the true economic status of these two families will be identical. However, as measured in Table 2.1 by Y19, the renting family will appear to have income higher than that of the owning family by the amount of income earned on the assets not invested in a home. The positions of the two households could be equalized either by deducting rent from the income of the renting family or by adding implicit interest income to the income of the owning family. Because the rent or implicit interest income is more appropriately conceived as personal consumption expenditure (as opposed to a negative adjustment to income), and also because this treatment avoids the necessity of decomposing gross rent into maintenance/depreciation versus pure-property-income components, the alternative of augmenting the income of the homeowner by the amount of implicit interest income on owner-occupied homes is in fact preferrable.[3]

The second inadequacy of this measure of gross current money income can be viewed as a generalization of the first: It will be sensitive to portfolio composition (i.e., to variations in the level and composition of assets and liabilities, given the level of net worth). Thus, gross property-type income (interest, dividends and rent) is included in income without an adjustment for interest expense. To appreciate the potentially discriminatory implications of the inclusion of gross (positive) rather than net interest income,, consider the assessed status of a family borrowing a given sum, reinvesting it at the same rate of interest at which it had borrowed. Measured by gross current money income, its financial capacity would appear to have increased by the interest earned on the borrowed funds, while its true financial capacity or status

---

[3] In the absence of information on the rental payments of non-homeowners, the preferred solution is actually the only feasible solution.

is, obviously, unchanged, since gross interest income is just offset by gross interest expense. In this case derivation of a more neutral measure is somewhat ambiguous. Clearly, interest expense up to the amount of property-type income should be offset against the latter, i.e., deducted from gross current money income. However, the treatment of interest expense in excess of property-type income is less clear. On the one hand, net positive interest expense can reasonably be considered a negative factor income flow. On the other, net positive interest expense might be argued to be a component of personal consumption expenditure, reflecting the difference between the value of consumption of a given volume of goods now rather than in the future. Essentially, this ambiguity arises from the attempt to define current income as opposed to lifetime consumption. For present purposes, a pragmatic consideration is sufficient to suggest an appropriate procedure for derivation of an adjusted measure of current income: It is likely that an excess of interest expense over property-type income is associated with unobserved components of property-type income, e.g., unrealized capital gains or unreported interest income. Thus, in the adjustment derived subsequently, interest expense only up to the amount of property-type income is deducted from the latter in the derivation of net income.

In order to derive a more neutral, comprehensive measure of actual current income, however, it is necessary to deal explicitly with family wealth (net worth) and its composition.

1.2. Actual Current Net Worth and Its Components

Derivation of actual current net worth and its components is outlined in Table 2.2. Of the elements entering into this accounting of assets, liabilities and net worth, several are less than perfect and unambiguous. This is the case, for example, with reference to one component of A2, designated "fixed income securities", which was specified in the HS&B parent questionnaire as "amount invested in other marketable securities (e.g., other [non-U.S.-government] bonds or commodities)." It is apparent that this

category was intended as a miscellaneous, "not-elsewhere-classified" category of marketable assets. Classification of the entire amount as "fixed-income securities" represents only a judgemental decision (specifically, the judgement that the average parent is more likely to hold fixed-income securities than, e.g., commodities).

The derivation of gross real estate assets (A4) is also less than ideal. While other categories of assets were specified by the questionnaire as gross, it is not clear what the objective of the questionnaire designers was in this case. Specifically, the questionnaire requested "Amount of principal paid off to data on land and real estate (other than home or apartment)." This amount (presumably the paid-off principal of mortgages) bears no obvious or necessary relationship to the owner's equity in the property. If, for example, the property was heavily mortgaged and if its value fell subsequent to purchase, then "paid-off principal" would significantly overstate the owner's equity (which might in fact be negative), while equity would be severely understated if mortgages were small or nonexistent and/or if the market value has subsequently risen. However, in the absence of other information it is necessary to treat the reported amount as a measure of equity.[4] In light of the general secular trend (at least through the 1970s) of rising market values of real estate, it can be reasonably assumed that this measure will usually constitute a downward-biased estimate of owner equity, and hence that the sum of this equity measure and outstanding real estate debt (L2) will correspondingly understate the gross market value of land and real estate. Further ambiguities with reference to this variable arise in the case of farmers and other selfemployed individuals, as will be discussed.

The inclusion of reported parental " savings" for the child's college education as a distinct asset and net worth category also deserves comment. In principle, it would

---

[4]This is the interpretation stipulated by NCES and NORC in the Codebook of the HS&B parents' file, although no justification for this interpretation is provided. Thus, as in the case of the present study, the structure and content of the underlying questionnaire effectively determine the structure and content of the derived accounting system.

Table 2.2
Actual Current Net Worth and Its Components

		ASSETS
	A1.	Cash and cash-equivalents
	A2.	Fixed-income securities
A7.		Interest-bearing assets [= A1 + A2]
	A3.	Equity securities
A8.		Total liquid (marketable) assets [= A1 + A2 + A3]
	A4.	Real estate assets ("equity" + real estate debt)
	A5.	Business, farm assets (except real estate)
	A6.	Owner-occupied housing (market value)
A9.		Total illiquid assets [= A4 + A5 + A6]
A10.		Accumulated savings for child's college education
A11.		Total assets [= A1 + ... + A6 + A11]
		LIABILITIES
	L1.	Current personal liabilities
	L2.	Real estate debt (except own home)
	L3.	Business, farm debt (except land and real estate)
L6.		Total commercial debt [= L2 + L3]
	L4.	First home mortgage
	L5.	Second home mortgage
L7.		Total home mortgage debt [= L4 + L5]
L8.		Total real property debt [= L2 + ... + L5]
L9.		Total liabilities [= L1 + ... + L5]
		NET WORTH
	NW1.	Net liquid assets [= A8 - L1]
	NW2.	Net commercial property assets [= A4 + A5 - L6]
	NW3.	Net home equity [= A6 - L7]
	NW4.	Accumulated savings for child's college education [= A10]
NW5.		Net worth [= NW1 + NW2 + NW3 + NW4]

be expected that this would already have been included in other categories of assets. However, a comparison of reported accumulations for the child's college education (by form or type of asset in which it was held) with corresponding reports of assets in the balance sheet component of the questionnaire suggested that this component of wealth was in fact systematically excluded from other assets, at least in a majority of cases. Given tax inducements to transfer legal title to such assets to the child, this exclusion may not be surprising, and in other cases the parents may segregate these assets from other assets psychologically even if not legally. As a result, this "segregationist" interpretation of savings for college as a distinct category of asset, resulting in a "maximalist" computation of net worth, appears more reasonable than any alternative.

1.3. Implicit Interest (Property) Income and Expense

In order to achieve a more neutral, comprehensive measure of current income, it is necessary to derive several conceptually distinct measures of implicit interest, or, more generally, property, income and expense. Only on this basis is it possible to derive a measure of income which is not sensitive to the portfolio composition of the family.

In the derivation of these implicit interest estimates, as developed in Table 2.3, several assumed interest rates (denoted Ri) are employed. The rate R1 is stipulated as a relatively "low risk" (e.g., first-mortage) interest rate. R2 is a somewhat higher-risk, secured rate (e.g., second-mortgage, farm or business equipment). R3 is then an estimate of the consumer loan rate. Provisional values of these *(circa* 1980) are also indicated in Table 2.3. Given these assumed rates, the subsequent items of interest income and expense are derived.

The first of the indicated implicit interest income and expense measures will be used to adjust the incomes of home owners to correspond conceptually to those of renters.[5] Interest on "other real estate debt" (RY2) will be deducted from gross rental

[5]Note that the "actual" interest rate on the first home mortgage is used to obtain an estimate of interest

Table 2.3
Implicit Interest Rates, Income and Expense

	IMPLICIT INTEREST RATES
R1.	Low-risk secured rate [= 12%]
R2.	Higher-risk secured rate [= 15%]
R3.	Consumer loan rate [= 18%]
	IMPLICIT INTEREST (PROPERTY) INCOME
RY1.	Owner-occupied housing income [= $R1 \cdot A6$]
RY2.	Business, farm (exc. real estate) asset income [= $R2 \cdot A5$]
RY3.	Business, farm real estate income [= $R1 \cdot A4$]
	IMPLICIT INTEREST (PROPERTY) EXPENSE
RE1.	Mortgage interest [= $ACT\_RATE \cdot L4 + R2 \cdot L5$]
RE2.	Other real estate debt interest [= $R1 \cdot L2$; = 0 if (Y12 > 0 and Y7 = 0)]
RE3.	Business, farm (exc. real estate) interest exp. [= $R2 \cdot L3$]
RE4.	Business, farm real estate expense [= $R3 \cdot L2$; = 0 if (Y7 > 0 or Y12 = 0)]
RE5.	Current personal debt interest [= $R3 \cdot L1$; but ≤ $Y16 + RY1 + RY2 + RY3 - RE1 - RE2 - RE3 - RE4$]

income to obtain a measure of net real estate income. Finally, the business-farm components of implicit interest income and expense will be used in side adjustments to decompose total selfemployment income into labor and capital components. The only significant complication in the foregoing involves the decomposition of real estate interest income and expense into business/farm and other ("pure real estate") components. Essentially, if positive (presumably gross) rental income (Y7) was reported, "pure" (non-business/farm- related) interest expense on real estate

paid. In fact, the procedure was somewhat more complicated. Respondents were to report (1) the original principal of the mortgage, (2) the principal remaining, (3) the interest rate and (4) the year in which the mortgage was negotiated. Inspection of the data indicated that original principal was more accurately reported than principal remaining. Therefore, outstanding principal was obtained by mathematically determining the remaining principal, assuming a 25 year mortgage taken out in the indicated year at the indicated interest rate. In any case in which the interest rate was missing, the modal value for the year in question was utilized. Only if the original mortgage year and interest rate were missing was the stated remaining principal utilized.

liabilities is assumed. However, if selfemployment income (Y12) is positive and rental income (Y7) is zero, then interest on real estate debt is assumed to be attributable to business or farm real estate. If both are zero, pure real estate interest is assumed to be at least offset by unobserved real estate appreciation.

1.4. Adjusted Current Income

Because implicit business/farm interest (property-type) income and expense are presumably included (on a net basis) in selfemployment income (Y12), the adjusted measure of current income is not altered by the values of these components of implicit interest income and expense; they are of relevance only in the decomposition of selfemployment income into property-type and labor components, the latter of which is further distributed between the father and mother in proportion to their respective total selfemployment incomes.[6] Other components of implicit interest income and expense, however, do enter into the derivation of total adjusted current income, as outlined in Table 2.4.

1.5. Summary of the Alternative Measures of Actual Current Financial Status

As developed in the foregoing sections of this chapter, the elements entering into the assessment of actual current parental financial capacity can be classified as falling into one of two broad classes, *income* and *wealth* (the former a "flow" variable, the latter a "stock" variable). The two are related in that (a) in general (but subject to exceptions) wealth is the product of past savings out of income and (b) income includes current returns to accumulated wealth.

Broadly speaking, income can be decomposed into three components: (1) labor income, (2) capital (property-type or wealth) income, and (3) other income (including

[6]This procedure, it should be noted, permits the derivation of a negative labor component of selfemployment income. Conceptually, the procedure could be reversed, with an estimate of pure labor earnings deducted from selfemployment income to obtain the net capital income component. Because the "true" economic opportunity cost of capital devoted to selfemployment can be determined more accurately than that of labor, the procedure elected appears to be more reasonable.

Table 2.4
Adjusted Current Income and Its Components

AY1.		Net property component of selfemployment income [= RY2 + RY3 - RE3 - RE4]
AY2.		Labor component of selfemployment income [= Y12 - AY1]
	AY3.	Father's wage and salary income [= Y1]
	AY4.	Father's labor selfemp. income [= $AY2 \cdot Y2 / Y12$]
AY18.		Father's total labor income [= AY3 + AY4]
	AY5.	Mother's wage and salary income [= Y3]
	AY6.	Mother's labor selfemp. income [= AY2 - AY4]
AY19.		Mother's total labor income [= AY5 + AY6]
	AY7.	Gross interest income [= Y5]
	AY8.	Gross dividend income [= Y6]
	AY9.	Personal debt interest expense (negative) [= -RE5]
AY20.		Net securities' income [= AY7 + AY8 + AY9]
	AY10.	Gross rental income [= Y7]
	AY11.	Real estate interest expense (negative) [= -RE2]
AY21.		Net real estate income [= AY10 + AY11]
	AY12.	Owner-occ. housing implicit int. income [= RY1]
	AY13.	Owner-occ. housing interest exp. (negative) [= -RE1]
AY22.		Net owner-occ. housing income [= AY12 + AY13]
AY23.		Total net property-type income [= AY1 + AY7 + ... + AY13]
	AY14.	Social Security, pensions, etc. [= Y8]
	AY15.	Other "public" transfers [= Y9]
AY24.		Total "public" transfers [= AY14 + AY15 = Y17]
	AY16.	Private transfers [= Y10]
AY25.		Total transfer payments [= AY14 + AY15 + AY16 = Y18]
	AY17.	Miscellaneous income [= Y11]
AY26.		Adjusted net current income [= AY1 + AY3 + ... + AY17 = Y19 + RY1 - RE1 - RE2 - RE5]

public and private transfers and any other "unclassifiable" income). Precise differentiation between these, and especially between labor and capital income, is not unambiguous, and it is for this reason that two somewhat different accounting systems for current income have been developed. The first, designated the "Y" system, might be characterized as a "conventional" accounting, while the second, designated

the "AY" system, can be characterized as a "comprehensive economic" accounting.

In the conventional accounting, labor income is defined as the sum of reported (a) wages and salaries and (b) selfemployment income. For the household, labor income thus-defined, denoted YL, is equal to the sum of Y13 (father's labor income) and Y14 (mother's labor income). The economically undesirable feature of this measure is that reported (presumably net) selfemployment income includes a component which should actually be considered income to capital invested in the business or farm (the value of business/farm equipment, real estate and other assets). Thus, the comprehensive measure of labor income, denoted AYL, differs from the conventional measure in that net capital income incorporated in reported selfemployment income is deducted from selfemployment income to arrive at an estimate of "pure" labor income.

Under the conventional accounting system, capital income is defined, simply, as the sum of reported (a) gross interest income, (b) gross dividend income, and (c) gross rental income, which together can be designated YK. The disadvantages of this measure of capital income are that (a) it is a gross measure which fails to take into account negative elements of capital income, e.g., interest expense, and hence is sensitive to the asset/liability composition of the family's portfolio, (b) it excludes the capital element of selfemployment income, and (c) it excludes implicit rental income on owner-occupied housing (understating the incomes of owners relative to renters). For these reasons, the comprehensive measure of capital income, designated AYK (= AY23), adds to the conventional measure (a) the capital component of selfemployment income, (b) implicit rental income on owner-occupied housing, and deducts (c) interest expenses.

The residual element of income consists of total (public and private) transfer payments (Y18 = AY25) plus miscellaneous (unclassifiable) income (Y11 = AY17), resulting in a total YT = AYT. Thus, the conventional and comprehensive accounting sys-

tems differ only in their estimates of labor and capital income. The AY measure of labor income will necessarily be less than or equal to the Y measure, in that the capital income component of selfemployment income is deducted from the latter to obtain the former. The relationship between the conventional and comprehensive measures of capital income cannot be determined *a priori*, in that there are both additions and substractions in moving from the former to the latter.

In contrast to current income, which can be determined and decomposed subject to two alternative accounting systems, there is a single accounting measure of wealth or net worth, equal to gross assets less gross liabilities, denoted W (= NW5). Empirically, there are indeed ambiguities in the derivation of wealth or net worth, especially with reference to discrepancies between reported assets, on the one hand, and reported parental savings for the child's college education, on the other. Assuming that parent's systematically excluded the latter in reporting the former, an assumption for which there is empirical support,[7] a "maximalist" measure of net worth can be obtained, incorporating college savings as a distinct category of assets in the determination of net worth, as derived above. This maximalist measure of net worth is utilized in the empirical analyses of this study.

2. Potential Financial Capacity

While a number of estimates and imputations are required to obtain the AY income measures from the underlying Y, A, and L elements, the Y, AY and NW accounting systems are intended to relfect as accurately as possible actual income flows to and wealth stocks of the family. For many purposes, however, what might be character-

---

[7]As noted above, a comparison of reported "savings for college" and reported gross assets (in the balance sheet segment of the parents' questionnaire) indicated that, in a substantial majority of cases, savings reported for a child's college education were not considered a component of the parents' general assets and net worth. This may reflect either that the parents' actually transfered legal title to these funds to the child (an action which would be encouraged by tax considerations) or that the parents' simply do not consider these assets to be available, i.e., segregate college savings from other assets. This "segregationist" hypothesis is reflected in the derivation of net worth (W = NW5) in Table 2.2, in which reported savings for college is treated as a differentiable asset (A10) and component of net worth (NW5).

ized as "potential" financial capacity will be of equal or greater interest. Most briefly stated, the important difference between families may be not in actual financial resources but rather in the financial resources potentially available to the family. Discrepancies between actual and potential financial capacity will simply reflect voluntary desicions on the part of the family not to fully exploit financial opportunities, decisions which can be argued to be within the legitimate purview of the family alone and hence of no public policy significance. Moreover, the measures of actual financial capacity may be imperfect, requiring adjustment for unreported and/or unrealized components of income. Both issues are dealt with under the rubric of *potential financial capacity*.

2.1. Potential Capital Income Conditional on Actual Wealth

Although the comprehensive measure of capital income (AYK) has been designed to be exhausive, this measure may nonetheless be seriously incomplete, in that it excludes "unrealized" capital income (i.e., unrealized capital gains). Moreover, this measure may well be subject to substantial underreporting of realized capital income flows. To adjust for these sources of error, it is possible to substitute an imputation of capital income, conditional on the level of net worth, for actually derived capital income in any case in which the former exceeds the latter. For this purpose, imputed capital income is defined as the product of the low-risk interest rate (R1) and reported wealth (W). The result (the maximum of derived capital income, AYK, and imputed capital income, $R1 \cdot W$) can be designated as "potential capital income conditional on actual wealth," PAWAYK. Combining the adjusted measure of labor income (AYL), transfer income (YT) and potential capital income conditional on actual wealth (PAWAYK), a "potential-actual-wealth-conditional" measure of income, PAWAY, is obtained.

2.2. Potential Labor Income

While the adjusted measure of labor income (AYL) represents a comprehensive measure of labor income actually received, it has the disadvantage from an economic point of view of failing to take into account nonpecuniary labor income (differential leisure and nonpecuniary aspects of specific employments). As a result, when benefits of public programs are apportioned on the basis of income defined according to the AY accounting system, more or less serious discrimination against those who more fully exploit their pecuniary earnings capacity is implied, resulting in potentially serious horizontal inequities. To achieve greater neutrality with reference to the pecuniary/nonpecuniary composition of labor income (including the value of differential leisure associated with nonparticipation in the labor force), an estimate of "potential pecuniary labor income" can be derived, and in any case in which reported labor income falls short of this estimate of potential labor income, the latter can be substituted for the former.

The difficulty associated with the derivation of "potential pecuniary labor income" is that earnings vary over individuals for a large number of observed and unobserved reasons. To capture the observed sources of variation, earnings (wage-salary) functions (stratified by sex) have been estimated, utilizing as observations persons for whom (a) wages and salaries exceeded $1,000 and (b) selfemployment net labor income (AY measure) was less than 20 percent of total net labor income (AY measure). In the estimated equation, the natural logarithm of reported wages and salaries was expressed as a linear function of (a) age (in decades), (b) age (in decades) squared, (c) a series of dummy variables for full- and part-time employment (before the child was in elementary school, when the child was in elementary and in high school), (d) a series of dummy variables for educational attainment, and (e) a series of dummy variables for race/ethnicity, i.e.,

$$AYL_s = \exp\Big[\beta_{s,0} + \beta_{s,1}A_s + \beta_{s,2}A_s^2 + \sum_{j=1}^{nLS}\beta_{s,2+j}LS_{s,j} + \sum_{e=1}^{nED}\beta_{s,2+nLS+e}ED_{s,e} + \sum_{r=1}^{nR}\beta_{s,2+nLS+nED+r}R_{s,r} + e_s\Big]$$

where AYL_s = adjusted labor income of the parent (of sex s),,
$\beta_{s,i}$ = estimated coefficient,
A_s = year of age,
$LS_{s,j}$ = labor force status dummy (j=1,...,nLS),
$ED_{s,e}$ = education dummy (e=1,...,nED),
$R_{s,r}$ = race dummy (r=1,...,nR), and
e_s = error.

Thus, estimating separate earnings functions for males and females, predictions of earnings conditional on sex, age, educational attainment, race and prior work history of the parent can be obtained. The coefficients of the estimated earnings functions are presented in Table 2.5. In the case of the age variable, if age was missing for any individual, age was set equal to that of the spouse (if available) or to the modal age for the individual's sex. Missing educational attainments are the "excluded" category, represented by the constant term of the equation. In the case of labor-force-participation status, persons who did not report working either full- or part-time are included in the intercept, i.e., the intercept includes both those who did not work and those for whom the information was missing. Similarly, in the case of race both whites and persons for whom race was missing are captured by the intercept.

The estimated earnings functions conform quite closely to those generally available in the literature. Thus, earnings first rise (at a decreasing rate) and then decline with age. While this is true for both males and females, the rate of initial increase is substantially greater for men than for women. For both males and females earnings rise significantly with increases in educational attainment from less than high school graduation (ED1 = 1) to high school graduation (ED2 = 1). However, the effects of education beyond high school but less than college graduation (ED3 = 1 through ED7 = 1) are quite mixed. Completion of a baccalaureate degree (ED8 = 1) is highly beneficial

Table 2.5
Estimated Male and Female Earnings Functions

Explanatory Variables	Male	Female
Age	0.068 (0.011)	0.023 (0.020)
$(0.1\ \text{Age})^2$	-0.069 (0.012)	-0.029 (0.022)
ED1 (< HS grad)	-0.394 (0.117)	-0.343 (0.154)
ED2 (HS grad)	-0.199 (0.117)	-0.187 (0.152)
ED3 (< 1 yr. voc-tech)	-0.204 (0.124)	-0.128 (0.160)
ED4 (1-2 yrs. voc-tech)	-0.162 (0.121)	-0.036 (0.158)
ED5 (2 yrs. voc-tech)	-0.098 (0.123)	0.056 (0.168)
ED6 (< 2 yrs. college)	-0.030 (0.119)	0.026 (0.155)
ED7 (2-3 yrs. college)	0.004 (0.122)	0.014 (0.160)
ED8 (4-5 yrs. college)	0.200 (0.119)	0.084 (0.157)
ED9 (master's degree)	0.149 (0.121)	0.276 (0.164)
ED10 (doctoral degree)	0.380 (0.128)	0.600 (0.265)

(Table 2.5 continues)

but substantially more so for males than females. Interestingly, by comparison to a baccalaureate degree, a master's degree (ED9 = 1) actually results in lower earnings for males but in a substantial positive increment for females. And while a higher graduate or professional degree (ED10 = 1) is profitable for males, it is significantly more beneficial for females. With the exception of the period prior to the child's entry into

Table 2.5, continued

Explanatory Variables	Male	Female
WRK_FT_HS	0.388 (0.067)	0.211 (0.051)
WRK_PT_HS	-0.301 (0.084)	-0.387 (0.053)
WRK_FT_EL	-0.012 (0.076)	0.152 (0.041)
WRK_PT_EL	-0.310 (0.093)	0.061 (0.037)
WRK_FT_BF	0.159 (0.063)	0.111 (0.035)
WRK_PT_BF	0.198 (0.084)	0.110 (0.040)
RACE1 (Native Am.)	-0.140 (0.063)	-0.081 (0.081)
RACE2 (Asian, Pac. Is.)	-0.226 (0.064)	0.127 (0.104)
RACE3 (Hispanic)	-0.247 (0.031)	-0.178 (0.048)
RACE4 (Black)	-0.238 (0.033)	-0.148 (0.037)
Constant	7.901 (0.296)	8.626 (0.472)
R^2	0.285	0.218
Standard error	0.499	0.687

Note: Dependent variable is the natural logarithm of wages and salaries.
Standard error of estimated coefficient in parentheses.
Age is expressed in decades.
All variables other than age and age-squared are dichotomous (0,1).

elementary school, working full-time in the past, by comparison to working part-time, implies higher current earnings, and this is the case for both males and females. The lack of any significant difference for work prior to the child's elementary schooling may well reflect the fact that many parents working only part-time in this period may well have been attending school, with the part-time work variable capturing some part of the returns to schooling. By comparison to whites and persons whose race was missing, males of other races experience significantly lower earnings. The differentials are substantially smaller, and more variable, for females.

2.2.1. Potential Current Labor Income

In the first variant of potential pecuniary labor income, denoted "potential current labor income" ($PCAYL_s$), variables related to past labor force participation (full- and part-time work before and during elementary school) are permitted to take on actually observed values. Working full-time when the child was in high school is specified, as a proxy for working full-time in 1979, the year for which income is reported (when the child was either a sophomore or senior in high school). The logarithmic earnings function is then evaluated for each parent s of family i (denoted s,i), resulting in the expected value of the natural logarithm of earnings, $\mu_{s,i} = x_{s,i}'\beta_s$. Given the assumption (implicit in the estimation of an ordinary least squares earnings function) that the distribution around the expected value of the natural logarithm of expected earnings is normal, then the antilogarithm of $\mu_{s,i}$ $\left[= e^{\mu_{s,i}}\right]$ is the median of the distribution of expected earnings.

Unobserved characteristics of the individual, i.e., characteristics not captured (or not adequately captured) by the vector $x_{s,i}$, are responsible for the variance of the log of earnings around its expected value. Because (a) it would be indefensible to assume that the individual had no characteristics adversely affecting earnings in making an imputation of potential labor income and (b) persons not in the labor force or exhibit-

ing low earnings can be expected to have what are, on average, net negative characteristics (with reference to the determinants of earnings),[8] it is simply inappropriate to impute to an individual exhibiting low or zero earnings the median $\left[e^{\mu_{s,t}}\right]$ or the mean $\left[e^{\mu_{s,t} + 0.5\sigma_s^2}\right.$, where σ_s^2 is the standard error of the estimated regression$\left.\right]$ of expected earnings. Instead, the lower quartile of the expected earnings distribution $\left[e^{\mu_{s,t} - 0.674\sigma_s}\right]$ is determined, and the greater of this value (the lower quartile of expected net labor income) and actual net labor income (AYL_s) is used as the measure of $PCAYL_s$, potential current labor income.[9] For the household the resultant measure of potential current labor income is denoted PCAYL ($= \sum_s PCAYL_s$). Combining this measure of potential current labor income (PCAYL) with the potential-actual-wealth-conditional estimate of capital income (PAWAYK) and transfer income (YT), an estimate of "potential-current-wealth-conditional" total income (PCAWAY) is obtained.

2.2.2. Potential Lifecycle Labor Income

As noted, the measure of potential current labor income accepts whatever work history is reported. Thus, individuals who chose not to work when the child was in elementary school are not penalized for this less-than-modal pattern of prior labor force participation. However, it can be argued that this results in an understatement of potential labor income of nonworkers, or alternatively, relatively overstates the labor incomes of those who did chose to work in the past, resulting in unfairly favorable treatment of the former relative to the latter (who are penalized because they have, and generally are expected to have, higher labor income now precisely because of their higher past pattern of labor force participation, while others are compensated

---

[8] This is simply an instance of selection bias. The expectation of low earnings will lead to a systematic reduction in labor force participation under any conventional assumptions.

[9] The election of the lower quartile of predicted earnings as the measure of potential earnings is, obviously, arbitrary. In the empirical analysis the sensitivity of the results to this election will be assessed by comparison to the alternatives of electing the median and the lower decile.

for the failure to work in the past). For this reason, a second estimate of potential labor income, denoted "potential lifecycle labor income" ($PLCAYL_s$), is derived. In this case, the evaluation of the estimated earnings function of males stipulates full-time work in both past perios (before and during elementary school), while for females nonparticipation in the labor force is assumed for the period prior to elementary school, followed by full-time work after elementary school entry. For both males and females the stipulated lifecycle patterns of work represent the modal patterns. In other words, the vector $x_{s,t}$ is altered to reflect the modal pattern of labor force participation, regardless of the pattern actually exhibited by the individual. The earnings function is then evaluated, and the adjustment to obtain the first (lower) quartile is made, as indicated above.[10] The result is a lower-bound estimate of potential lifecycle labor income which, if greater than actual net labor income, is used as the estimate of $PLCAYL_s$. Potential lifecycle income for the household is then PLCAYL ($= \sum_s PLCAYL_s$). The resultant measure of total income is $PLCAWAY$ ($= PLCAYL + PAWAYK + YT$), "potential lifecycle income conditional on actual wealth."

2.3. Potential Wealth and Associated Capital Income

A serious source of horizontal inequity is incorporated in public programs which apportion benefits according to wealth: Of two otherwise identical individuals or families (identical in lifetime income and initial wealth), the one which elects to defer consumption to more advanced ages (saving more heavily at younger ages to permit subsequent dissaving) or which receives a higher proportion of its income at younger ages (requiring higher levels of savings in order to achieve a common consumption pattern over the lifecycle) is penalized due to its higher observed level of wealth. Thus, a tax on actually observed wealth (W) results in discrimination in favor of non-

[10] Again, the sensitivity of the results to the arbitrary election of the lower quartile will be assessed by comparison to the median and lower decile.

savers and against savers.

As in the case of earnings, differences in wealth can be viewed as a function of both observed and unobserved individual (family) characteristics. On the one hand, wealth will depend upon the lifecycle profile of earnings. On the other, it will depend upon (a) preferences for present versus future consumption and (b) exigencies (e.g., medical) which virtually force low rates of savings on individuals (families) under certain circumstances.

Unfortunately, in the present context only current income and wealth (however defined) are observable. The first step in the derivation of the potential wealth measure is to exploit what little information is available to estimate how, in fact, a family arrived at the present level of income and the present level of wealth. We assume, first, that all past returns to wealth have been reinvested, and second, that all transfer and miscellaneous income is (and has been in the past) consumed. Under these assumptions, the current level of wealth is equal to the difference between (a) the present value of all past labor income and (b) the present value of all past consumption out of labor income. To simplify the analysis, we further assume that, prior to age 25, all labor income is consumed (wealth is zero), i.e., that the term "past," as just employed, consists of the period between age 25 and the current age.

If the lifecycle profile of earnings is known, and if the generic characteristics of the lifecycle profile of consumption are known, then knowledge of (a) current labor income and (b) current wealth, together, permits the derivation of the actual lifecycle paths of income, consumption/savings and wealth. To identify the lifecycle path of labor income, income from age 25 to the current age (denoted α) is assumed to have grown at the rate of mean earnings growth between the ages of 25 and 45 revealed by cross-sectional earnings data in 1979, conditional on educational attainment. Given this assumed rate of real earnings growth, it is assumed that consumption out of labor income has grown, between the ages of 25 and α, at a real annual rate equal to 0.75

times the stipulated rate of real earnings growth. It is then possible to determine the value of consumption at age 25 and, by implication, the age 25 savings rate. Specifically, denoting labor income at age a by L_a,

$$L_{25} = L_a \left[1+g\right]^{-(a-25)}$$

where g is the assumed (educational-attainment-conditional) real rate of earnings growth.

Then,

$$W_a = L_{25} \sum_{t=25}^{a} (1+g)^{t-25}(1+r)^{a-t} + C_{25} \sum_{t=25}^{a} (1+h)^{t-25}(1+r)^{a-t}$$

or

$$C_{25} = \frac{L_{25} \sum_{t=25}^{a} (1+g)^{t-25}(1+r)^{a-t} - W_a}{\sum_{t=25}^{a} (1+h)^{t-25}(1+r)^{a-t}}$$

where
- W_a is observed wealth at age a,
- C_{25} is implied consumption at age 25,
- $h = 0.75 \cdot g$ is the rate of growth of consumption out of labor income, and
- $r = 0.03$ is the real interest rate (= R1 minus the inflation rate = 0.03 by assumption, i.e., rate of inflation stipulated is 0.09).

The age-25 savings rate, rs_{25}, is

$$rs_{25} = \frac{\left[L_{25} - C_{25}\right]}{L_{25}}$$

Once the age-25 savings rate is determined, the entire temporal profile of consumption, savings and wealth can be derived, conditional only on age-a (and, by implication, age-25) labor income. Thus, to obtain a proxy for potential wealth, the observed distribution of the age-25 savings rate can be employed. If the only factor influencing the age-25 savings rate were the family's preferences for future versus present consumption (rate of time preference), then discrimination in favor of those differentially preferring present over future consumption could be avoided by imputing the mean or median age-25 savings rate and hence obtaining a corresponding

(mean or median) measure of potential wealth at age a. This would effectively involve asking the question: What would be the family's wealth at age a if it had saved over its lifecycle at rates representative of the population at large?

In fact, as noted above, savings rates vary for a number of observed and unobserved reasons. First, the savings rate may well be a function of the level of income itself, i.e., those with higher incomes (over the lifecycle) may save at higher rates than those with lower incomes (motivated by the desire to leave bequests, etc.). Second, even conditional on income, savings rates may be lower for some families because of specific adverse financial circumstances (or financial exigencies). To control for these two sources of variation in savings rates, the age 25 savings rate, rs_{25}, can be expressed as a function of proxied age-25 labor income, L_{25}, and its square. This estimated equation is reported in Table 2.6. Then, conditional on the imputed age 25 labor income of any family, the lower quartile of the labor-income-conditional estimate of the age-25 savings rate is determined, i.e.,

$$rs_{25,lq} = \alpha_0 + \alpha_1 L_{25} + \alpha_2 L_{25}^2 - 0.674\sigma,$$

where σ is the standard error of the estimated equation. The lower quartile of the age 25 savings rate thus recognizes, at least in part, the possibility of adverse circumstances which may lead to lower than conventional rates of savings.[11]

Given the lower-quartile savings rate, potential wealth ($PW_{a,lq}$) is obtained as indicated above. Assuming the educational-attainment-specific rate of earnings growth, from implied age-25 labor income and the lower-quartile age-25 savings rate (itself a function of the implied level of age-25 labor income) it is possible to derive the time paths (between age 25 and age α) of earnings and consumption. The difference between the present values of earnings and consumption is then an estimate of "lower-quartile potential wealth," i.e.,

[11] As in the case of the imputation of lower-quartile labor income, the sensitivity of the election of the lower quartile will be assessed in the empirical analysis by comparison to the results when the median and lower decile are elected.

Table 2.6
Estimated Age-25 Savings Rate Equation

	rs_{25}
AYL_{25}	$+0.348 \cdot 10^{-5}$ $(0.408 \cdot 10^{-6})$
AYL_{25}^2	$-0.605 \cdot 10^{-10}$ $(0.967 \cdot 10^{-11})$
Constant	-0.032 (0.004)
R^2	0.021
Standard Error	0.085

Note: Std. error of est. coef. in parentheses.

$$PW_{a,lq} = L_{25} \sum_{i=25}^{a} (1+g)^{i-25}(1+r)^{a-i} + L_{25}(1-rs_{25,lq}) \sum_{i=25}^{a} (1+h)^{i-25}(1+r)^{a-i}$$

2.3.1. Potential Current Wealth

Two "lower quartile potential wealth" measures are derived. The first, denoted "potential current wealth" (PCW), is obtained using actual current labor income (AYL) (if positive) as the L_a measure.[12] In any case in which actual current wealth (W) is greater than potential current wealth (PCW), PCW is set equal to W, i.e., PCW is equal to the greater of actual and potential current wealth. Corresponding to this measure of potential current wealth is a measure of "capital income from potential current wealth" ($PCWAYK = R1 \cdot PCW$), which replaces AYK as the measure of capital income. The corresponding measure of total income is $PCWAY$ (= $AYL + PCWAYK + YT$).

2.3.2. Potential Lifecycle Wealth

The second measure of potential wealth, denoted "potential lifecycle wealth" (PLCW),

[12] If actual current labor income (AYL) is zero or negative, then potential current wealth is also assumed to be zero.

is derived using potential lifecycle labor income (PLCAYL) as the measure of L_0. As before, in any case in which actual current wealth (W) is greater than potential lifecycle wealth (PLCW), PLCW is set eqaul to W, i.e., PLCW is equal to the greater of actual and potential lifecycle wealth. Corresponding to this measure of potential lifecycle wealth is a measure of "capital income from potential lifecycle wealth" ($PLCWAYK = R1 \cdot PLCW$), which replaces AYK as the measure of capital income. Obviously, this is internally consistent only which potential lifecycle labor income (PLCAYL) replaces actual net labor income in the derivation of total income. Thus, the corresponding measure of total income is $PLCPWAY$ ($= PLCAYL + PLCPWAYK + YT$).

3. Other Measures of Parental Financial Capacity

The measures of actual and potential financial capacity which have been developed in the preceeding sections of this chapter can be interpreted as viewing parental support for a child's schooling as a tax, levied at specified rates on parental income and wealth, however defined. In Chapter 6, moreover, in which the major existing program of "need-based" grants to students (Pell or Basic Educational Opportunity Grants) is examined, this interpretation is made explicit. Whether explicit or implicit, this tax interpretation essentially involves the issue of the appropriate definition of income and wealth for purposes of specifying the tax base. For a variety of reasons, this casting of the issue can be questioned and can even be argued to be inappropriate.

Perhaps most importantly, postsecondary education represents an investment in the child. Requiring the active participation of the child (a person who, at the level of higher education, is almost invariably age 17 or older), generating a stream of returns to which the child will, in the first instance, hold title (and from which the child will, in most cases, derive the full benefit), the investment can most appropriately be viewed as one made by the child, not the parents. Under these circumstances it is reasonable to ask (a) whether the parents and the child, individually or collectively,

do view parental support of postsecondary education as a legitimate "tax" on the parents, and (b) whether society should view such parental support in this light and, if necessary, attempt to impose this perception (and corresponding action) on the parents and child.

At the most general level, a tax may be a legitimate basis on which to finance the provision of truly collective goods, e.g., national defense, and general income redistribution, but it is highly questionable on efficiency grounds as a basis for the financing of investments, whether in plant and equipment, physical structures such as buildings, bridges, highways and ports, or human capital of the type represented by postsecondary or higher education. Most simply stated, if investments are financed via taxes, as opposed to the capital market, then there can be no assurance that investments which are in fact undertaken have higher value (generate higher rates of return) than investments which are not undertaken.[13]

Secondly, even if it were considered appropriate to finance postsecondary education via a tax on parents, in the absence of legal mandates and sanctions for parental support the tax is entirely voluntary. Thus, just because society believes that a particular assessment against parental income and wealth should be made in determining the level of supplementary governmental for the child's schooling, there is no assurance that this parental assessment will actually be forthcoming in support of the child's schooling. If the issue of equity in governmental support for postsecondary schooling is viewed with reference to the population of actual and potential students, as ultimately it must (since students embody the ultimate output, human capital), then a student who fails to receive the socially sanctioned parental assessment but receives a lower or nonexistent governmental benefit because of the stipulated (but nonmandated) parental assessment is indeed treated unfairly *vis-a-vis* other students

---

[13]This issue is addressed in Stephen P. Dresch, "Save the Infrastructure — By Auctioning It Off," Opinion and Commentary, *The Christian Science Monitor* (December 9, 1982).

whose socially sanctioned parental assessments are lower, who receive higher governmental benefits as a result, but who also actually receive the sanctioned parental assessment (or even greater amounts) from the parents.

Finally, there is the issue of the practical import of differences in assessed parental financial capacity. If, in fact, children of parents with lower assessed financial capacity, *ceteris paribus* (all else equal), make investments in postsecondary education which are comparable in magnitude to those of persons whose parents have higher assessed financial capacity, or if differences in parental financial capacity affect only the cost (as opposed to quantity or quality) of schooling, then differences in financial capacity, at least as measured, will have no or little allocative significance, and "compensatory" governmental interventions will serve only to redistribute income to parents with low financial capacity or to children of these parents. With data on a single cohort of actual/potential students, it will be difficult (in fact, impossible) to isolate the effects of differences in assessed financial capacity *per se* from the effects of compensatory governmental interventions on schooling investments, since a measure of parental financial capacity is the primary determinant of the level of governmental support. However, it is important at least to consider the relationship of actual schooling investments to parental financial capacity, governmental support and other factors.

For the foregoing reasons, a number of financial measures not directly concerned with parental financial capacity as a tax base are also examined in this study. These relate to the potential for intrafamily debt financing (as opposed to financial capacity for tax purposes) and to levels of postsecondary expenditure and sources of funds.

3.1. 'Loanable Funds': Parents as Capital Suppliers to the Child

If postsecondary education is conceived as an investment by the child in his human capital, undertaken in the expectation that the returns to that investment (pecuniary and nonpecuniary) will equal or exceed the cost of funds, then the financing of that

investment can be viewed as legitimately within the purview of the capital market. However, for a variety of reasons, related to the mobility of human capital, to the possibility of substituting nonpecuniary for pecuniary returns, but especially to the Constitutional and statutory status of human capital as an asset which cannot be attached by the lender in the event of default by the investing borrower, the overt private capital market may be virtually precluded as a source of financing for postsecondary education. Nonetheless, indirect access to the capital market may well be available to the student through the intermediation of the family, at least to the extent of the family's saleable or mortgageable wealth.

Total wealth, as defined above and represented by W, provides an upper bound on the amount of credit which the parents, solely on the basis of realized wealth (not including the value of the parents' human capital), can extend to the child, as a loan, for purposes of human capital investment. However, total wealth contains a possibly significant illiquid component. For portfolio reasons the parents may prefer not to liquidate illiquid assets (A9), and in any event the liquidation of these assets at prices approximating their true market values may well not be instantaneously possible. Thus, a more appropriate measure of potential parental capital supply is provided by the sum of net liquid assets and the mortgageable component of illiquid assets less associated liabilities.

Assuming, conservatively, that illiquid assets can be mortgaged at a minimum of three-quarters of their reported values, an appropriate measure of "available wealth" (AW) is provided by

$$AW = W - \left[0.25 \cdot A9\right]$$

where A9 is gross illiquid assets. This amount can be viewed as potentially available to the child, as a loan from the parents, for purposes of financing the child's investment in human capital.

In fact, the capital potentially available to the student exceeds the available

wealth of the family by the amount which the family would elect to save out of nonwealth income over the period of the human capital investment activity. If, for example, the child is considering an investment in four years of collegiate schooling, then the total capital that the family can provide over the four-year schooling period, expressed as a present value at the commencement of schooling, is the family's available wealth plus the present value of savings out of nonwealth income over the four year period. If the rate of growth of the family's savings out of nonwealth income is approximately equal to the discount rate, then the total amount which can be provided by the family over the course of the investment period, again expressed as a present value at the beginning of that period, is equal to available wealth plus four times the current level of savings out of nonwealth income.[14]

Unfortunately, we do not directly observe the current rate of savings (nonwealth income less consumption). However, the analysis of Section 2.3 of this chapter can be employed to derive an estimate of the current rate of savings, conditional on (a) current labor income (AYL) and (b) current wealth (W). In that section a lifecycle profile of labor income was determined, assuming an educational-attainment-conditional rate of labor income growth. In addition, it was assumed that the lifecycle profile of consumption out of labor income exhibited a rate of growth three-quarters that of the rate of growth of labor income. Thus, it was possible to find that profile of consumption just consistent with current income and wealth.

In the previous formulation, the analysis just described was utilized to find the level of age-25 consumption and the corresponding rate of savings out of labor income

[14]The stress in the above on "savings out of nonwealth income" deserves at least brief note. Wealth at the commencement of the schooling period will itself generate a stream of income. However, if it is assumed that this stream of capital income is reinvested and that the discount rate is equal to the rate of return to wealth, then the present value of wealth, including subsequent returns, at the conclusion of the schooling period, discounted to the commencement of the schooling period, will be identical to wealth actually observed at the commencement of the schooling period. In short, recognizing total wealth as potentially available to the student simultaneously recognizes that returns to wealth are available. Thus, for consistency, it is necessary to recognize only the present value of current savings out of nonwealth income, i.e., nonwealth income less current consumption expenditures. To add to wealth the present value of total (including capital) income less consumption would be to double count the returns to initial wealth.

at age 25. However, that analysis can easily be extended to obtain explicity an estimate of consumption and savings at the current age. Specifically, if the derived level of age 25 consumption for a family was C_{25}, and the growth rate of consumption was h (= 0.75g, where g is the educational-attainment-conditional rate of real earnings growth), then the implied level of consumption at the current age, a, is

$$C_a = C_{25}\,(1+h)^{a-25}$$

and the associated level of savings is

$$S_a = L_a - C_a\ (=AYL - C_a)$$

Assuming that the rate of savings is approximately equal to the discount rate, "loanable funds" (LF), the amount which the parents have (or will have) available to supply to the child (as a loan) for the support of four years of schooling, are given by

$$LF = AW + (4 \cdot S_a) = W - (0.25 \cdot A9) + (4 \cdot S_a)$$

Because other financial measures will represent annualized amounts (income, assessments on income and wealth), it is necessary for comparative purposes to present the measure of loanable funds on an annualized basis, denoted "annualized loanable funds" (ALF). Assuming a four-year schooling period, annualized loanable funds are, then,

$$ALF = \left[AW + (4 \cdot S_a)\right] / 4$$

Annualized loanable funds thus-derived represent the amount which the parents in principle are capable of supply to the student as a loan in each of four years of schooling, conditional on the child's repayment of the loan at an interest rate at least equal to the rate which the parents could realize on their portfolio were it otherwise invested, adjusted for the possibly greater risk involved in lending to the child as an alternative to other possible investments of these resources.

It might be argued that it is inappropriate to recognize this amount as potentially available to the child since the parents might not, in fact, agree to provide these resources to the student.[15] However, a refusal of the parents to advance to the student

[15] Of course, the same objection can be made to the determination of an "expected parents' contribution"

up to the full amount of loanable funds as repayable credits would reflect their perception either (a) that the student was unlikely actually to realize a return sufficient to permit repayment of the loan, or (b) that the student would refuse to fulfill what is likely to be a legally unenforceable repayment obligation. However, if either of these conditions is in fact fulfilled, then it can be argued that the child should not make the investment or have access to debt financing for purposes of the investment. The capital market rightly assesses the financial prospects of alternative investments and restricts the supply of funds to those investments which are expected to generate a rate of return at least equal to the current market interest rate. Moreover, the capital market quite legitimately refuses to provide credit to would-be borrowers who are expected to purposefully evade contracted obligations, since such evasion totally undermines the allocative efficiency of the capital market.

If the parents refuse to extend credit to the child, up to the amount of loanable funds as defined above, then it can be argued that, with minor exceptions, no other capital supplier should consider an extension of credit to the child for purposes of human capital investment. Presumably, the parents are in a better position to assess both the potential financial returns to the child's schooling (taking into account ability, motivations, etc.) and the good-faith commitment of the child, as a borrower, to meet his obligation to repay the loan. Thus, unless incompetence (in the assessment of the child's financial prospects or of his integrity as a borrower) or purposeful villany can be demonstrated to underlie the parents' refusal to extend up to the amount of loanable funds to the child, then such a refusal should be considered by other possible lendors (including governmental or governmentally- sponsored lendors) as a justification for denying the child access to other (extrafamily) credit.

---

under conventional needs analyses, since this contribution may, similarly, not actually be offered to the student, as discussed previously.

3.2. Actual Parental Support of Postsecondary Schooling and Related Variables

While financial capacity (however defined) might be considered to be relevant to the issue of what the parents *ought* to provide as financial support for the child's schooling, any particular measure of financial capacity may be only slightly related (or even unrelated) to amounts which parents in fact provide. Thus, it is reasonable to consider actual parental support of students, a question which can be addressed, obviously, only in the case of actual (as opposed to potential) students and, in the case of HS&B, only for parents of 1980 seniors, not sophomores (since only the base- year-student and parent files are available to this study). For the academic year 1980-81, actual parental support for the child's schooling, denoted "actual parental contribution" (APC), is directly reported by the parents.

While the parents' estimate of APC is available (subject to reporting error), the interpretation of this amount is open to some question. First, it cannot be concluded, necessarily, that a child whose APC is lower than another's is in fact receiving lesser financial benefit from parents. Thus, prior or subsequent gifts and inheritances, e.g., parental agreement to repay educational loans incurred by the student, may fully offset differences in APCs. Second, if, as suggested above, parental support, in at least some cases, is considered a loan, then the availability of loans to the child for educational purposes at interest rates lower than the rate of return the parents can realize on their porfolio will lead to a substitution of these nonfamily loans for parental loans, which will appear as a reduction in the APC. Third, variations in APCs may simply reflect differences in optimal levels of educational investment on the part of children, in levels of schooling-period consumption financed via transfers or loans from the parents and/or in the availability of support from other sources. With reference to each of these three sources of variation in observed parental support, the existence and differential availability of highly subsidized, governmentally-sponsored, educational loans would be expected to significantly reduce the apparent level of parental

support.

In light of the foregoing, it will be important to examine the variation in APC in relationship to variations in (a) schooling costs, (b) loans from nonparental sources and (c) other sources of financial support for schooling. Thus, the following variables are derived:

- O postsecondary expenses (PSEXP), consisting of the sum of
  - living expenses (LIVEXP), and
  - schooling expenses (SCHEXP)
- O total loans from nonfamily sources (TL)
- O total grants (TG), consisting of
  - grants from Federal sources (FG)
  - grants from nonFederal sources (OG)
- O contributions to the child from other relatives (including spouse) (RCC)
- O support from the child's own earnings (TE), consisting of
  - summer earnings (SUME), and
  - school-year earnings (SCHE)
- O support from the child's own savings (CSAV)

Together, these variables will make it possible to examine covariations in all of the principle sources of financial support and the relationship of these to variations in the types and costs of schooling investments actually undertaken.

4. Overview of the Financial Measures

The various measures of income and wealth which have been derived in this chapter are summarized in Table 2.7. Table 2.8 then summarizes the loanable funds, parental contribution and postsecondary finance variables which have been developed. These variables provide the focus for the financial analyses of this study.

Table 2.7
Measures of Income and Wealth

Variable		Derivation
	Labor Income	
YL	Conventional	$Y13 + Y14$
AYL	Comprehensive	$AY18 + AY19$
PCAYL	Pot. current	$PCAY18 + PCAY19$
PLCAYL	Pot. lifecycle	$PLCAY18 + PLCAY19$
	Wealth	
W	Actual	$NW5$
PCW	Pot. current	$max[W, f(AYL)]$
PLCW	Pot. lifecycle	$max[W, f(PLCAYL)]$
	Capital Income	
YK	Conventional	$Y16$
AYK	Comprehensive	$AY23$
PAWAYK	Pot. act.-wlth.-cond.	$R1 \cdot W$
PCWAYK	Pot. cur.-pot.wlth.-cond.	$R1 \cdot PCW$
PLCWAYK	Pot. lifecyc.-pot.-wlth.-cond.	$R1 \cdot PLCW$
	Transfer & Other Income	
YT = AYT	All accountings	$Y18 + Y11$
	Total Income	
Y	Conventional	$YL + YK + YT$
AY	Comprehensive	$AYL + AYK + AYT$
PAWAY	Pot.-cap.-income	$AYL + PAWAYK + AYT$
PCAWAY	Pot.-current	$PCAYL + PAWAYK + AYT$
PLCAWAY	Pot.-lifecycle	$PLCAYL + PAWAYK + AYT$
PCWAY	Pot.-cur.-wlth.	$AYL + PCWAYK + AYT$
PLCPWAY	Pot.-lifecyc.-pot.-wlth.	$PLCAYL + PLCWAYK + AYT$

Table 2.8
Loanable Funds, Parental Contribution
and Postsecondary Financial Variables

Variable		Derivation
	Loanable Funds	
AW	Available wealth	$W - 0.25 \cdot A9$
S	Cur. annual savings	$[= f(AYL, W)]$
LF	Tot. loanable funds	$AW + 4 \cdot S$
ALF	Annualized loan. funds	$LF/4$
	Actual Parental Contrib.	
APC	One measure	
	Postsecondary Expenses	
LIVEXP	Living expenses	
SCHEXP	Schooling expenses	
PSEXP	Total postsec. expenses	*LIVEXP + SCHEXP*
	Total Loans (Nonfamily)	
TL	One measure	
	Grants	
FG	Federal grants	
OG	Other grants	
TG	Total grants	*FG + OG*
	Other Relatives' Cont.	
RCC	One measure (incl. spouse)	
	Child's Selfsupport	
SUME	Summer earnings	
SCHE	School-year earnings	
TE	Total earnings	*SUME + SCHE*
CSAV	Support from savings	

Chapter 3

PARENTAL FINANCIAL CAPACITY DISTRIBUTIONS

The remainder of this study is devoted to analyses of and utilizing the various measures of financial capacity derived in the application of the alternative accounting systems developed in the preceeding chapter. In this chapter the focus is on the marginal distributions of the financial capacity measures and their components, concluding with examinations of the distributions of net postsecondary schooling costs as perceived by the family and by the student and of the degree to which annualized loanable funds are (or would be) exhausted by these schooling costs.

At the outset it should be noted that, in this and subsequent chapters, the analyses are restricted to a subsample of the entire HS&B parent sample, derived by eliminating extreme observations of income and wealth. This "censuring" of the sample was dictated by two considerations: (1) Income and wealth "outliers" appear in many cases to be spurious, i.e., to result from mis- and/or incomplete reporting of important elements of family finances, and (2) even observations with legitimately high income and wealth are of little or no significance with reference to public higher education and related policies. Thus, the sample analyzed in the remainder of this report includes only observations for which (1) net labor income was determined to be (a) less than $100,000 per year and (b) greater than $-25,000 per year,[1] and (2) wealth was determined to be (a) less than $500,000 and (b) greater than $-50,000.[2]

---

[1]Because net labor income could be negative only in this case of the selfemployed, and then only if imputed returns to capital invested in the business or farm (imputed interest on business/farm assets net of imputed interest on business/farm liabilities) exceeded reported (presumably net) selfemployment income, the second condition related to labor income serves only to eliminate a small number of the selfemployed. In most cases these observations probably reflect the failure of the HS&B questionnaire to accurately capture the total financial situation of the selfemployed.

[2]The last condition represents what we consider to be a "reasonable" limitation on negative net worth. While

Broadly speaking, these exclusions from the sample have only minor consequences for the empirical analyses utilizing nonparametric statistics describing the distributions of the financial variables, e.g., percentiles.[3] However, interpretation requires recognition of the restrictions on the tails of the distributions. In the case of parametric statistics, e.g., means, standard deviations and coefficients of variation, the elimination of extreme "outliers" in some cases has major consequences (especially with reference to variance-related measures in which, because these measures utilize the square of the distance of an observation from the mean, extreme outliers carry very heavy weight). Nonetheless, recognizing the restrictions on the sample range, these measures provide more useful information concerning differences between the various financial variables than would be the case if the extreme observations were retained.

Because several classes of high schools (notably those with high concentrations of low income and minority students and also private schools) were intentionally oversampled in the stratified HS&B sample design, with further systematic sampling in selecting the ultimate sample for the parent survey, in the derivation of the marginal distributions of the various financial variables observations were weighted to represent the actual population of parents of high school sophomores and seniors (subject to the exclusions indicated above). However, the estimates of conditional statistics, e.g., correlation coefficients and least-squares regressions, appropriately utilize unweighted observations.

---

legitimate cases of even more negative net worth may occasionally be observed, in general extreme negative values (if not totally spurious) probably reflect the failure to fully capture important components of assets.

[3] In distinguishing between "parametric" and "nonparametric" statistics, parametric is used here to refer to statistics which, in conjunction with others, can be employed to describe the entire distribution, as an entire distribution can be described by its moments, e.g., the normal distribution (fully characterized by the first and second moments, i.e., by the mean and variance). Thus, more technically stated, parametric statistics are (or derive from) the moments of the distribution, while this is not true of nonparametric statistics, e.g., percentiles and interquartile ranges.

1. Distributions of the Alternative Measures and Components of Income and Wealth

1.1. Labor Income

Statistics describing the distributions of the various measures of labor income derived in the preceeding chapter are presented in Table 3.1. Consider, first, the "conventional" labor income measure, YL. Not surprisingly, in light of the ages of parents of high-school-age children, relatively few parents (approximately five percent) report zero labor income. Reflecting the positive skewness of the distribution, the mean, $24,641, exceeds the median, $22,500, although the difference is modest, primarily because of the exclusion of high income/wealth families (those with total income, Y, greater than $100,000 and/or total wealth, W, greater than $500,000, as discussed above). The interquartile range (the thrid quartile minus the first quartile) is $19,500, equal to 86.7 percent of the median, providing a general measure of the dispersion of the distribution.

Adjusted labor income, AYL, differs from the conventional measure only in that it deducts from YL the imputed value of net capital income included in the conventional measure of labor income of the selfemployed. This deduction reduces the estimate of mean labor income by about $1,250, to $23,388, but has no effect on the median, while the interquartile range declines to $18,150, 80.7 percent of the median. The differences between the distributions are greatest in the upper and lower tails, indicating the bimodal distribution of the selfemployed. Thus, the shift from the YL to the AYL measure reduces the 99th percentile from $85,000 to $77,500 and the first percentile from $0 to $-3,125.

By comparison to adjusted labor income, AYL, potential current labor income differs only for (a) those families in which selfemployment labor income is low or negative and (b) those families in which one or both parents either do not work or report extremely low labor income (less than the lower-quartile estimate for full-time wage and salary workers, conditional on sex, race, educational attainment, age and

Table 3.1
Distributions of the Alternative Labor Income Measures

	YL	AYL	PCAYL	PLCAYL
Mean	$24,641	$23,388	$28,051	$28,392
Std. dev.	17,184	16,883	15,672	15,704
Coef. of var.	69.7%	72.2%	55.9%	55.3%
Percentiles				
1st	$0	$-3,125	$4,045	$4,548
5th	300	0	6,113	6,250
10th	4,000	4,000	8,750	8,750
25th	12,500	12,500	17,500	17,848
50th	22,500	22,500	26,250	26,289
75th	32,000	30,650	35,600	36,324
90th	46,500	44,500	48,534	48,852
95th	60,000	55,750	59,737	59,983
99th	85,000	77,500	80,000	81,008
Q3 - Q1	$19,500	$18,150	$18,100	$18,476
% of med.	86.7%	80.7%	69.0%	70.3%

Note: Distributions are derived utilizing weighted observations. Number of observations = 5,474.

prior work experience). Thus, PCAYL is significantly greater than AYL for the lowest range of the distribution, with the first percentile rising from $-3,125 to $4,045, the fifth percentile from $0 to $6,113, the tenth percentile from $4,000 to $8,750, and the 25th percentile from $12,500 to $17,500. However, because of the prevalence of non-working wives in the higher end of the distribution, the upper tail would also shift upward significantly, with the third quartile (75th percentile) rising from $30,650 to $35,600, the 90th percentile from $44,500 to $48,534, and the 95th percentile from $55,750 to $59,737. The mean and median, respectively, rise from $23,388 to $28,051 and from $22,500 to $26,250. Reflecting the greater relative compression of potential versus adjusted labor income, the interquartile range relative to the median declines from 80.7 percent to 69 percent.

The differences between "potential lifecycle" and"potential current" labor income, differing only in that the former stipulates the modal lifecycle pattern of employment ("penalizing" those whose prior labor force participation was less than

modal), are modest, with the mean and median each rising by less than $500 (PLCAYL versus PCAYL) and with similarly trivial effects on other characteristics of the distribution.

While the various labor income measures obviously differ, it is not selfevident that the differences are of any significance with reference to the characterization of differences between families. Thus, if one measure were simply a linear transformation of another, e.g., if potential current labor income were simply a multiple of adjusted labor income for all families (or, more plausibly, in light of its derivation, if the potential measure differed from the actual only by a constant), then the two alternatives would contain the same information, i.e., variations in adjusted labor income would fully correspond to variations in potential labor income. Although this issue is addressed in greater detail subsequently, when differences between the alternative measures for families with various characteristics are explicitly examined, a preliminary indication of the fundamental differences between the measures is given by their correlations, which are presented in Table 3.2.

Table 3.2
Correlations between the Alternative Labor Income Measures

	YL	AYL	PCAYL	PLCAYL
YL	1.000	0.955	0.947	0.943
AYL		1.000	0.945	0.941
PCAYL			1.000	0.999
PLCAYL				1.000

Note: Correlations are derived utilizing unweighted observations. Number of observations = 5,474.

The various measures are indeed highly correlated, with correlation coefficients in excess of 0.94 in all cases, implying that the variance in any one measure can account for at least 88 percent of the variance in any other. However, because the "unexplained" component of variance (up to 12 percent) is systematically related to

various family characteristics, the differences between them will be found to be of substantive significance nonetheless. The virtual identity of the alternative potential measures (current versus lifecycle) is indicated by a correlation coefficient which is almost identically unity; however, the use of the lifecycle earnings measure in the derivation of potential lifecycle wealth requires that it be retained in any event.

1.2. Wealth

Basic statistics describing the various alternative measures of wealth are presented in Table 3.3. As can be observed, actual wealth (W, "maximalist" net worth) exhibits a much more positively skewed distribution than any of the measures of labor income, with a mean of $55,537 versus a median of $36,377. The extreme dispersion of wealth is also indicated by the interquartile range of $63,675, equal to 175 percent of the median. It will be observed that negative wealth (net worth) is estimated for slightly more than ten percent of the families, and even the 25th percentile family is observed to have wealth of less than $10,000. Recall that wealth explicitly includes equity in owner-occupied housing and that home owners constitute about 80 percent of the sample.

The estimate of potential current wealth, PCW, is obtained by imposing lower-quartile savings behavior, conditional on the estimate of actual current labor income (AYL) and the assumed mean growth of earnings over the lifecycle. The estimate of PCW is then equal to the greater of actual wealth or that which would be implied by "lower-quartile" savings behavior. Superficially, it might be thought that this imposition would have the greatest impact on the lower tail of the wealth distribution. While it is true that significant upward shifts are observed below the 10th percentile and that the lower quartile rises from $9,625 to $14,837, the absolute impact is at least as great in the upper range of the distribution, with the third quartile rising from $73,300 to $78,480 and the 90th percentile from $127,653 to $134,000. The mean and median, respectively, would rise from $55,537 to $59,949 and from $36,377 to $40,702.

Table 3.3
Distributions of Alternative Measures of Wealth

	W	PCW	PLCW
Mean	$55,537	$59,949	$61,572
Std. dev.	72,081	71,736	71,855
Coef. var.	129.8%	119.7%	116.7%
Percentiles			
1st	$-14,950	$-3,453	$-3,650
5th	-3,429	-417	-600
10th	-600	200	500
25th	9,625	14,837	16,142
50th	36,377	40,702	43,200
75th	73,300	78,480	79,919
90th	127,653	134,000	136,069
95th	188,268	191,739	194,694
99th	383,730	383,730	389,566
Q3 - Q1	$63,675	$63,643	$63,777
% of med.	175.0%	156.4%	147.6%

Note: Distributions are derived utilizing weighted observations. Number of observations = 5,474.

Thus, the interquartile range would be virtually unaffected, although, relative to the now higher median, the range would decline from 175 percent to 156 percent.

The third wealth measure, potential lifecycle wealth (PLCW), is derived in a manner identical to that of potential current wealth, with the exception that potential lifecycle labor income is employed instead of actual adjusted labor income as the measure of current labor income. Thus, potential lifecycle wealth effectively represents that level of wealth which would be exhibited by a family if (a) it had exhibited modal lifecycle labor force participation, (b) it had received at least lower-quartile earnings (conditional on all relevant characteristics), and (c) it had engaged in at least lower-quartile savings behavior (conditional on the level of earnings).

By comparison to potential current wealth, potential lifecycle wealth would shift the entire upper three-quarters of the distribution upward, by between $1,500 and $3,000, while the impact would be substantially less in the lower quartile of the distri-

bution. Again, the interquartile range would be only marginally affected, although, relative to the median, it would fall from 156 percent to 148 percent.

The substantive differences between these alternative wealth measures are indicated by their correlations, which are presented in Table 3.4. The correlations between the actual wealth measure, on the one hand, and the potential measures, on the other, are slightly higher than those between the actual and potential income measures, 0.96 to 0.97 versus 0.94, although the variance of actual wealth still accounts for only about 93 percent of the variance of either measure of potential wealth. Potential current and potential lifecycle wealth, surprisingly are extremely highly correlated (r = 0.99+), notwithstanding the fact that the former is derived utilizing actual adjusted labor income (AYL) while the derivation of the latter uses potential lifecycle labor income (PLCAYL).

Table 3.4
Correlations Between Alternative Measures of Wealth

	W	PCW	PLCW
W	1.000	0.974	0.964
PCW		1.000	0.997
PLCW			1.000

Note: Correlations are derived utilizing unweighted observations. Number of observations = 5,474.

Correlations between the alternative wealth measures and the various measures of labor income are presented in Table 3.5. The correlation between actual wealth and conventional labor income ($r_{W,YL}$), 0.42, is substantially higher than that between actual wealth and adjusted labor income ($r_{W,AYL}$), 0.24, which is not surprising in that the capital-income component of selfemployment income is removed from the adjusted measure of labor income. Somewhat unexpectedly, the correlations between wealth and labor income, however defined, are not exceptionally great, even in the case of the potential wealth measures which themselves are based upon measures of

labor income (imputing a lifecycle pattern of earnings and stipulating a lower-quartile pattern of lifecycle savings). Thus, depending primarily on the measure of labor income and secondarily on the measure of wealth, variations in labor income can "account" for only between five and 25 percent of variations in wealth. Stated somewhat more technically, labor income and wealth constitute relatively orthogonal components of parental financial capacity.

Table 3.5
Correlations Between Wealth and Labor Income Measures

	YL	AYL	PCAYL	PLCAYL
W	0.421	0.239	0.350	0.353
PCW	0.481	0.305	0.415	0.418
PLCW	0.481	0.307	0.423	0.426

Note: Correlations are derived utilizing unweighted observations.
Number of observations = 5,474.
Underscore (____) denotes correlation between elements of same accounting system.

1.3. Capital Income

Having derived the various alternative wealth measures, it is appropriate to turn to the capital income flows to which they would give rise. The distributions of these are presented in Table 3.6. The most notable fact concerning actually reported capital income (YK) is its generally extremely low level. Thus, almost half of the sample reports zero capital income, and the third quartile level is only $600. Because the interquartile range contains no relevant information in this context, the coefficient of variantion, 303 percent (equal to the ratio of the standard deviation, $3,253, to the mean, $1,073), provides some indication of the degree of dispersion of the capital income distribution.

Reported capital income is incomplete in three important dimensions. First, it ignores implicit capital income on equity in owner-occupied housing, while the latter

Table 3.6
Distributions of Alternative Capital Income Measures

	YK	AYK	PAWAYK	PCWAYK	PLCWAYK
Mean	$1,073	$6,065	$6,664	$7,194	$7,389
Std. dev.	3,253	8,256	8,650	8,608	8,623
Coef. var.	303.1%	136.1%	129.8%	119.7%	116.7%
Percentiles					
1st	$0	$0	$-1,794	$-414	$-438
5th	0	0	-411	-50	-72
10th	0	0	-72	24	60
25th	0	644	1,155	1,780	1,937
50th	50	3,991	4,365	4,884	5,184
75th	600	7,682	8,796	9,418	9,590
90th	2,300	13,677	15,318	16,080	16,328
95th	5,500	20,824	22,592	23,009	23,363
99th	17,550	43,192	46,048	46,048	46,748
Q3 - Q1	$600	$7,038	$7,641	$7,637	$7,653
% of med.	1,200.0%	176.3%	175.1%	156.4%	147.6%

Note: Distributions are derived utilizing weighted observations.
Number of observations = 5,474.

constitutes the most significant asset of most families. Second, it is a gross measures from which interest obligations on liabilities is not deducted, rendering it sensitive to the asset/liability composition of the portfolio, i.e., a family which incurred debt to acquire an income-producing asset wouldappear to have enjoyed an increase in capital income equal to the gross return to the asset purchased, while only the difference between the gross return and interest expense would constitute a true increase in income. Finally, third, reported capital income fails to recognize the capital income component of reported selfemployment income, resulting in an overstatement of labor income and a corresponding understatement of capital income. These deficiencies are corrected in the measure of adjusted capital income (AYK), which differs from conventional, reported capital income (YK) by (a) adding implicit income on the value of owner-occupied housing, (b) deducting interest expense, and (c) incorporating that part of selfemployment income attributable to capital invested in the

business or farm.

Because of these modifications, adjusted capital income is substantially higher for most families. Thus, the mean rises from $1,073 to $6,065, the median from $50 to $3,991. Notably, the increases are substantially greater in the upper portion of the distribution, with the third quartile rising from $600 to $7,682, the 90th percentile from $2,300 to $13,677, the 95th percentile from $5,500 to $20,824, and the 99th percentile from $17,550 to $43,192. In contrast, the lower quartile would rise only from $0 to $644, and almost 20 percent of the sample would continue to exhibit zero capital income, a group consisting almost entirely of non-home-owners. Because of the substantial impact on the middle range of the distribution, the coefficient of variation would be only 136 percent (in contrast to 303 percent in the case of YK), while the interquartile range of $7,038 would equal 176 percent of the median.

Even the adjusted capital income measure, AYK, is incomplete, in that it excludes unrealized capital gains and may also be subject to substantial underreporting. The estimate of "potential actual-wealth-conditional" capital income, PAWAYK, overcomes these difficulties by applying a common rate of return to actual wealth, W, using the assumed low-risk interest rate, R1 (= 12 percent) as the common rate of return. By comparison to AYK, this adjustment increases the mean and median by about 10 percent, from $6,065 to $6,664 and from $3,991 to $4,365, respectively. The lower quartile would rise by about $500, to $1,155, while the third quartile would rise by about $1,100, to $8,796, the 90th percentile by almost $1,700, to $15,318. Because of the more substantial impacts on the upper range of the distribution, the interquartile range would rise from $7,038 to $7,641.

In contrast to the preceeding measures, which derive from actually reported wealth, the final two capital income measures are linked (via the stipulated low-risk interest rate, R1, as in the case of PAWAYK) to the current and lifecycle potential wealth measures. Potential current wealth (PCW), derived by assuming a minimum of

lower-quartile savings behavior conditional on actual labor income (AYL), results in PCWAYK. By comparison to PAWAYK, this measure of potential capital income would shift the entire distribution upward substantially, with the exception only of the extreme upper tail (above the 95th percentile). Thus, the fifth percentile would rise from $-411 to $-50, the lower quartile from $1,155 to $1,780, the median from $4,365 to $4,884, the third quartile from $8,796 to $9,418, and the 90th percentile from $15,318 to $16,080. Relative to the median, the dispersion of the distribution would contract, with the ratio of the interquartile range to the median declining from 175 percent to 156 percent.

Potential lifecycle wealth (PLCW) differs from potential current wealth (PCW) in that it is based upon an estimate of the potential lifecycle profile of labor income (PLCAYL, stipulating the modal pattern of lifecycle labor force participation and imputing lower-quartile earnings, conditional on age, sex, race and educational attainment) rather than on actual adjusted labor income (AYL). As a result, relative to capital income from potential current wealth (PCWAYK), capital income from potential lifecycle wealth (PLCWAYK) is somewhat, but not substantially, higher, with the mean and median, respectively, rising from $7,194 to $7,389 and from $4,884 to $5,184. Impacts below the lower quartile would be substantially less than those at and above the lower quartile, over which range the effects would be virtually constant at all levels.

Correlations between the various capital income measures are presented in Table 3.7. The incompleteness of the reported capital income measure, YK, is indicated by its low correlation ($r = 0.5$) with adjusted capital income, AYK. Thus, less than one-quarter of the variance in the comprehensive (adjusted) measure is captured by the reported (unadjusted) measure. Correlations between the reported and potential measures of capital income are even lower, between 0.27 and 0.28. In contrast, the correlations between the adjusted measure, on the one hand, and the potential meas-

ures, on the other, all exceed 0.8, while the intercorrelations between the various potential measures all exceed 0.96, and, in the case of the potential-wealth-based measures, the correlation exceeds 0.99.

Table 3.7
Correlations Between Alternative Capital Income Measures

	YK	AYK	PAWAYK	PCWAYK	PLCWAYK
YK	1.000	0.500	0.281	0.277	0.276
AYK		1.000	0.845	0.822	0.814
PAWAYK			1.000	0.974	0.964
PCWAYK				1.000	0.997
PLCWAYK					1.000

Note: Correlations are derived utilizing unweighted observations.
Number of observations = 5,474.

Correlations between the various capital income measures, on the one hand, and the alternative measures of (a) labor income and (b) wealth, on the other, are presented in Table 3.8. The most notable observation from this table is that the correlations between the adjusted capital income measure (AYK) and the various labor income measures are all substantially higher than those between the conventional capital income and the various labor income measures. Moreover, a similar observation applies with reference to the potential versus adjust capital income measures. Thus, the progressive adjustments to capital income serve to increase the strength of the relationship between labor and capital income.

The inadequacy of the conventional measure of capital income is clearly revealed by its very low correlation with actual wealth ($r_{W,YK} = 0.28$). The corresponding correlation in the case of adjusted capital income is vastly higher ($r_{W,AYK} = 0.84$). Because they apply a standard rate of return to a specified measure of wealth, the correlations between the various potential capital income measures and the corresponding wealth measures are, not surprisingly, 1.0.

Table 3.8
Correlations Between Alternative Capital Income Measures and Alternative Measures of (a) Labor Income and (b) Wealth

	YK	AYK	PAWAYK	PCWAYK	PLCWAYK
YL	0.116	0.350	0.421	0.481	0.481
AYL	0.094	0.141	0.239	0.305	0.307
PCAYL	0.111	0.258	0.350	0.415	0.423
PLCAYL	0.112	0.261	0.353	0.418	0.426
W	0.281	0.845	1.000	0.974	0.964
PCW	0.277	0.822	0.974	1.000	0.997
PLCW	0.276	0.814	0.964	0.997	1.000

Note: Correlations are derived utilizing unweighted observations.
Number of observations = 5,474.
Underscore (____) denotes correlation between elements of same accounting system.

1.4. Transfer Income

Fewer than 40 percent of parents of high school students report receipt of any transfer income (YT = AYT), public or private. However, as indicated by Table 3.9, 10 percent report receipt of $6,250 or more, five percent $12,500 or more, and one percent $30,000 or more. As would be expected, the correlations between transfer income and the various measures of labor income, as reported in Table 3.10, are all significantly negative, although their magnitudes (-0.08 to -0.094) are not as great as one would casually expect. Interestingly, correlations between transfer income and the measures of wealth and of capital income are positive, although of trivial magnitude.

1.5. Total Income

Appropriately combining the various preceeding components of income, the alternative total income measures are obtained, the distributions of which are described in Table 3.11. Focussing first on total money income as conventionally defined (Y), the

Table 3.9
Distribution of Transfer Income

	YT = AYT
Mean	$2,298
Std. dev.	6,070
Coef. var.	264.1%
Percentiles	
1st to 50th	$0
75th	2,000
90th	6,250
95th	12,500
99th	30,000

Note: Distributions are derived utilizing weighted observations. Number of observations = 5,474.

Table 3.10
Correlations Between Transfer Income and Other Income-Wealth Measures

	YT		YT		YT
YL	-0.085	W	0.039	YK	0.021
AYL	-0.094	PCW	0.047	AYK	0.031
PCAYL	-0.081	PLCW	0.051	PAWAYK	0.039
PLCAYL	-0.080			PCWAYK	0.047
				PLCWAYK	0.051

Note: Correlations are derived utilizing unweighted observations. Number of observations = 5,474.

positive skewness of the distribution is indicated by the fact that the mean, $28,013, significantly exceeds the median, $24,500. One-quarter of high school sophomores and seniors come from families with incomes less than $14,850, another one-quarter from families with money incomes greater than $36,050. Thus, the interquartile range is $21,200, 86.5 percent of the median, providing a general measure of the dispersion of the distribution of money income.

The overall accuracy of the HS&B parent survey data is indicated by the consistency between these estimates of mean and median money income (Y) and comparable mean and median money-income estimates for 1979 from the from the Current

Population Survey.[4] For purposes of this comparison, the CPS estimates for families headed by a person between the ages of 45 and 54 are utilized, since this age range corresponds most closely to ages of HS&B parents (although the median HS&B parent age is in the lower end of the 45 to 54 CPS range). The HS&B mean, $28,013, is remarkably close to the CPS mean of $28,155, and the HS&B and CPS medians are comparably close ($24,500 versus $25,345, respectively). For neither pair of measures (mean or median) are the HS&B and CPS estimates statistically different at any conventional level of significance. Focusing on the lower tail of the distribution, with 1979 poverty levels of $5,763 for three person families and of $7,386 for four person families, the proportion of HS&B families below the poverty level, between five and 10 percent, is reasonably close to the CPS estimate of 9.1 percent of all families and of 7.3 percent of persons between the ages of 45 and 54. While more precise comparisons between the HS&B and CPS money-income distributions would be possible (using unpublished data from the CPS Annual Demographic File), even these rather crude assessments are sufficient to indicate the general representativeness of the HS&B sample and data.

The movement from the conventional reported-money-income measure (Y) to the adjusted measure of income results in a substantial upward shift of the distribution, with the mean and median, respectively, rising from $28,013 to $31,751 and from $24,500 to $28,426. Significantly, however, the absolute differences would be greatest in the upper tail of the distribution. Thus, the lower decile would rise by $750, the lower quartile by $2,650, the median by almost $4,000, the upper quartile by $5,350, and the 90th percentile by more than $6,500. The dispersion of the adjusted measure would be more than ten percent greater than that of the unadjusted measure in absolute terms, but would decline marginally relative to the median (from 86.5 percent to

---

[4]U.S. Bureau of the Census, Series P-60, No. 137, "Money Income of Households, Families, and Persons in the United States: 1979" (Washington, D.C.: Government Printing Office, 1980).

Table 3.11
Distributions of Alternative Total Income Measures

	Y	AY	PAWAY	PCAWAY	PLCAWAY	PCWAY	PLCPWAY
Mean	$28,013	$31,751	$32,350	$37,014	$37,355	$32,880	$38,079
Std. dev.	18,424	20,224	21,081	20,897	20,947	21,463	21,369
Coef. var.	65.8%	63.7%	65.2%	56.5%	56.1%	65.3%	56.1%
Percentiles							
1st	$350	$650	$624	$5,233	$5,448	$701	$5,462
5th	4,000	5,500	5,165	9,014	9,024	5,223	9,128
10th	8,000	8,750	8,720	13,706	14,170	8,756	14,368
25th	14,850	17,500	17,406	22,760	23,013	17,656	23,472
50th	24,500	28,426	28,687	33,342	33,615	29,182	34,285
75th	36,050	41,400	42,484	46,772	47,227	42,963	48,078
90th	52,550	59,116	60,753	65,005	65,245	61,752	66,384
95th	64,600	70,899	74,262	78,452	78,894	75,911	80,242
99th	89,000	97,354	99,612	104,780	105,242	101,410	106,913
Q3 - Q1	$21,200	$23,900	$25,078	$24,012	$24,214	$25,306	$24,607
% of med.	86.5%	84.1%	87.4%	72.0%	72.0%	86.6%	71.8%

Note: Distributions are derived utilizing weighted observations.
Number of observations = 5,474.

84.1 percent).

Replacing adjusted capital income (AYK) by potential capital income conditional on actual wealth (PAWAYK) in the derivation of total income, i.e., comparing the PAWAY and AY total income measures, the mean would increase by about $600, to $32,350, the median by only about $250, to $28,687. While the consequences would be minor in the lower range of the distribution (actually reducing the estimate of total income at and below the lower quartile, where interest obligations on liabilities frequently exceed interest income on assets), the absolute impact would rise with income in the upper range, with the third quartile rising by almost $1,100 (to $42,484), the 90th percentile by about $1,650 (to $60,753), and the 95th percentile by almost $3,400 (to $74,262). Thus, the net effect of unrealized and/or unreported capital income is absolutely greater in the upper tail of the distribution, as would be expected.

Turing to potential current income (PCWAY), which differs from potential actual wealth income (PAWAY) by utilizing the greater of actual and potential current labor income (AYL or PCAYL), the entire distribution shifts upward by about $5,000 by comparison to PAWAY, with the mean and median rising, respectively, from $32,350 to $37,014 and from $28,687 to $33,342. Thus, the absolute level of unexploited earnings capacity is effectively invariant with respect to the estimated level of income. Because the median would rise significantly, while the interquartile range would decline by about $1,000, the ratio of the interquartile range to the median would decline from 87.4 percent (PAWAY) to 72 percent (PCAWAY).

While PCAWAY adjust to a (lower-quartile) norm of current labor force participation, PLCAWAY adjusts to a norm of lifecycle labor force participation (stipulating non-participation on the part of the mother prior to the child's entry into school and full-time participation thereafter). However, given the only very slight differences between potential current and potential lifecycle labor income (PCAYL and PLCAYL), the distributions of PCAWAY and PLCAWAY are virtually identical, with the mean rising only from $37,014 to $37,355, and with similarly minor effects over the entire distribution.

Conjoining actual adjusted labor income (AYL) with a norm of lower quartile savings behavior results in potential current income, PCWAY. By comparison to potential actual wealth income (PAWAY, PCWAY is only marginally greater, with the mean and median each rising by about $500. However, the effect is even smaller at and below the 25th percentile, while the 90th percentile increases by about $1,000 and the 95th percentile by more than $1,500. Thus, imposition of a norm for savings behavior has a greater absolute impact in the upper ranges of the distribution.

The final measure of total income, PLCPWAY, combines both a norm for lifecycle labor force participation (as reflected in potential lifecycle labor income, PLCAYL) and a norm for savings behavior (linking lower quartile savings with potential lifecycle

labor income to obtain potential lifecycle wealth, PLCW, andassociated capital income, PLCWAYK). By comparison to the most comprehensive measure of potential current income conditional on actual wealth and actual labor income (PAWAY), the mean and median shift upward significantly, the former from $32,350 to $38,079, the latter from $28,687 to $34,285. The absolute impact, about $5,000, would be approximately constant over the entire distribution.

Correlations between the various alternative measures of total income, actual and potential, are presented in Table 3.12. Interestingly, the correlation between reported and adjusted current income (Y and AY), 0.98, is substantially higher than the correlations between the conventional and adjusted measures of their primary components, labor income (0.95) and capital income (0.5); this reflects the transfer of the capital-income component of selfemployment earnings from labor to capital income and the inclusion of net imputed income on owner-occupied housing in the adjusted measures. The predominance of labor income in total income is also reflected in these correlations. Across the various pairs of measures the lowest correlations, approximately 0.9, are observed between (a) gross current money income as conventionally defined, Y, and (b) the measures incorporating potential labor income, PCAWAY, PLCAWAY and PLCPWAY. Conversely, these latter three measures utilizing potential labor income (current or lifecycle, with or without potential wealth in the case of the latter) are the only income variables which are essentially identical in information content (exhibiting correlations greater than 0.99). Over all pairs, the degree of "explanatory power" of one measure with reference to another ranges from approximately 0.8 to virtually 1.

Table 3.13 presents correlations between the various income measures and the measures of (a) wealth, (b) labor income, (c) capital income and (d) transfer income. The inclusion of net imputed income on owner-occupied housing (the primary component of wealth) raises the correlation between wealth and income from 0.46 (Y) to

Table 3.12
Correlations Between Alternative Total Income Measures

	Y	AY	PAWAY	PCAWAY	PLCAWAY	PCWAY	PLCPWAY
Y	1.000	0.978	0.955	0.916	0.913	0.958	0.916
AY		1.000	0.976	0.941	0.939	0.974	0.936
PAWAY			1.000	0.965	0.963	0.996	0.958
PCAWAY				1.000	0.999	0.960	0.994
PLCAWAY					1.000	0.958	0.995
PCWAY						1.000	0.962
PLCPWAY							1.000

Note: Correlations are derived utilizing unweighted observations.
Number of observations = 5,474.

0.55 (AY). Imputing income to wealth in any case in which reported income fell below the norm (suggesting unrealized and/or unreported capital income) raises the correlation between wealth and income (PAWAY) to 0.6. Imposing the lower-quartile norm for labor income again raises the wealth-income (PCAWAY and PLCAWAY) correlation, to 0.66. The highest correlation, 0.72, results when a norm is set for both savings behavior (and hence wealth) and labor earnings (comparing PLCW and PLCPWAY). A norm only for savings behavior results in a correlation (between PCW and PCWAY) of 0.64, somewhat less than that observed when a norm only for labor earnings is imposed.

Correlations between total and labor income, especially within the same accounting system, as substantially higher, as would be expected (since labor income is the primary component of total income). However, this correlation is greatest (0.93) in the case of the conventional (Y) accounting system, in which the capital component of selfemployment income is included in labor income and in which no imputation of net income to owner-occupied housing is included in capital (and total) income. In all other cases the correlations between total income and the associated measure of labor income are about 0.88 (with the variance of labor income accounting for less than 80 percent of the variance of total income).

Table 3.13
Correlations Between Alternative Total Income Measures and Alternative Measures of (a) Wealth and (b) Components of Income

	Y	AY	PAWAY	PCAWAY	PLCAWAY	PCWAY	PLCPWAY
W	0.457	0.550	0.603	0.681	0.682	0.580	0.653
PCW	0.516	0.598	0.648	0.721	0.722	0.644	0.715
PLCW	0.517	0.597	0.647	0.724	0.725	0.646	0.724
YL	0.931	0.916	0.912	0.862	0.858	0.916	0.863
AYL	0.882	0.868	0.873	0.784	0.781	0.880	0.790
PCAYL	0.881	0.872	0.877	0.875	0.873	0.883	0.882
PLCAYL	0.878	0.870	0.875	0.875	0.875	0.881	0.884
YK	0.297	0.284	0.193	0.203	0.204	0.188	0.198
AYK	0.429	0.527	0.461	0.546	0.547	0.442	0.523
PAWAYK	0.457	0.550	0.603	0.681	0.682	0.580	0.653
PCWAYK	0.516	0.598	0.648	0.721	0.722	0.644	0.715
PLCWAYK	0.517	0.597	0.647	0.724	0.725	0.646	0.724
YT	0.237	0.218	0.213	0.231	0.230	0.211	0.230

Note: Correlations are derived utilizing unweighted observations.
Number of observations = 5,474.
Underscore (____) denotes correlation between elements of same accounting system.

Correlations between total income and the associated capital income measures are substantially lower. In the case of the conventional accounting system (without imputed income on owner-occupied housing and with selfemployment capital income incorrectly included in labor income) the lowest correlation between total and capital income is observed, 0.3. Correctly treating the capital component of selfemployment income and including net imputed income on owner occupied housing, the correlation (between AY and AYK) rises to 0.53. Imposing a norm on capital income, given observed wealth, the correlation (between PAWAY and PAWAYK) rises further to 0.6. In

this and all remaining cases the correlations between total income and associated measures of capital income are necessarily identical to those between total income and wealth.

Finally, and somewhat surprisingly, the correlations between transfer income and total income are invariably positive (about 0.22). This undoubtedly results from the fact that gifts and transfers from private sources are included in total transfers.

2. Distributions of Parental 'Loanable Funds' and Its Components

While closely related to parental income and wealth, from which they are derived, the measures of loanable funds and its components are intended to capture a quite distinct dimension of financial capacity. Essentially, income and wealth are of interest primarily as bases for overt or covert "taxes" on parents for purposes of financing the schooling of children. In contrast, the concept of loanable funds focuses solely on the capacity of the parents to act as lenders to a child investor in human capital. Thus, the question is not one of the parents' "capacity" out of income and wealth to "subsidize" the child's schooling, but rather one of the capacity of the parents simply to "finance" the child's investment, given the parents' existing portfolio of assets and liabilities, their current rate of net savings out of nonwealth income, and the expectation of eventual repayment (inclusive of interest at the parents' opportunity cost of funds, i.e., at the rate of return earned by the parents' portfolio).

As derived in the preceeding chapter, loanable funds (LF) consist of (a) the parents' "available wealth" (AW) at the commencement of the investment (schooling) period, defined as total wealth (W) less the "nonmortgageable component" of illiquid assets (25 percent of total illiquid assets, A9), plus (b) the present value of savings out of nonwealth income (annual rate S) over the investment period. The annual rate of savings is determined on the basis of currently observed adjusted labor income (AYL) and wealth (W), deriving those paths of consumption and savings which are just consistent with observed labor income and wealth at the current age, under the

assumptions that (a) labor income and consumption have grown at average educational-attainment-specific rates since age 25 (with the growth rate of consumption stipulated to be 0.75 times the growth rate of adjusted labor income), (b) wealth at age 25 was zero, (c) all returns to wealth since age 25 have been reinvested, and (d) all transfer income since age 25 has been consumed. In any case in which adjusted current labor income is observed to be negative, current savings are set equal to zero. Having obtained the current annual rate of savings (in the "first" year of the assumed four-year investment period), savings over the investment period are assumed to increase at the rate of interest (discount rate), implying that the present value of all savings over the investment period is equal to the length of the period (in years) times the current annual rate of savings. Assuming a four-year investment period, "annualized loanable funds" (ALF) is, then, $0.25 \cdot AW + S$.

The distributions of available wealth (AW), savings (S) and annualized loanable funds (ALF) are described in Table 3.14. As can be observed by comparing Tables 3.3 and 3.14, available wealth is substantially less than total wealth (W), primarily because of the importance of owner-occupied housing (an illiquid asset assumed to be only 75 percent mortgageable) in the latter. Thus, lower-quartile available wealth of $2,302 contrasts with lower-quartile wealth of $9,625, and the discrepancy becomes absolutely greater in the higher ranges of the distribution, with the median (W versus AW) declining from $38,377 to $22,841, the third quartile from $73,300 to $53,534, the 90th percentile from $127,653 to $95,500, and the 95th percentile from $188,268 to $141,084. Mean available wealth of $38,582 is only about 70 percent of mean total wealth, $55,537. The greater dispersion of available wealth, by comparison to total wealth, is indicated by the increase in the ratio of the interquartile range to the median, which rises from 175.0 percent (W) to 224.3 percent (AW).

As would be expected in light of the ages of parents of high school and college age children, the estimates of current annual savings are quite substantial, with a median

Table 3.14
Distributions of Loanable Funds and Its Components

	AW	S	LF	ALF
Mean	$38,582	$3,649	$53,179	$13,295
Std. dev.	56,598	3,478	62,065	15,516
Coef. var.	146.7%	95.3%	116.7%	116.7%
Percentiles				
1st	$-23,801	$0	$-12,175	$-3,044
5th	-8,000	0	-1,151	-288
10th	-3,050	250	765	191
25th	2,302	1,169	11,692	2,923
50th	22,841	2,757	37,286	9,322
75th	53,534	5,098	72,358	18,090
90th	95,500	8,218	120,116	30,029
95th	141,084	10,522	170,132	42,533
99th	287,075	15,866	313,809	78,452
Q3 - Q1	$51,232	$3,929	$60,666	15,166
% of med.	224.3%	142.5%	162.7%	162.7%

Note: Distributions are derived utilizing weighted observations.
Number of observations = 5,474.

of $2,757, a third quartile of $5,098 and a 90th percentile of $8,218. However, the skewness of the distribution is indicated by the comparison of the mean to the median, $3,649 versus $2,757, respectively, and by the low values of the 10th percentile, $250, and of the lower quartile, $1,169. The implied dispersion of the distribution is indicated by the ratio of the interquartile range to the median, 142.5 percent, which is, however, substantially smaller than the comparable measure for available wealth, 224.3 percent.

The distribution of total loanable funds (LF) indicates that three-quarters of all parents could finance a child's investment in human capital (present value over four years) of at least $11,692 without requiring recourse to external sources of funds,[5] while the median parent could full finance an investment of $37,286, and one-quarter

[5]Portfolio preferences of parents might imply recourse to external capital markets. However, this would simply indicate that the returns achievable by the parents on their non-child assets exceed the interest costs on liabilities.

of parents could fully finance at least $72,358. Again, however, a significant proportion of families would be capable of financing little or no human capital investment, with the tenth-percentile family having total loanable funds of only $765. The dispersion of this measure of lending capacity is indicated by the interquartile range relative to the median, 162.7 percent.

The distribution of annualized loanable funds (ALF) is implied by the distribution of total loanable funds (LF), from which it is directly derived (dividing the latter by an assumed four-year schooling period). Thus, a lower-quartile family could fully selffinance an annual schooling investment (over four years, with costs stated in constant 1979-80 prices) of at least $2,923, with a median family capable of investment financing at an annual rate of $9,322, an upper quartile family at an annual rate of $18,090, and the 90th percentile family at an annual rate of $30,029. Interpretively, one-half of all families could fully finance four years of schooling at a relatively expensive private institution, and one-quarter could fully finance the most expensive private schooling. However, the tenth percentile family could self-finance virtually no schooling, with annualized loanable funds of only $191.

As will be discussed subsequently, the foregoing evidence suggests that almost three-quarters of all families could fully self-finance schooling at the median cost (inclusive of tuition, fees, and room and board) actually reported by the HS&B seniors actually attending college in 1980-81, $3,250. Conversely, only one-quarter would require non-parent-wealth-collateralized access to capital markets or other sources of funds in order to finance four years of collegiate schooling. Indicative of the degree to which parental lending capacity is *not* being exploited, the median parents' actual contribution to support of the child's postsecondary schooling is less than 10 percent of those parents' annualized loanable funds.

Correlations between parental loanable funds and its components are presented in Table 3.15. The predominant influence of available wealth (AW) on total/annualized

loanable funds (LF/ALF) is indicated by the fact that the correlation between this component and the total is 0.98. In contrast, the correlation between current annual savings (S) and total/annualized loanable funds (LF/ALF) is only 0.51.

Table 3.15
Correlations Between Loanable Funds and Its Components

	AW	S	LF(ALF)
AW	1.000	0.304	0.978
S		1.000	0.506
LF(ALF)			1.000

Note: $r_{LF\,ALF} = 1.0$
Correlations are derived utilizing unweighted observations.
Number of observations = 5,474.

The relationships between loanable funds and its components, on the one hand, and the various measures of income and wealth, on the other, are indicated by the correlations presented in Table 3.16. Not surprisingly, the highest correlation, 0.97, is observed between actual wealth (W) and available wealth (AW); if the relationship between illiquid assets and wealth were invariant across families (i.e., if illiquid assets were a constant proportion of wealth), this correlation would be 1. Again reflecting the predominant influence of wealth on loanable funds, a correlation of 0.95 is observed between wealth (W) and total/annualized loanable funds (LF/ALF).

More interesting are the correlations of the loanable funds measures with the various measures of income. In contrast to a correlation of 0.56 between conventional money income (Y) and total/annualized loanable funds, this correlation rises to 0.65 when the comprehensive measure of current income (AY) is employed and to 0.76 with the recognition of potential lifecycle labor income (PLCAWAY). Because the correlations between current annual savings and the various income measures are relatively invariant (ranging from 0.75 to 0.83), this increase in the income/total-loanable-funds correlations is almost entirely due to the higher correlations between the

Table 3.16
Correlations Between Loanable Funds Components and Alternative Measures of (a) Total Income and (b) Wealth

	AW	S	LF(ALF)
Y	0.421	0.790	0.583
AY	0.520	0.793	0.654
PAWAY	0.580	0.808	0.711
PCAWAY	0.647	0.757	0.761
PLCAWAY	0.649	0.755	0.762
PCWAY	0.556	0.834	0.696
PLCPWAY	0.620	0.788	0.743
W	0.973	0.315	0.953
PCW	0.944	0.426	0.953
PLCW	0.935	0.440	0.948

Note: Correlations are derived utilizing unweighted observations. Number of observations = 5,474.

adjusted/potential income measures and available wealth. Thus, the correlation between income and available wealth rises from 0.42 (Y), to 0.52 (AY) and further to 0.65 (PLCAWAY). While the higher correlation in the case of the adjusted income measure (AY) reflects its recognition of net imputed income to owner-occupied housing, the fact that the highest correlation is observed when potential lifecycle labor income is recognized (in PLCAWAY) suggests that the degree of exploitation of earnings capacity is negatively associated with the level of wealth.

3. Distributions of Actual Postsecondary Expenditure and Sources of Funds

In this section actual (parentally-reported) postsecondary expenditures and sources of funds are examined for that subset of the HS&B sample of 1980 high school seniors reported by the parents to be in college in the Fall of 1980. It should be stressed that these are parental reports of schooling finances for the current year, made after the commencement of the school year, and thus should be reasonably accurate. That this is the case is indicated by the close correspondence between estimates of mean and median postsecondary expenditures, on the one hand, and of total mean and median

sources of funds to finance this schooling, on the other, with differences between these of less than $100.

For reasons of internal logic, the analysis focuses successively on (a) actual postsecondary expenditure, (b) "external" sources of support for schooling, and (c) parental and student contributions to the financing of schooling. The following section then conjoins these to obtain estimates of net schooling costs as perceived by the family and by the student. Finally, in the last section of this chapter these net cost estimates are combined with the preceeding estimates of parental loanable funds to assess directly the issue of the degree to which parents could in fact act as capital suppliers to the child for purposes of human capital investment, given the actual net investment costs incurred.

3.1. Postsecondary Expenditures

The distributions of (a) living expenditures (excluding schooling costs *per se*), (b) schooling expenditures (consisting of tuition and fees), and (c) total postsecondary expenditures (the sum of schooling and living expenditures) are described in Table 3.17. Because living expenditures (LIVEXP) refer only to out-of-pocket expenses, i.e., in general do not include the costs to the family of housing and feeding a commuting student, 30 percent of students are reported to incur no living expenses. Living expenses are $1,500 for the median student, $2,500 for the upper-quartile student and $3,500 for the 90th percentile student.

With reference to schooling expenditures (SCHEXP), only 1.5 percent of students report zero costs. However, more than 10 percent report schooling costs of only $250, and the lower-quartile is only $750, the median $1,500. The upper quartile, conversely, is $3,000, and the 90th percentile is $5,000. Mean schooling expenditures of $1,944 slightly exceed mean living expenditures of $1,704.

Combining living and schooling expenditures, total postsecondary expenditures

Table 3.17
Distributions of Postsecondary Expenditures

	LIVEXP	SCHEXP	PSEXP
Mean	$1,704	$1,944	$3,648
Std. dev.	1,612	1,546	2,613
Coef. var.	94.6%	79.5%	71.6%
Percentiles			
1st	$0	$0	$250
5th	0	250	250
10th	0	250	750
25th	0	750	1,500
50th	1,500	1,500	3,250
75th	2,500	3,000	5,500
90th	3,500	5,000	7,500
95th	4,500	5,000	8,500
99th	6,000	7,000	11,000
Q3 - Q1	$2,500	$2,250	$4,000
% of med.	166.7%	150.0%	123.1%

Note: Distributions are derived utilizing weighted observations. Number of observations = 1,554.

(PSEXP) have a mean and median of $3,648 and $3,250, respectively. In excess of five percent report postsecondary expenditures of $250 or less, and the tenth percentile is only $750. However, total expenditures rise rapidly, with a lower quartile of $1,500, an upper quartile of $5,500, a 90th percentile of $7,500 and a 95th percentile of $8,500. The interquartile range relative to the median is 123.1 percent, substantial but significantly lower than that of either living or schooling expenses in isolation, 166.7 percent and 150 percent, respectively.

Perhaps surprisingly, the correlation between living expenses and schooling expenses, reported in Table 3.18, is rather low, 0.35. Interestingly, however, each is approximately equally correlated with total postsecondary expenditures (~ 0.82).

Correlations of these expenditure variables with the income, wealth and loanable funds measures are reported in Table 3.19. Correlations of the expenditure variables and the income variables are approximately constant across income variables. How-

Table 3.18
Correlations Between Postsecondary Expenditure and Its Components

	LIVEXP	SCHEXP	PSEXP
LIVEXP	1.000	0.349	0.829
SCHEXP		1.000	0.813
PSEXP			1.000

Note: Correlations are derived utilizing unweighted observations. Number of observations = 1,554.

ever, the correlation of income and schooling expenditure (SCHEXP), ~ 0.11, is more than twice as great as that between income and living expenditure (LIVEXP), ~ 0.04. The correlation between income and total postsecondary expenditure (PSEXP) is virtually invariant at about 0.09.

Table 3.19
Correlations Between Postsecondary Expenditures and Alternative Measures of (a) Total Income, (b) Wealth and (c) Loanable Funds

	LIVEXP	SCHEXP	PSEXP
Y	0.046	0.110	0.094
AY	0.039	0.101	0.085
PAWAY	0.039	0.108	0.088
PCAWAY	0.037	0.115	0.091
PLCAWAY	0.036	0.115	0.092
PCWAY	0.043	0.112	0.093
PLCPWAY	0.041	0.122	0.098
W	0.022	0.054	0.046
PCW	0.036	0.072	0.065
PLCW	0.036	0.079	0.070
AW	0.025	0.061	0.052
S	0.058	0.122	0.109
LF(ALF)	0.037	0.085	0.074

Note: Correlations are derived utilizing unweighted observations. Number of observations = 1,554.

A more interesting pattern is observed in the correlations between the postsecon-

dary expenditure measures and the alternative measures of wealth. Again, the correlations are more than twice as great for schooling expenditures as for living expenditures. However, in this case the correlations with the potential wealth measures, especially potential lifecycle wealth (imposing norms for both labor force participation and savings) are substantially higher (roughly 1.5 times higher) than those for actual wealth. In effect, higher levels of current expenditure over the lifecycle, implying lower wealth, are associated with correspondingly higher current expenditure for schooling. The highest correlations are observed between schooling expenditure and (a) current savings (S), 0.12, and (b) total/annualized loanable funds (LF/ALF), 0.09. The latter is primarily a reflection of the former, which itself reflects the relationship between the imputed rate of savings and both income and wealth.

3.2. 'External' Financial Support for Schooling

Distributions of external financial support for postsecondary schooling are presented in Table 3.20 , distinguishing (a) total loans (TL, virtually all of which are Federally sponsored, directly or indirectly), (b) Federal grants (FG), (c) other grants (OG), and (d) total grants (TG = FG + OG). Only about one-fourth of students are reported to utilize external (nonfamily) borrowing as a source of financial support, although mean borrowing, conditional on borrowing at all, is about $1,800, and between five and 10 percent of students report borrowing in excess of $2,000, with more than five percent borrowing over $2,600.[6]

Grants are a much more significant source of support for postsecondary schooling than are loans, with about 20 percent of students reporting grants from both

[6]The treatment of student borrowing from external sources as "external" financing might well be questioned, on grounds that this borrowing represents an obligation of the student, commiting him to future repayments, and hence should be considered a source of "selfsupport." To the degree to which student loans are unsubsidized this is indeed correct. However, as demonstrated in Stephen P. Dresch, "Financial and Behavioral Implications of Federal Student Loan Programs and Proposals," published in H. Tuckman and E. Whalen, eds., *Subsidies to Higher Education: The Issues* (New York: Preager Publishers, 1980), existing Federally-sponsored student loans incorporate a substantial "pure-grant" component, constituting approximately 50 percent of the amount of the ostensible loan. Clearly, a more refined analysis would decompose loans into implicit grant and true loan components and treat the latter as one component of selfsupport.

Table 3.20
Distributions of External Sources of Support for Schooling

	TL	FG	OG	TG
Mean	$442	$400	$420	$820
Std. dev.	886	809	737	1,222
Coef. var.	200.6%	202.3%	175.2%	149.1%
Percentiles				
1st to 25th	$0	$0	$0	$0
50th	0	0	0	150
75th	150	450	600	1,350
90th	1,600	1,600	1,350	2,600
95th	2,600	2,600	2,050	3,400
99th	2,750	3,500	3,050	5,200
Q3 - Q1	$150	$450	$600	$1,350
% of med.	NA	NA	NA	900.0%

Note: Distributions are derived utilizing weighted observations.
Number of observations = 1,553.
NA indicates not applicable.

Federal and other sources, 10 percent reporting only Federal grants and 20 percent reporting only grants from nonFederal sources. For more than 25 percent of students Federal grants totaled $450 or more, and for more than 10 percent these grants were at least $1,600. In the case of nonFederal grants, the award exceeded $500 for more than 25 percent of students and was equal to $1,350 or more for in excess of 10 percent of students. As noted, more than fifty percent of all students received grants from some source or sources, and at least 25 percent of students received grants of at least $1,350, with in excess of 10 percent receiving at least $2,600.

Correlations between these various external sources of financial support for post-secondary schooling are reported in Table 3.21. While the correlations between loans, on the one hand, and grants, on the other, are relatively low, it is interesting that the loan/Federal-grant correlation is negative (-0.04) while the loan/nonFederal-grant correlation is positive (0.07). Federal and nonFederal grants are more highly correlated (0.23), and the two grant components are approximately equally correlated (~

0.78) with total grants.

Table 3.21
Correlations Between Elements of External Support

	TL	FG	OG	TG
TL	1.000	-0.037	0.069	0.019
FG		1.000	0.234	0.794
OG			1.000	0.776
TG				1.000

Note: Correlations are derived utilizing unweighted observations. Number of observations = 1,553.

Correlations between the external support variables and the various measures of income, wealth, loanable funds and postsecondary expenditure are reported in Table 3.22. Regardless of the income measure employed, loans are positively correlated with income (~ 0.16), while the income/grant correlations are negative (Federal grants ~ -0.22, nonFederal grants ~ -0.2, total grants ~ -0.26), and the same is true of the wealth/grant correlations (Federal grants ~ -0.15, nonFederal grants ~ -0.18, total grants ~ -0.21). Also as in the case of income, the wealth/loan correlations are positive but small, although higher in the case of the potential wealth measures.

Probably reflecting the positive relationship between savings, income and wealth, loans are positively correlated with current savings, while grants and savings are negatively correlated, and the same is generally true of available wealth and total/annualized loanable funds. Loans are particularly highly correlated with schooling and total postsecondary expenditure (0.36). While Federal grants are approximately equally correlated with living and schooling expenditures (~ 0.15), nonFederal and total grants are more high correlated with schooling expenditure (~ 0.3).

3.3. Family and Student Contributions to Postsecondary Finance

Family and student contributions to the financing of postsecondary schooling can be decomposed into (a) parental support (APC: Actual Parental Contribution), (b) support

Table 3.22
Correlations Between External Sources of Support and Alternative Measures of (a) Total Income, (b) Wealth, (c) Loanable Funds and (d) Postsecondary Expenditure

	TL	FG	OG	TG
Y	0.172	-0.213	-0.170	-0.244
AY	0.156	-0.228	-0.187	-0.264
PAWAY	0.154	-0.228	-0.200	-0.272
PCAWAY	0.153	-0.232	-0.210	-0.282
PLCAWAY	0.153	-0.233	-0.211	-0.283
PCWAY	0.162	-0.218	-0.195	-0.263
PLCPWAY	0.161	-0.222	-0.205	-0.272
W	0.044	-0.158	-0.181	-0.215
PCW	0.073	-0.149	-0.185	-0.212
PLCW	0.076	-0.148	-0.181	-0.209
AW	0.034	-0.140	-0.177	-0.201
S	0.163	-0.216	-0.153	-0.236
LF(ALF)	0.071	-0.179	-0.198	-0.240
LIVEXP	0.236	0.142	0.157	0.190
SCHEXP	0.366	0.150	0.306	0.289
PSEXP	0.365	0.177	0.281	0.290

Note: Correlations are derived utilizing unweighted observations.
Number of observations = 1,553.

to the child from other relatives (RCC), (c) student earnings (TE), distinguishing between summer (SUME) and school-year (SCHE) earnings, and (d) drawings against the accumulated savings of the child (CSAV). The distributions of these elements of student and family selfsupport are portrayed in Table 3.23.

More than 15 percent of parents report making no financial contribution toward the child's postsecondary schooling expenditures, and the lower quartile of APC is only $150. The median parent reports a contribution of $900, and at the upper quartile and above the parents' contribution equals or exceeds the maximum amount reportable on the parents' HS&B questionnaire ($2,600).

Table 3.23
Distributions of Student and Family Support for Schooling

	APC	RCC	SUME	SCHE	TE	CSAV
Mean	$1,157	$93	$414	$502	$916	$194
Std. dev.	984	414	512	715	972	452
Coef. var.	85.0%	445.2%	126.5%	142.5%	106.1%	232.8%
Percentiles						
1st to 10th	$0	$0	$0	$0	$0	$0
25th	150	0	0	0	150	0
50th	900	0	150	150	600	0
75th	2,600*	0	450	900	1,350	150
90th	2,600*	150	900	1,600	2,500	450
95th	2,600*	450	1,600	2,600*	2,750	900
99th	2,600*	2,600*	2,600*	2,600*	4,200	2,600*
Q3 - Q1	$2,450	$0	$450	$900	$1,200	$150
% of med.	272.2%	NA	300.0%	600.0%	200.0%	NA

Note: Distributions are derived utilizing weighted observations.
Number of observations = 1,553.
Asterisk (*) denotes point estimate of highest category.
NA denotes not applicable.

As can be observed, contributions from other relatives are zero or of trivial magnitude for the vast majority of students, with only 20 percent reporting receipt of any support from this source. Half of those reporting a positive amount receive only about $150, and fewer than a quarter receive $450 or more. This is, in short, a quantitatively very unimportant source of finance for the postsecondary schooling of the vast majority of students.

Technically, a student's selfsupport for schooling includes earnings, withdrawal of accumulated savings, and borrowing, either within or outside the family. However, because the "loan" component of parental and other support for schooling cannot be directly observed, it is more useful here to focus on nonloan selfsupport, although the substantive reality of loans (to the extent of the "true-loan" equivalent of subsidized loans) as a cost ultimately borne by the student should be kept in mind.

The remarkable observation with reference to the nonloan component of student

selfsupport is the extremely small amounts reported. Thus, zero summer earnings are reported for 35 percent of students, and more than 40 percent report zero earnings during the school year. For 20 percent zero earnings are reported for the entire year. With reference to summer earnings, half of all students report $150 or less, 75 percent $450 or less, and 90 percent $900 or less. Thus, only 10 percent of students relie on summer earnings to any substantial extent as a source of financial support for postsecondary schooling. In the case of school-year earnings, 25 percent report amounts of $900 or above, and between five and 10 percent report $2,600 or more. For total (summer and school-year) earnings, half report $600 or less, 75 percent $1,350 or less, and 95 percent $2,500 or less.

If student earnings provide only modest support for postsecondary schooling, accumulated student savings are a virtually trivial source of finance. Thus, more than 60 percent of students are reported to cover no postsecondary expenses from past savings, 90 percent report $450 or less, and even the 95th percentile is only $900.

As reported in Table 3.24, the correlations between these various components and student and family support for schooling are generally extremely small in absolute value. Only in the case of the earnings and child's savings variables do these correlations exceed 0.2. Not surprisingly, the correlations between support from the child's savings and summer/total earnings is 0.26, probably reflecting a significant positive correlation between earnings over time. The greater importance of school-year as opposed to summer earnings in the total is reflected in the relative correlations, 0.85 versus 0.7.

Table 3.25 presents correlations between the student/family support variables and the various measures of income, wealth, loanable funds, postsecondary expenditure and external support. As would be expected, the correlations between income (however defined) and actual parental contributions (APC) are reasonably high, ~ 0.32. Positive correlations are also observed between income and the child-earnings (espe-

Table 3.24
Correlations Between Sources of Student and Family Support for Schooling

	APC	RCC	SUME	SCHE	TE	CSAV
APC	1.000	0.032	0.048	-0.019	-0.043	0.059
RCC		1.000	0.083	0.029	0.066	0.020
SUME			1.000	0.211	0.696	0.262
SCHE				1.000	0.849	0.160
TE					1.000	0.260
CSAV						1.000

Note: Correlations are derived utilizing unweighted observations.
Number of observations = 1,553.

cially summer and total) and child-savings variables, ~ 0.09. Parental contributions and support from the child's savings are also positive correlated with wealth (~ 0.23 and ~ 0.14, respectively) and with total/annualized loanable funds (0.27 and 0.14, respectively).

With reference to postsecondary expenditures, the parental contribution correlations are reasonably high (0.34 in the case of total expenditure). While summer earnings are positively correlated with expenditure, school-year earnings exhibit negative correlations (especially with schooling expenditure, -0.09). Support from the child's savings is positively correlated (0.11) with schooling expenditure.

Turning to the relationships between student/family and external sources of support, total loans are positively correlated with the parents' contribution (0.15), summer earnings (0.08) and support from the child's savings (0.11). In contrast, grants are negatively correlated with the parental contribution (-0.14 in the case of Federal grants, -0.07 nonFederal, and -0.14 total). No significant relationships are observed between the child-earnings/savings variables and external support.

4. Net Postsecondary Schooling Costs

The foregoing data concerning postsecondary schooling costs and sources of funds can be combined to provide evidence on the net costs associated with a year of postsecon-

Table 3.25
Correlations Between Student/Family Support for Schooling and Other Financial Variables

	APC	RCC	SUME	SCHE	TE	CSAV
Y	0.311	0.077	0.094	0.056	0.092	0.099
AY	0.320	0.070	0.089	0.049	0.084	0.099
PAWAY	0.329	0.065	0.084	0.033	0.070	0.089
PCAWAY	0.334	0.061	0.084	0.027	0.065	0.103
PLCAWAY	0.334	0.060	0.084	0.026	0.065	0.102
PCWAY	0.329	0.066	0.082	0.030	0.067	0.086
PLCPWAY	0.334	0.062	0.081	0.023	0.061	0.098
W	0.214	0.040	0.059	-0.004	0.029	0.142
PCW	0.237	0.047	0.060	-0.007	0.027	0.140
PLCW	0.240	0.049	0.059	-0.010	0.024	0.139
AW	0.214	0.041	0.042	-0.026	0.004	0.144
S	0.318	0.040	0.078	0.004	0.045	0.027
LF(ALF)	0.271	0.047	0.057	-0.023	0.014	0.137
LIVEXP	0.271	0.047	0.109	-0.019	0.045	0.037
SCHEXP	0.291	0.063	0.106	-0.087	-0.007	0.114
PSEXP	0.342	0.067	0.131	-0.063	0.024	0.091
TL	0.148	0.042	0.084	-0.051	0.008	0.112
FG	-0.139	-0.024	-0.003	-0.008	-0.007	-0.022
OG	-0.071	0.015	0.015	-0.035	-0.017	0.020
TG	-0.135	-0.006	0.007	-0.027	-0.016	-0.001

Note: Correlations are derived utilizing unweighted observations. Number of observations = 1,553.

dary schooling. First, however, it is necessary to address the issue of the "true" cost of schooling to the individual and family.

It is conventional in higher education circles to define college cots as the sum of tuition and fees (here, SCHEXP), on the one hand, and living expenses (LIVEXP), on the other, and this convention has been followed in the derivation of "total postsecondary expenditures" (PSEXP). However, while living expenses must obviously be paid, these

are, in general, costs which would be incurred whether an individual were in school or not. Moreover, because room and board costs of most public and of many private colleges are highly subsidized,[7] living expenses as a student are not uncommonly less than the expenses which an individual would incur were he not to be a student.[8] Thus, living expenses cannot be considered a "cost" of schooling in any meaningful or legitimate economic sense.[9] Nonetheless, as a gesture to convention we first develop what we characterize as a series of "nominal net cost" estimates, utilizing total postsecondary expenditure as the measure of the gross cost. This is followed by an analysis of economically defensible measures of "true net cost," in which schooling expenditures alone (excluding living expenses) are recognized as real costs to the student of his schooling.

Three alternative nominal net cost measures are derived. The first can be considered a measure of the nominal net cost to the family, including parents, the student and other relatives, and is obtained by deducting total grants from total postsecondary expenditure, resulting in a measure denoted NNFC (= PSEXP - TG). This measure will incorporate a possibly substantial upward bias in that it fails to deduct from gross costs the subsidy element of highly subsidized student loans, estimated, as noted above, to equal approximately 50 percent of a nominal loan.

---

[7]It might be objected that such "auxilliary enterprises" as dormitories and food services are required to be selfsupporting even in public colleges and universities. However, by comparison to other providers of housing and of food services, these enterprises are highly subsidized nonetheless. Thus, these facilities, at both public and private institutions, are financed through governmentally-guaranteed borrowing, interest on which is exempt from state and Federal income taxes, their sales are exempt from sales taxes, their net income is exempt from state and Federal income taxes, and many of the inputs (including administrative overhead) are incorporated in directly subsidized budgets.

[8]This is especially the case when ancillary subsidies to students (by comparison to nonstudents) are considered. Thus, health care services provided by colleges and universities are commonly highly subsidized, students (but not nonstudents) continue to be eligible for health insurance through the employer-provided plans of their parents, both the student and the parent are permitted to claim the student as a dependent for purposes of Federal and state income taxes, a student's implicit earnings (invested in human capital) are not subject to income taxation, *ad nauseum*.

[9]Of course, while living expenses cannot be considered a true cost of schooling, it is necessary to recognize foregone earnings as a legitimate schooling cost. Ironically, in light of the conventional treatment of living expenses, the true economic cost of schooling is in fact higher than appears on the basis of the conventional calculation.

Deducting parents' and relatives' contributions from nominal net family cost, the second nominal net cost variable represents a rough measure of the cost to the student, denoted NNSC (= PSEXP - TG - APC - RCC). It incorporates a downward bias in that some part of the deducted parents' and relatives' support may in fact be repayable loans rather than gifts. However, it also incorporates the upward bias present in the estimate of net cost to the family, i.e., the subsidy element of loans.

Finally, the third measure, nominal net residual cost, NNRC (= PSEXP - TG - APC - RCC - TL - TE - CSAV) is offered as a basis for assessing the internal consistency and reliability of the underlying data, since in principle this residual should be zero or negative as all sources of funds have ostensibly been captured.

The distributions of these alternative measures of nominal net cost are presented in Table 3.26. For the median family nominal net cost (NNFC), equal to gross cost (including living expenses) less external grants, is $2,555. However, for more than five percent of families this cost is negative, and for more than one-fourth nominal net cost is $750 or less. On the other hand, 25 percent of families confront nominal net costs of $4,250 or more, and for 10 percent this measure of family cost is over $6,000.

Nominal net cost to the student (NNSC), equal to nominal net cost to the family less parental and other relatives' contributions, i.e., treating these as nonrepayable gifts to the student, is substantially lower, with a median net student cost of $1,350. For more than 25 percent of students nominal net cost is negative, while 25 percent confront net costs of about $3,000 or more, and 10 percent face costs greater than $4,500. The latter two figures, however, are probably significantly upward biased as a result of the truncation of individual sources of support (especially parental contributions) at $2,600. In any event, it is clear that a significant fraction (more than one-fourth) of students incur zero or only trivial net costs on account of schooling, even when living expenses are considered a component of schooling cost.

Nominal net residual costs (NNRC), equal to nominal net cost to the student less

Table 3.26
Nominal and True Net Costs: Family, Student and Residual

	NNFC	NNSC	NNRC	TNFC	TNSC	TNRC
Mean	$2,828	$1,578	$26	$1,124	$-126	$-1,677
Std. dev.	2,564	2,334	2,462	1,719	1,656	2,014
Coef. var.	90.6%	147.9%	9,312.1%	152.9%	NA	NA
Percentiles						
1st	$-2,000	$-3,250	$-6,795	$-2,850	$-4,450	$-8,400
5th	-350	-1,850	-3,900	-1,300	-2,700	-5,200
10th	250	-850	-2,750	-645	-2,000	-4,150
25th	750	-50	-1,250	250	-1,100	-2,750
50th	2,555	1,350	-100	750	-150	-1,450
75th	4,250	2,950	1,350	1,650	600	-350
90th	6,050	4,600	2,850	3,000	2,100	400
95th	7,500	5,900	4,000	5,000	2,500	1,200
99th	10,500	8,000	6,500	6,550	4,400	3,000
Q3 - Q1	$3,500	$3,000	$2,600	$1,400	$1,700	$2,400
% of med.	137.0%	222.2%	NA	186.7%	NA	NA

Note: Distributions are derived utilizing weighted observations.
Number of observations = 1,554.
NA denotes not applicable.

loans from external sources and support from the student's own earnings and savings, is negative for more than one-half of all students. Interpretively, after paying all costs, including living expenses, 50 percent of students enjoy a financial surplus, available for savings or for "extraordinary" consumption. While net residual costs are estimated to exceed $1,350 for 25 percent of students and to exceed $2,850 for 10 percent, these positive differences between nominal costs and revenues are probably accounted for by the truncation of individual sources of funds at $2,600, although there are undoubtedly some students for whom anticipated revenues in the Fall of the school year are indeed less than anticipated expenses, with the residual to be met by whatever means possible (e.g., additional grants, parental contributions and borrowing) when the need arises.

As has been discussed, no economic meaning can be attached to the nominal net cost measures which have just been presented. Thus, three parallel "true-net-

schooling-cost" measures are developed, using schooling expenses alone (SCHEXP), exclusive of living expenses, as the measure of true schooling cost. The first of these measures is true net cost to the family (TNFC = SCHEXP - TG), the second is true net cost to the student (TNSC = SCHEXP - TG - APC - RCC), and the third is true net residual cost (TNRC = SCHEXP - TG - APC - RCC - TL - TE - CSAV). These measures will incorporate the respective biases discussed with reference to the corresponding measures of nominal net cost. In this case, true net residual cost (TNRC) will indicate the residual amount (negative) available to the student to cover any living expenses not met directly by the parents.

The distributions of the alternative measures of true net cost are also portrayed in Table 3.26. In contrast to nominal net family cost (NNFC), true net family cost (TNFC) is trivial or negative for one-quarter of all families and is $750 or less for more than one-half of all families. On the other hand, 25 percent of families confront true net costs of $1,650 or more, and for more than 10 percent of families this measure of cost exceeds $3,000.

True net cost to the student (TNSC), equal to true net cost to the family less parental and other relatives' support, is negative for more than 50 percent of students and is $600 or less for 75 percent of students. For 10 percent this net student cost is $2,100 or greater, but most of these cases are probably the spurious result of the truncation of individual sources of funds in the underlying data.

True net residual cost (TNRC), equal to schooling expenses less all sources of support, including external loans and student earnings and savings, provides an indication of amounts available (negative) for consumption and savings. The median of $-1,450 indicates that one-half of all students have at least this amount available to meet living expenses, to engage in extraordinary consumption or to save. For 10 percent of students the available amount is greater than $4,000, and it is $2,750 or greater for 25 percent of students. Moreover, notwithstanding limitations of data

(truncation), the residual net cost is negative for more than three-quarters of students, and the 90th percentile is only $400.

Correlations between the six net cost measures (nominal versus true, family versus student versus residual) are presented in Table 3.27. While the nominal family and student net costs are highly correlated (0.91), a substantially lower correlation (0.8) is observed between the true family and student net costs. Correlations between corresponding true/nominal pairs of the various net cost measures (family, student, residual), in the range of 0.75, suggest that only slightly more than half of the variance in true net cost is associated with variations in nominal net cost, and *vice versa*.

Table 3.27
Correlations Between Nominal and True Net Cost Measures

	NNFC	NNSC	NNRC	TNFC	TNSC	TNRC
NNFC	1.000	0.911	0.716	0.779	0.540	0.249
NNSC		1.000	0.813	0.690	0.715	0.406
NNRC			1.000	0.527	0.584	0.745
TNFC				1.000	0.798	0.488
TNSC					1.000	0.694
TNRC						1.000

Note: Correlations are derived utilizing unweighted observations.
Number of observations = 1,554.

Correlations between the alternative net cost variables and the various measures of income, wealth, loanable funds, postsecondary expenditure, external- and student/family-support variables are presented in Table 3.28. As would be expected, nominal net family cost is positively correlated with income (regardless of the income variable employed), although the magnitude of the correlation (~ 0.22) is relatively small, with variations in income accounting for less than five percent of the variance in cost. Even lower correlations (~ 0.1) are observed between nominal net student cost and income, while nominal net residual costs are entirely uncorrelated with income. Interestingly, the correlations between true net family cost and income (~

0.3) are about 50 percent higher than the correlations between nominal net family cost and income. However, this is entirely offset by variations in parental contributions, resulting in correlations between true net student cost and income which are about the same as those observed between nominal net student cost and income. True net residual cost is marginally negatively correlated with income. In general, the correlations between wealth, on the one hand, and nominal/true net family/student cost are somewhat lower than those between wealth and the cost variables. Apart from current savings (determined by income and wealth), the same is true of the relationship between loanable funds and costs.

While nominal net costs are highly correlated with total postsecondary expenditure, this is much less true of true net costs, with the correlations declining from 0.89 to 0.55 in the case of family costs, from 0.82 to 0.35 in the case of student costs, and from 0.64 to 0.1 in the case of residual costs. Reflecting the "residual" role of external (nonfamily) loans, the correlations between nominal net family/student costs and loans are significantly positive (0.37 and 0.33, respectively), while a very low (-0.05) correlation is observed between nominal net residual costs and loans. As would be expected, grants (especially Federal grants) are highly negatively correlated with net costs, particularly in the case of true net costs, although in absolute value the correlations are higher with family cost than with student costs (suggesting that variations in grants are offset, to some degree, for the student by opposing variations in parental contributions). Finally, parental contributions are quite highly correlated with nominal and true net family cost but are virtually uncorrelated with nominal net student cost. True net student cost is quite negatively correlated with parental contributions.

5. Loanable Funds and the Capacity of Parents to Underwrite Postsecondary Education

The final issue addressed in this chapter concerns the relationship between annualized loanable funds of parents and the actual schooling costs of their children. As

Table 3.28
Correlations Between Nominal/True Net Cost Measures and Other Financial Variables

	NNFC	NNSC	NNRC	TNFC	TNSC	TNRC
Y	0.213	0.091	-0.026	0.278	0.084	-0.070
AY	0.213	0.089	-0.020	0.285	0.088	-0.056
PAWAY	0.220	0.094	-0.007	0.297	0.096	-0.040
PCAWAY	0.228	0.101	-0.001	0.310	0.107	-0.031
PLCAWAY	0.229	0.102	0.001	0.312	0.110	-0.029
PCWAY	0.221	0.095	-0.007	0.294	0.093	-0.044
PLCPWAY	0.231	0.104	0.002	0.310	0.107	-0.032
W	0.150	0.069	0.014	0.206	0.076	-0.001
PCW	0.168	0.078	0.013	0.220	0.075	-0.013
PLCW	0.171	0.080	0.016	0.224	0.078	-0.011
AW	0.149	0.068	0.026	0.202	0.072	0.011
S	0.224	0.107	0.024	0.284	0.095	-0.019
LF(ALF)	0.190	0.088	0.029	0.252	0.088	0.006
LIVEXP	0.762	0.714	0.578	0.187	0.021	-0.113
SCHEXP	0.699	0.634	0.463	0.722	0.557	0.278
PSEXP	0.890	0.822	0.635	0.547	0.345	0.096
TL	0.366	0.333	-0.052	0.327	0.240	-0.257
FG	-0.196	-0.153	-0.127	-0.435	-0.360	-0.271
OG	-0.081	-0.062	-0.080	-0.276	-0.246	-0.226
TG	-0.178	-0.136	-0.133	-0.454	-0.387	-0.317
APC	0.416	0.036	-0.010	0.368	-0.219	-0.234
RCC	0.072	-0.104	-0.144	0.063	-0.195	-0.213
SUME	0.131	0.109	-0.244	0.093	0.047	-0.387
SCHE	-0.052	-0.024	-0.366	-0.061	-0.015	-0.431
TE	0.032	0.042	-0.401	0.005	0.014	-0.526
CSAV	0.094	0.075	-0.247	0.107	0.070	-0.332

Note: Correlations are derived utilizing unweighted observations.
Number of observations = 1,553.

discussed previously, it is necessary to distinguish between the conventionally recognized concept of schooling cost, combining schooling expenses and living costs (PSEXP = SCHEXP + LIVEXP), and true schooling costs, restricted to tuition, fees and other similar expenses (SCHEXP). Since the living expenses of the child were presumably met as part of the family's consumption budget prior to the child's entry into college, the only net additional cost necessarily imposed on the family is the more narrowly defined schooling expenditure, underlying the true net cost measures already

developed. We consider, first, the *absolute* excess of loanable funds over postecondary costs alternatively defined, and then demonstrate the robustness of the conclusions by assessing the *relative* unused financing capacities of parents.

5.1. Absolute Residual Annualized Loanable Funds

Consider, first, the relationship of annualized loanable funds to conventional or nominal schooling costs (PSEXP). Two questions can be raised: First, if the students received no external grant support, to what degree could parents finance gross postsecondary schooling costs out of annualized loanable funds? This question can be answered by examining what will be characterized as "nominal residual annualized loanable funds gross," NRALFG (= ALF - PSEXP), which will measure the "unused" underwriting capacity of the parents (considering the advance from the parent to the child to be a repayable loan). The second question recognizes the existence of external grant suppor and asks, to what extent are the parents' annualized loanable funds sufficient to finance the net-of-external-grant costs of schooling? This question is addressed by examining what will be characterized as "nominal residual annualized loanable funds net," NRALFN (= ALF - NNFC), measuring the "unused" underwriting capacity of parents given the existing system of external grants.

The distributions of the gross and net estimates of nominal residual annualized loanable funds are presented in Table 3.29. As can be observed, even if it were necessary for parents to advance to their children the full amount of gross postsecondary costs (including living expenses), the median family would have residual, unused, loanable funds of more than $8,000 per year (in each of the four years of the schooling period), and the upper quartile family would have unused capacity of almost $19,000. Even at the lower quartile unused capacity of more than $1,300 per year is observed. Only between the lower quartile and the lower decile would annualized loanable funds be fully exhausted, with the lower-decile family's ALF "overdrawn" by almost $3,000, and at the fifth percentile the family's financing capacity would be overdrawn by

almost $5,000.

Table 3.29
Distributions of Residual Annualized Loanable Funds

	NRALFG	NRALFN	TRALFG	TRALFN
Mean	$12,677	$13,497	$14,381	$15,201
Std. dev.	16,982	16,678	16,940	16,660
Coef. var.	134.0%	123.6%	117.8%	109.6%
Percentiles				
1st	$-9,151	$-7,043	$-5,456	$-3,462
5th	-4,921	-3,170	-2,509	-1,001
10th	-2,680	-1,300	-750	377
25th	1,353	2,444	3,028	4,400
50th	8,341	9,259	10,029	10,833
75th	18,745	19,256	20,492	20,799
90th	31,109	31,375	32,942	33,265
95th	46,031	46,597	48,531	48,814
99th	78,268	78,268	82,393	82,523
Q3 - Q1	$17,392	$16,812	$17,410	$16,399
% of med.	208.5%	181.6%	173.6%	151.4%

Note: Distributions are derived utilizing weighted observations.
Number of observations = 1,554.

Recognizing the existing distribution of grants, i.e., assessing the excess of annualized loanable funds over nominal costs net or external grant assistance, as reflected in NRALFN, the median family's unused financing capacity is estimated to rise by almost $1,000, to $9,259, and the lower quartile rises from $1,353 to $2,444. The "overdraft" on the lower-decile family's underwriting capacity declines from $2,680 to $1,300. Thus, with the existing system of grant support, substantially fewer than 25 percent of families would face financial demands greater than annualized loanable funds, even if the entire cost of postsecondary schooling (inclusive of living expenses) net of grant aid were to be met by advances from the parents to the child. Perhaps even more importantly, this would continue to be true for the vast majority of families even if grant aid were eliminated and postsecondary schooling costs were increased substantially.

Because they utilize total schooling costs, including living expenses, while these living expenses were met by the parents as part of current consumption prior to the child's college entry, the foregoing estimates of nominal residual annualized loanable funds have little economic meaning or significance. More appropriate measures are provided by "true" residual annualized loanable funds, recognizing only direct schooling expenses as a gross cost. Again, two variants of this true loanable funds residual can be derived. First, if there were no external grants, the parents' "unused" underwriting capacity would be indicated by the difference between annualized loanable funds and schooling expenses, giving "true residual annualized loanable funds gross," TRALFG (= ALF - SCHEXP). Second, recognizing the existence of grants, one can examine the unused underwriting capacity of the parents were they to finance the child's net schooling costs, giving "true residual annualized loanable funds net," TRALFN (= ALF - TNFC).

The distributions of the true residual annualized loanable funds measures, gross and net, are also presented in Table 3.29. The true gross unutilized underwriting capacity of the parents (considering only schooling costs and ignoring grants) is estimated for the median parent to be $10,029, i.e., even if grants were eliminated, the median family would be able to fully finance over $10,000 per year *more than* the actual cost of its child's schooling. At the 75th percentile this unused capacity exceeds $20,000, and even the lower-quartile family is found to have unutilized capacity of $3,082. Only in the vicinity of the lower decile is the family's financial capacity estimated to become exhausted by true gross schooling costs, with the lower-decile family confronting an overdraft of $750.

Recognizing the existing pattern of grant aid, even the lower decile family enjoys a surplus of annualized loanable funds over true net family cost, of $377. And while the fifth-percentile family would overdraw is available funds, a deficit of only $1,001 is estimated (and recall that this assumes no contribution by the child to meeting the

costs of schooling, as through school-year or summer work).

The correlations between the various residual annualized loanable funds measures indicate that they contain essentially the same information, apart from the specific metrics (absolute magnitudes) involved. This indicates, effectively, that the results are being driven by annualized loanable funds, and that the schooling cost measures simply serve to determine the magnitude of the residual.

Table 3.30
Correlations Between Residual Annualized Loanable Funds Measures

	NRALFG	NRALFN	TRALFG	TRALFN
NRALFG	1.000	0.998	0.995	0.991
NRALFN		1.000	0.994	0.995
TRALFG			1.000	0.997
TRALFN				1.000

Note: Correlations are derived utilizing unweighted observations.
Number of observations = 1,554.

Not surprisingly, residual annualized loanable funds are highly positively correlated with income (however defined), as indicated by Table 3.31. Because wealth is the primary determinant of loanable funds, while loanable funds are the primary determinant of *residual* annualized loanable funds, the correlations between the residual loanable funds measures, on the one hand, and wealth and loanable funds, on the other, are extremely high. While nominal residual annualized loanable funds are slightly negatively correlated with schooling costs, true residual annualized loanable funds are effectively uncorrelated with postsecondary expenditures. Although loans bear no significant relationship to residual loanable funds, grants (and especially non-Federal grants) exhibit significant negative correlations, indicating that grants do compensate to some degree for the absence of parental underwriting capacity. Of the family/student contributions to the financing of postsecondary education, only parental contributions and contributions from the child's savings are at all significantly

correlated, positively, with residual annualized loanable funds. Of the various net cost measures, only true net family cost is significantly, again positively, correlated with residual loanable funds, suggesting that true net family costs may be determined in part with consideration of consequences for used parental underwriting capacity.

5.2. Relative Residual Annualized Loanable Funds

Of all families of students, annualized loanable funds are zero or negative for 5.7 percent. For these families, loanable funds provide no basis on which to underwrite children's schooling. However, for the other 94.3 percent the preceeding conclusions can be made even more graphic by assessing relative residual annualized loanable funds, i.e., the unutilized residual as a proportion of total annualized loanable funds (with the utilized proportion equal to one minus the unutilized proportion). The distributions of the various residual annualized loanable funds measures relative to total annualized loanable funds (the parents' total underwriting capacity) are presented in Table 3.32.

A perusal of Table 3.32 will indicate that, even if our derivation of annualized loanable funds results in a substantially inflated estimate of parents' underwriting capacities, relatively few parents would even approach full utilization of that capacity, even if costs are defined to include living expenses and if grants were eliminated. Thus, even the highest estimate of costs results in median unutilized capacity of in excess of 75 percent of annualized loanable funds, i.e., costs would have to be four times greater than we have estimated or "true" annualized loanable funds would have to be one-fourth as great as our estimate before gross costs (including living expenses and ignoring grants) would equal total annualized loanable funds. Considering only schooling expenses (i.e., excluding living expenses, as costs which would have to be borne in any event and which were previously covered by the family) and taking into account grants, the median family is found to have unused underwriting capacity equal to almost 94 percent of its annualized loanable funds.

Table 3.31
Correlations Between Residual Annualized Loanable Funds Measures and Other Financial Variables

	NRALFG	NRALFN	TRALFG	TRALFN
Y	0.541	0.533	0.548	0.539
AY	0.634	0.626	0.640	0.632
PAWAY	0.697	0.690	0.704	0.696
PCAWAY	0.750	0.743	0.757	0.749
PLCAWAY	0.750	0.743	0.757	0.749
PCWAY	0.676	0.670	0.684	0.676
PLCPWAY	0.725	0.718	0.732	0.725
W	0.948	0.950	0.954	0.955
PCW	0.945	0.946	0.952	0.953
PLCW	0.938	0.940	0.945	0.946
AW	0.964	0.967	0.970	0.972
S	0.463	0.454	0.471	0.461
LF(ALF)	0.988	0.988	0.996	0.995
LIVEXP	-0.092	-0.080	0.004	0.019
SCHEXP	-0.042	-0.021	-0.008	0.013
PSEXP	-0.082	-0.062	-0.002	0.019
TL	0.014	0.015	0.037	0.039
FG	-0.207	-0.152	-0.194	-0.139
OG	-0.241	-0.189	-0.227	-0.174
TG	-0.285	-0.217	-0.268	-0.199
APC	0.217	0.212	0.245	0.239
RCC	0.036	0.036	0.041	0.041
SUME	0.037	0.038	0.048	0.049
SCHE	-0.013	-0.015	-0.015	-0.017
TE	0.010	0.010	0.015	0.014
CSAV	0.123	0.125	0.127	0.129
NNFC	0.051	0.039	0.125	0.114
NNSC	-0.040	-0.051	0.029	0.019
NNRC	-0.070	-0.081	-0.014	-0.024
TNFC	0.167	0.137	0.186	0.156
TNSC	0.035	0.007	0.037	0.009
TNRC	-0.009	-0.033	-0.020	-0.044

Note: Correlations are derived utilizing unweighted observations. Number of observations = 1,554.

There would, of course, be families for which costs, however measured, would exceed annualized loanable funds. However, even in the "worst case" (ignoring grants and including living expenses as a cost), this is true of only between 10 and 25 percent of all families, with the 25th percentile family having unused capacity equal to almost

Table 3.32
Distributions of Relative Residual Annualized Loanable Funds

	RNRALFG	RNRALFN	RTRALFG	RTRALFN
Mean	-0.312	0.610	0.253	1.175
Std. dev.	8.261	4.412	5.061	5.740
Coef. var.	NA	723.4%	1,997.5%	483.4%
Percentiles				
1st	-20.957	-9.303	-13.353	-2.475
5th	-2.529	-1.115	-0.737	0.188
10th	-0.681	0.009	0.130	0.634
25th	0.435	0.585	0.703	0.839
50th	0.756	0.823	0.878	0.937
75th	0.906	0.943	0.950	0.987
90th	0.965	0.993	0.978	1.069
95th	0.985	1.056	0.989	1.227
99th	0.997	3.243	1.000	6.569
Q3 - Q1	0.471	0.358	0.246	0.148
% of med.	62.3%	43.5%	28.0%	15.8%

Note: Distributions are derived utilizing weighted observations.
Number of observations = 1,453.

44 percent of annualized loanable funds, while the lower decile family would face an overdraft equal to 68 percent of it capacity. When true costs (exclusive of living expenses) and the presence of grants are recognized, fewer than five percent of all families would find annualized loanable funds fully exhausted by net schooling costs, and the fifth percentile family would have unutilized capacity equal to almost 19 percent of annualized loanable funds.

This picture is only marginally altered when the one seriously restrictive, implicit qualification in the derivation of annualized loanable funds is recognized. In that derivation, it is assumed that the parent, at any one time, has outstanding advances for the financing of schooling to only one child. If, in fact, child spacing is such that each child is able to fully requite his financial obligations to the parents before the next child reaches the stage of postsecondary attendance, then this implicit assumption is justified. However, in many families the ages of children will be sufficiently

close that the parents may be required to underwrite the schooling of several children simultaneously, or, at least, to underwrite the schooling of one child prior to the full amortization of the debts to the parents of older children.

If it were possible to borrow against future earnings (without other collateral), which is more feasible for "established" parents than for their "unestablished" children, then our derivation of annualized loanable funds would have seriously underestimated actual parental underwriting capacity, and the possibility of outstanding loans to multiple children would not require significant qualifications to the foregoing conclusions. However, even in the absence of such "perfect" capital markets, multiple children require only minor qualifications to our conclusions. Consider the distribution of relative true residual annualized loanable funds gross (recognizing only schooling costs, not living expenses, but assuming an absence of grants), as portrayed in Table 3.32 Even after fully meeting one child's gross schooling expenses, the median parent would have left 87.8 percent of his underwriting capacity; viewed differently, only if this parent were simultaneously underwriting the schooling of octuplets (or, less restrictively, of eight siblings) would his financing capacity be fully exhausted. For the 75th percentile family, only the full underwriting of 20 children simultaneously would exhaust annualized loanable funds, and even at the 25th percentile level the parents could simultaneously underwrite the schooling of triplets without exhausting their underwriting capacity. Of course, the tenth percentile family would be capable of underwriting the schooling of only one child at a time; however, it would have some residual capacity which, combined with the repayment of advances made to older children, would permit the at-least-partial underwriting of younger children. And, in any even, the conclusion remains that, except significantly below the lower quartile, parental resources are sufficient to permit the financing of schooling, without regard to the number and spacing of children. Below the lower quartile there is indeed a significant limitation on the financial capacities of parents,

but this is the case whether or not one introduces the qualifications associated with numbers of children and the timing of their births.

In summary, loanable funds of the parents would be more than adequate to permit the underwriting of total schooling costs for substantially more than 75 percentd of all students, even if grants were eliminated. In light of the fact that more than one half of all students are reported to receive grants, it is clear that for many recipients these grants (not to mention highly subsidized loans) are not required in order to permit the student to meet the financial demands of schooling, although the grants may indeed motivate school attendance (by reducing its costs, or raising its net benefits, relative to the alternatives).

Chapter 4

DIFFERENTIAL DISTRIBUTIONAL IMPLICATIONS OF THE ALTERNATIVE ACCOUNTING SYSTEMS

As discussed in Chapter 2, in which the alternative accounting systems were developed conceptually, the important implications of different accounting systems relate not to differences in the *level* of assessed (in this case parental) financial capacity, but rather to systematic differences in the *distribution* of assessed financial capacities. Differences in the distribution of the relevant population over assessed financial capacity, i.e., marginal distributions, have been examined in Chapter 3. Here, attention focuses on differentials in the central tendancies of conditional distributions, i.e., on differences in mean financial capacities of identifiable subgroups of the population. Thus, this analysis will indicate which groups of the population would gain/lose *relative to other groups* as the result of the replacement of one measure of financial capacity by another.

Differentials in six socioeconomic/demographic dimensions are examined (in each case independently):

(1) **Comprehensive (AY) Income Quartiles**- Because this is the most complete measure of actual financial capacity, differentials across comprehensive income quartiles will indicate the incidence implications of each of the accounting systems in the dimension most commonly employed in the analysis of distributional issues.

(2) **Race/Ethnicity**- Differential implications of alternative actual/potential public policies for various racial and ethnic groups, especially those conceived to have suffered past/present discrimination, has represented a continuing focus of political and social concern.

(3) **Family Structure**- Especially in light of changes in "traditional" patterns of behavior, and especially the secular rise in the proportion of children in female-headed households, implications of social welfare programs in this dimension are of obvious interest and importance.

(4) **Parental Education**- Because observed, realized income (even comprehensive current income, AY) can be argued not to adequately reflect permanent (nontransitory) economic welfare over the lifecycle, parental education (human capital) can be viewed as providing a possibly superior indication of true financial capacity, at least on average.

(5) **Parental Employment Status**- As discussed previously, differences in the treatment of exploited and unexploited financial capacities by conventional means-tested entitlement programs may have serious consequences for horizontal equity and for behavior (the degree of exploitation of earnings capacity). Differential treatments of working and nonworking parents are of particular significance from the vantage point of both equity and efficiency.

(6) **Home Ownership Status**- The apparent discrimination of conventional measures of financial capacity in favor of home owners, by comparison to renters, will have potentially significant equity implications, directly as it affects renters relative to owners and indirectly as it affects those groups the access of which to this form of wealth holding has been constrained by discrimination in housing and related financial markets. Moreover, this discrimination reinforces what may be a highly inefficient set of incentives in favor of particular forms of wealth holding, with adverse consequences for the economy at large.

Other dimensions of distributional analysis obviously could be identified. However, with reference to the issues associated with parental capacity to finance postsecondary education and in light of the information available from the High School and Beyond survey file, these represent the most relevant and significant.

1. The Analytical Technique Employed in the Distributional Analysis

The analytical technique utilized to assess these differential incidence implications of the alternative accounting systems can be very simply and briefly described. Assume that in some given dimension (e.g., family structure as reflected in presence/absence of parents) the population can be decomposed into n distinct classes (e.g., two-parent families, families with mother present and father absent, families with father present and mother absent). For each family j (in a sample of m families) a vector of variables $X_j = [x_{1j}, \cdots x_{ij}, \cdots x_{nj}]$ can be formed, any element i of which will equal unity if and only if the family is in the ith category in the socioeconomic/demographic dimension under analysis; all other elements of this vector are equal to zero. One of the classes, arbitrarilly denoted the *first*, is specified as the *reference class*. Given the sample of observations (families), an ordinary-least-squares (OLS) equation of the following general form can be estimated for each measure Y^q ($q = 1, \ldots, Q$) of financial capacity:[1]

$$Y_j^q = \beta_1^q + \sum_{i=2}^{n} \beta_i^q x_{i,j} + e_j^q$$

where Y_j^q is the qth measure of financial capacity for the jth family,

β_i^q is an estimated coefficient, and

e_j^q is a random error term with zero mean.

The *mean* value of the qth measure of financial capacity of families in the ith socioeconomic/demographic category is then

$$\begin{aligned} \hat{Y}_i^q &= \beta_1^q + \beta_i^q \quad \text{if } i \neq 1, \\ &= \beta_1^q \quad \text{if } i = 1. \end{aligned}$$

---

[1] While the focus here is on measures of financial capacity, the same technique will be employed to examine differential probabilities of receipt of grants and differential grant awards, conditional on receipt of a positive award. In other words, the analytical techniques described here are of general applicability to the analysis of intergroup differences.

More usefully, for present purposes, is the fact that the comparison of $\beta_i^{q_2}$ and $\beta_i^{q_1}$, for financial capacity measures q_2 and q_1 will indicate the gain (if positive) or loss (if negative), $G_i^{q_2 \cdot q_1}$,

$$G_i^{q_2 \cdot q_1} = \beta_i^{q_2} - \beta_i^{q_1},$$

for the mean family in the *i*th category *relative to the mean for the reference category* resulting from a replacement of the first by the second measure of financial capacity. These estimates of relative gain/loss (or the coefficients entering into their determination) provide the focus for the following distributional analysis.

2. Differential Implications of the Alternative Income and Wealth Measures

2.1. Differentials Across Comprehensive Income (AY) Quartiles

Estimated regression equations for the seven alternative total income measures, with dummy (0, 1) explanatory variables denoting quartiles of the distribution of the comprehensive measure of income (AY), are reported in Table 4.1. Corresponding regressions for the three alternative measures of wealth are provided by Table 4.2. The first (lowest) quartile of the AY income distribution is represented by the intercept of each equation. That the movement from the conventional current-money-income measure to the comprehensive income measure would be highly beneficial for lower income families is clearly revealed: By comparison to the lowest quartile, the second quartile's mean income differential would rise by about $1,600, the third quartile's mean by about $3,600, and the fourth quartile's mean by about $5,600. Thus, the substitution of comprehensive (AY) for conventional (Y) income in a means-tested program would, *ceteris paribus* (i.e., holding total program benefits constant) redistribute benefits to families with lower income. A similar but less dramatic pattern would be revealed by the substitution of the total income measure incorporating potential capital income conditional on actual wealth (PAWAY); this measure would result in one of the greatest relative distributions to lower income groups.

Table 4.1
Differential Incidence Equations:
Income as a Function of Comprehensive Income Quartiles

Quartile	Y	AY	PAWAY	PCAWAY	PLCAWAY	PCWAY	PLCPWAY
Intercept (1st)	9,101 (231)	10,195 (230)	10,268 (262)	16,502 (294)	16,852 (297)	10,499 (271)	17,249 (307)
2nd-1st	11,236 (334)	12,848 (333)	13,043 (379)	11,498 (425)	11,510 (429)	13,194 (391)	11,731 (443)
3rd-1st	20,631 (335)	24,232 (334)	24,974 (380)	22,913 (428)	22,913 (430)	25,244 (392)	23,208 (445)
4th-1st	43,961 (334)	49,586 (333)	50,601 (380)	47,689 (428)	47,637 (430)	51,540 (392)	48,597 (444)
R^2	0.772	0.813	0.777	0.713	0.708	0.772	0.703

Note: Estimates are based on unweighted observations.
Number of observations = 5,474.
Standard errors in parentheses.
Coefficients represent differentials between the indicated classes/groups and the intercept class/group.

By comparison to PAWAY, recognition of potential current labor income (i.e., employing PCAWAY, which incorporates a norm for current exploitation of earnings capacity) would be more beneficial to higher income groups, with the second quartile mean differential declining by about $1,500, the third quartile differential by almost $2,100, and the fourth (highest) quartile differential by about $2,900. The differential implications of the income measure recognizing a norm for lifecycle exploitation of earnings capacity (PLCAWAY) are virtually identical to those of the current earnings capacity expoitation measure (PCAWAY). In contrast, imposing a norm for savings behavior over the lifecycle, contingent on actual earnings, i.e., employing PCWAY, would result in the differentials most favorable to lower income groups, with the second quartile differential rising (relative to PAWAY) by $150, the third quartile differential by almost $300, and the fourth quartile differential by more than $900. While imposition of norms for both savings and earnings behavior over the lifecycle

Table 4.2
Differential Incidence Equations:
Wealth as a Function of Comprehensive Income Quartiles

Quartile	W	PCW	PLCW
Intercept (1st)	15,561 (1,611)	17,482 (1,565)	18,866 (1,571)
2nd-1st	19,716 (2,329)	20,980 (2,262)	21,555 (2,270)
3rd-1st	47,757 (2,336)	50,006 (2,269)	50,216 (2,277)
4th-1st	93,119 (2,334)	100,947 (2,267)	101,117 (2,275)
R^2	0.245	0.287	0.286

Note: Estimates are based on unweighted observations.
Number of observations = 5,474.
Standard errors in parentheses.
Coefficients represent differentials between the indicated classes/groups and the intercept class/group.

(PLCPWAY) would be relatively unfavorable from the vantage point of low income groups, they would still gain significantly by comparison to the conventional current money income measure (Y), with the second quartile differential (over the first) rising by about $500, the third quartile differential by approximately $2,600, and the fourth quartile differential by almost $4,600.

In short, by comparison to current practice (as reflected in current money income), each of the alternative accounting systems would serve to raise the assessed financial capacities of higher income groups relative to those of lower income groups. That the same is true of the potential measures of wealth by comparison to actual wealth, and hence that the foregoing interpretations of the income differentials are consistent with the findings for wealth, is clearly revealed by Table 4.2.

2.2. Differentials Associated With Race/Ethnicity

Estimated regression equations reflecting differentials in the alternative measures of income across groups defined by ethnicity and race are reported in Table 4.3. Corresponding regressions for the alternative wealth measures are provided by Table 4.4. Regardless of the income measure employed, all minority groups other than Asians and Pacific Islanders (one group) exhibit mean incomes substantially below that of whites (the intercept group). Thus, considering only the conventional current money income measure, mean black income is $12,300 less than that of whites, mean Hispanic income is $10,800 less, mean income of Native Americans is $7,800 less, and mean income of families with unreported race/ethnicity is $7,600 less (indicating that the unreported are disproportionately members of minority groups). While the Asian and Pacific Islands group is found to enjoy a higher mean income than whites, the differential ($2,100) is not statistically significant.

That the discrimination of the conventional current money income measure in favor of homeowners and against renters represents a *de facto* discrimination against members of minority groups is clearly revealed by the comparison of the Y and AY coefficients. Thus, the differential between black and white incomes rises by more than $2,800 as a result of a shift from Y to AY, that for Native Americans and for Hispanics rises by about $1,500, and that for families of unknown race/ethnicity rises by almost $1,400. On the other hand, the income "advantage" of the Asian group over whites would increase, but only by a statistically insignificant amount ($400).

Imposing a norm for capital income conditional on actual wealth, i.e., focusing on the PAWAY measure, by comparison to comprehensive current income (AY), differentials between white and minority incomes would rise even further, e.g., by $1,350 for blacks, by $800 for Hispanics, by $600 for Native Americans and by $1,200 for the unclassified. Again, by comparison to whites the Asian and Pacific group would be only marginally affected.

Table 4.3
Differential Incidence Equations:
Income as a Function of Race/Ethnicity

	Y	AY	PAWAY	PCAWAY	PLCAWAY	PCWAY	PLCPWAY
Intercept (White)	30,619 (286)	34,943 (312)	35,791 (325)	40,708 (318)	41,076 (319)	36,366 (333)	41,867 (327)
Native American	-7,816 (1,586)	-9,329 (1,732)	-9,937 (1,803)	-10,577 (1,764)	-10,569 (1,766)	-10,152 (1,844)	-10,832 (1,810)
Asian, Pac.Is.	2,132 (1,887)	2,510 (2,060)	2,438 (2,144)	2,221 (2,098)	2,269 (2,101)	3,768 (2,194)	3,725 (2,153)
Black	-12,324 (720)	-15,156 (786)	-16,505 (818)	-17,977 (800)	-18,195 (801)	-16,508 (837)	-18,292 (821)
Hispanic	-10,772 (808)	-12,311 (882)	-13,105 (918)	-13,854 (898)	-13,883 (899)	-13,338 (939)	-14,229 (922)
Missing	-7,610 (1,713)	-8,964 (1,870)	-10,158 (1,947)	-9,333 (1,905)	-9,144 (1,907)	-10,421 (1,991)	-9,391 (1,954)
R^2	0.074	0.088	0.095	0.112	0.113	0.093	0.111

Note: Estimates are based on unweighted observations.
Number of observations = 5,474.
Standard errors in parentheses.
Coefficients represent differentials between the indicated classes/groups and the intercept class/group.

Perhaps most significantly, imposing norms for parental labor force participation and earnings, comparing PCAWAY to PAWAY, would result in a further widening of the gap between whites and lower-income minorities. Thus, the black differential would increase by an additional $1,500 (to $18,000), that for Hispanics by more than $700 (to $13,900) and that for Native Americans by more than $600 (to $10,600). This finding constitutes clear evidence that relatively disadvantaged minorities more fully exploit their earnings capacities than do whites (or Asians and Pacific Islanders), contrary to many popular mythologies. That this is true over the lifecycle as well as currently is indicated by the fact that the differentials are marginally increased again (for blacks and Hispanics) when norms for lifecycle labor force participation and earnings are

Table 4.4
Differential Incidence Equations:
Wealth as a Function of Race/Ethnicity

	W	PCW	PLCW
Intercept (White)	65,201 (1,105)	69,990 (1,103)	71,797 (1,104)
Native American	-25,281 (6,124)	-27,072 (6,110)	-27,479 (6,117)
Asian, Pac.Is.	7,437 (7,284)	18,516 (7,267)	19,574 (7,275)
Black	-47,573 (2,778)	-47,595 (2,772)	-48,381 (2,775)
Hispanic	-31,090 (3,118)	-33,033 (3,110)	-33,970 (3,114)
Missing	-27,707 (6,612)	-29,893 (6,596)	-29,767 (6,604)
R^2	0.063	0.068	0.070

Note: Estimates are based on unweighted observations.
Number of observations = 5,474.
Standard errors in parentheses.
Coefficients represent differentials between the indicated classes/groups and the intercept class/group.

imposed.

That relatively disadvantaged minorities engage in savings behavior comparable to that of whites (again contrary to popular belief, as expressed by Banfield's reference to the "myopia of the poor")[2] is indicated by the fact that the differential between disadvantaged minorities and whites is not narrowed (and in fact widens marginally) when norms for lifecycle savings behavior (conditional on actual earnings) are imposed. This finding is corroborated by the observation that differentials between minority and white wealth remain constant or rise when the potential wealth

[2]Edward C. Banfield, *The Unheavenly City* (Boston: Little, Brown and Company, 1970).

measures replace the actual wealth measure. This is somewhat surprising, in light of the argument, mentioned previously, that discrimination in housing and related financial markets significantly reduces opportunities for profitable investment confronting minorities and hence constitutes a disincentive to save. Whatever disincentives are confronted clearly do not appear to reduce minority wealth, conditional on earnings. And, since a norm for wealth conditional on actual earnings does not narrow the minority-white income gap, simultaneous imposition of norms for lifecycle earnings and savings has results virtually identical to imposition of a norm for lifecycle earnings alone, resulting in effectively the highest discrepancies between minority and white incomes.

In summary, recognition of implicit income on owner occupied housing and imposition of norms for returns to wealth, for current and lifecycle labor force participation and earnings, and for lifecycle savings would serve only to widen the observed gaps between the incomes of whites and of disadvantaged minorities.

2.3. Differentials Associated With Family Structure

Differentials associated with differences in family structure, under the alternative accounting systems, are indicated by the regression estimates reported in Table 4.5 for income and Table 4.6 for wealth. As would be expected, incomes of female-headed households are less than one-half as great as those of households with two parents (the reference group), regardless of the accounting system employed. Similarly, "father-only" households exhibit lower incomes, generally on the order of 20 to 25 percent less than incomes of two-parent families.

Reflecting the lesser likelihood of home-ownership on the part of female-headed households, the income gap between mother-only and two-parent families would widen significantly, by more than $2,000 (from $17,300 to $19,400), as a result of a shift from the convention current money income measure (Y) to the comprehensive current income measure (AY), while the gap between father-only and two-parent families

Table 4.5
Differential Incidence Equations:
Income as a Function of Presence of Parents

	Y	AY	PAWAY	PCAWAY	PLCAWAY	PCWAY	PLCPWAY
Intercept (Both)	31,014 (262)	35,157 (288)	35,852 (301)	41,308 (286)	41,700 (286)	36,496 (308)	42,588 (293)
Mother Only	-17,323 (594)	-19,354 (652)	-20,087 (682)	-23,947 (649)	-24,193 (648)	-20,526 (697)	-24,871 (663)
Father Only	-5,322 (1,482)	-6,151 (1,627)	-6,437 (1,701)	-9,570 (1,617)	-9,731 (1,617)	-6,386 (1,738)	-9,859 (1,654)
R^2	0.135	0.139	0.137	0.201	0.204	0.137	0.206

Note: Estimates are based on unweighted observations.
Number of observations = 5,474.
Standard errors in parentheses.
Coefficients represent differentials between the indicated classes/groups and the intercept class/group.

Table 4.6
Differential Incidence Equations:
Wealth as a Function of Presence of Parents

	W	PCW	PLCW
Intercept (Both)	61,948 (1,061)	67,318 (1,056)	69,353 (1,056)
Mother Only	-36,296 (2,402)	-39,953 (2,391)	-41,946 (2,391)
Father Only	-13,831 (5,990)	-13,406 (5,963)	-14,896 (5,962)
R^2	0.040	0.049	0.053

Note: Estimates are based on unweighted observations.
Number of observations = 5,474.
Standard errors in parentheses.
Coefficients represent differentials between the indicated classes/groups and the intercept class/group.

would widen only marginally (from $5,300 to $6,200). Imposing a norm for returns to wealth (conditional on actual wealth) would increase the morther-only *versus* two-parent gap by a further $700.

As a result of the greater likelihood that female head-of-household will be employed (by comparison to the wife in a two-parent family), imposition of a norm for current labor force participation and earnings would raise the female-only *versus* two-parent gap by a highly-statistically-significant $3,900 (comparing PCAWAY to PAWAY). And because the mother's labor force participation is not an issue in a father-only household, the gap for this group also widens substantially, by $3,200 (from $6,400 to $9,600). For both groups the replacement of current by lifecycle norms for labor force participation would widen the gap slightly more. In contrast, imposition of norms for lifecycle savings behavior (conditional on actual current earnings) would have almost no effect on the differentials between two-parent and other families (comparing PCWAY and PAWAY). However, the greatest absolute gaps would be observed if norms for both lifecycle earnings and savings were imposed, with female-headed households falling below two-parent households by $25,000, male-only households by $9,900.

2.4. Differentials Associated With Parental Education

Regression equations identifying the income and wealth differentials associated with parental education under the alternative accounting systems are reported in Tables 4.7 and 4.8, respectively. That income increases monotonically with increases in education, regardless of the accounting system, is clearly revealed. The greater likelihood that the more highly educated will be home owners is indicated by the general rise in the differentials with replacement of conventional current money income (Y) by comprehensive current income (AY), with the gap between high school graduates and nongraduates (the reference group) rising by $1,100, that for persons with some college by $1,400, and that for college graduates by $3,200.

Table 4.7
Differential Incidence Equations:
Income as a Function of Parental Education

	Y	AY	PAWAY	PCAWAY	PLCAWAY	PCWAY	PLCPWAY
Intercept (<12Yrs.)	19,390 (462)	21,853 (505)	21,669 (523)	26,383 (512)	26,722 (513)	21,854 (532)	26,977 (521)
12 Yrs.	6,146 (655)	7,212 (715)	7,635 (741)	7,324 (726)	7,287 (727)	7,533 (753)	7,138 (738)
13-15 Years	9,250 (619)	10,627 (676)	11,359 (700)	10,960 (686)	10,948 (687)	11,996 (712)	11,806 (698)
16+ Years	20,725 (717)	23,891 (783)	26,083 (811)	26,832 (794)	26,916 (796)	27,201 (824)	28,401 (808)
R^2	0.136	0.149	0.163	0.178	0.178	0.172	0.192

Note: Estimates are based on unweighted observations.
Number of observations = 5,474.
Standard errors in parentheses.
Coefficients represent differentials between the indicated classes/groups and the intercept class/group.

Below the college-graduate level the imposition of norms for realized (reported) returns to wealth (conditional on the actual level of wealth) would have little effect (comparing PAWAY to AY); however, because a higher proportion of the returns to wealth of college graduates is either unrealized or unreported, the gap between this group and non-high-school-graduates would rise by a highly significant $2,200. The imposition of norms for current labor force participation and earnings has little impact at any educational level. However, imposition of norms for savings would substantially increase the differential of college graduates, by $1,100 (comparing PCWAY to PAWAY), suggesting that college graduates save at lower rates than nongraduates, conditional on actual earnings. This finding is borne out by the observation that the wealth differentials of college graduates increase dramatically when the potential wealth measures replace actual wealth. Simultaneous imposition of norms for both savings and lifecycle labor force participation would result in the greatest gap

Table 4.8
Differential Incidence Equations:
Wealth as a Function of Parental Education

	W	PCW	PLCW
Intercept (<12Yrs.)	32,764 (1,836)	34,308 (1,808)	34,889 (1,802)
12 Yrs.	17,881 (2,602)	17,025 (2,562)	16,636 (2,554)
13-15 Years	21,489 (2,460)	26,792 (2,422)	28,637 (2,415)
16+ Years	59,227 (2,848)	68,543 (2,804)	71,600 (2,795)
R^2	0.075	0.102	0.112

Note: Estimates are based on unweighted observations.
Number of observations = 5,474.
Standard errors in parentheses.
Coefficients represent differentials between the indicated classes/groups and the intercept class/group.

associated with college completion, $2,200 greater than the most comprehensive measure using actual wealth and earnings.

2.5. Differentials Associated With Parental Employment

Differentials in income and wealth associated with differences in parental employment, under the alternative accounting systems, are indicated by the regressions reported in Tables 4.9 (income measures) and 4.10 (wealth measures). Not surprisingly, families in which only the mother works exhibit lower levels of income and wealth than families in which only the father works. Conversely, incomes are higher (relative to the father alone working) when both spouses are employed. Interestingly, however, wealth is lower in two-worker households than in households in which the father alone works, suggesting that a working mother necessitates greater current expenditure or that the mother works largely to permit higher levels of consumption,

i.e., that families with a greater preference to present over future consumption are also more likely to more fully exploit their earnings capacity.

Table 4.9
Differential Incidence Equations:
Income as a Function of Parental Employment

	Y	AY	PAWAY	PCAWAY	PLCAWAY	PCWAY	PLCPWAY
Intercept (Father)	27,381 (401)	31,775 (443)	34,488 (484)	39,349 (486)	39,899 (487)	33,043 (474)	40,812 (478)
Mother Only	-10,822 (625)	-12,738 (691)	-13,497 (723)	-16,421 (727)	-16,757 (728)	-13,791 (739)	-17,228 (745)
Both	8,0310 (522)	7,739 (577)	7,810 (604)	3,897 (607)	3,581 (608)	8,020 (617)	3,549 (622)
Neither	-21,209 (1,095)	-23,845 (1,209)	-24,569 (1,268)	-22,240 (1,272)	-22,226 (1,275)	-25,049 (1,293)	-23,140 (1,304)
R^2	0.217	0.211	0.207	0.180	0.179	0.207	0.180

Note: Estimates are based on unweighted observations.
Number of observations = 5,474.
Standard errors in parentheses.
Coefficients represent differentials between the indicated classes/groups and the intercept class/group.

The discrimination of means-tested social welfare programs against those families more fully expoiting their earnings capacity is indicated by the relative declines in the differentials associated with a working mother (either alone or in conjunction with a working father) when income is adjusted to a norm of current labor force participation. Thus, comparing PCAWAY to PAWAY, the differential separating father-only-working from mother-only-working households increases (in absolute value) from $13,500 to $16,400, or by $2,900. The excess to two-worker over only-father-working households similarly declines from $7,800 to $3,900, or again by $2,900.

Table 4.10
Differential Incidence Equations:
Wealth as a Function of Parental Employment

	W	PCW	PLCW
Intercept (Father)	64,960 (1,701)	69,590 (1,692)	72,575 (1,694)
Mother Only	-32,358 (2,654)	-34,809 (2,640)	-36,280 (2,643)
Both	-3,003 (2,217)	-1,251 (2,205)	-3,276 (2,207)
Neither	-44,137 (4,646)	-48,130 (4,621)	-51,751 (4,626)
R^2	0.042	0.052	0.055

Note: Estimates are based on unweighted observations.
Number of observations = 5,474.
Standard errors in parentheses.
Coefficients represent differentials between the indicated classes/groups and the intercept class/group.

2.6. Differentials Associated With Home Ownership

Income and wealth differentials associated with renter *versus* home-owner status are indicated by the regressions reported in Tables 4.11 and 4.12. As would be expected, renters exhibit lower levels of income and wealth than owners, regardless of the accounting system employed. However, recognition of the implicit income on owner-occupied housing, i.e., moving from the conventional current money income concept to the comprehensive current income concept (from Y to AY), would greatly increase the differential, from $12,500 to $17,400 (or by $4,900, roughly the average value of implicit net income on owner-occupied housing). This finding indicates the magnitude of the degree of discrimination in favor of owners and against renters incorporated in conventional needs-tested social welfare programs.

Reflecting the greater relative returns to wealth held in the form of owner-

Table 4.11
Differential Incidence Equations:
Income as a Function of Home Ownership

	Y	AY	PAWAY	PCAWAY	PLCAWAY	PCWAY	PLCPWAY
Intercept (Own)	30,103 (269)	34,829 (289)	35,626 (301)	40,405 (295)	40,753 (296)	36,104 (309)	41,408 (305)
Rent	-12,469 (599)	-17,383 (644)	-18,616 (670)	-19,286 (657)	-19,323 (658)	-18,199 (689)	-18,818 (679)
R^2	0.073	0.118	0.124	0.136	0.136	0.113	0.180

Note: Estimates are based on unweighted observations.
Number of observations = 5,474.
Standard errors in parentheses.
Coefficients represent differentials between the indicated classes/groups and the intercept class/group.

Table 4.12
Differential Incidence Equations:
Wealth as a Function of Home Ownership

	W	PCW	PLCW
Intercept (Own)	67,328 (1,004)	71,312 (1,011)	72,783 (1,015)
Rent	-62,606 (2,235)	-59,128 (2,252)	-58,398 (2,261)
R^2	0.125	0.112	0.109

Note: Estimates are based on unweighted observations.
Number of observations = 5,474.
Standard errors in parentheses.
Coefficients represent differentials between the indicated classes/groups and the intercept class/group.

occupied housing, and hence the somewhat greater incentive to save, the differentials in wealth associated with ownership decline when the potential wealth measures replace the actual wealth measure. That is, on average renters engage in lesser savings than owners, although the differential is not statistically significant.

2.7. Conclusion

The evidence of this chapter clearly indicates that current means-tested social welfare programs, utilizing conventional measures of income and wealth (current money income and actual wealth) discriminate, in some cases severely, against lower-income groups, against disadvantaged minorities, against single-parent families, against the less-highly-educated, against families which more fully exploit their earnings capacity and against renter families. Thus, significant gains in equity would be associated with moves toward more comprehensive measures of income and toward adjustment of income and wealth for norms of labor force participation and lifecycle savings behavior. Such changes would not only improve equity; they would also have potentially significant efficiency implications, in that current programs discourage work effort and savings.

Chapter 5

PELL GRANTS UNDER THE ALTERNATIVE ACCOUNTING SYSTEMS

In this chapter the implications of the alternative parental-financial-capacity accounting systems for Federal outlays and the distribution of entitlements under the Pell (or Basic Educational Opportunity) Grant program are examined. At the outset it should be clearly indicated that we are not suggesting that any one of the alternative accounting systems could be substituted operationally for the "conventional" accounting system currently employed in determining eligibility for Federal Pell Grant support. Obviously, the imputations, e.g., of potential labor income, of potential capital income, of potential wealth and even of implicit rental income on owner-occupied housing are fraught with uncertainties. It will be virtually impossible in the case of any individual family to determine the actual source of a systematic deviation of financial circumstances from the "norm" for the population of families of college-age children. Thus, it might well be argued that to impose standards for receipt of labor income and for wealth accumulation would result in more serious inequities than are encountered under the existing measurement of financial capacity.

While it may be true that the imposition of norms in the case of any individual family might well be inequitable, it can nonetheless be argued that, *on average*, the adjustments to income and wealth made here do indicate the degree to which the conventional accounting of financial capacity serves to discriminate in favor of particular divergences of earnings and savings behavior from the norm. Whether the substitution of one of the alternative financial accounting systems for the conventional system would result in an increase in inequity is an interesting question, albeit one which would be difficult to answer empirically. However, if the adjustments do capture

the general magnitude of the degree of discrimination incorporated in current measurements of financial capacity, then they will indicate the desirability of programmatic modifications which would reduce this degree of discrimination. Because the alternative accounting systems may themselves incorporate serious operational inequities, however, the most desirable public policy response may be not to embrace the alternative but to find some "third" alternative which avoids the discriminatory effects, general and idiosyncratic, which are encountered in the existing program and which would also result under the alternatives. Stated somewhat differently, the evidence of discriminatory impact itself justifies the search for superior alternatives, even if these must diverge radically from the *status quo*.

1. The Structure of the Existing Pell Grant Program

Most briefly stated, the current Pell Grant program provides federal grants to students on terms which are designed to at least partially compensate for differential parental financial capacity to support postsecondary schooling. Thus, the program is "need based", with need defined with reference to (a) the costs of schooling and (b) the assessed financial capacities of parents and students. Oversimplifying somewhat, parental financial capacities are reflected in an "expected parental contribution", itself a function of parental income and wealth as defined by the conventional accounting system, the expected contribution representing the result of applying specified "tax rates" to income and wealth as conventionally measured.

Operationally, the expected parental contribution is obtained as follows: To the previous year's adjusted gross income for Federal Personal Income Tax purposes, total nontaxable income is added, resulting in what is called "annual adjusted family income."[1] Deducting the parents' Federal Personal Income Tax liability for the prior

[1]For present purposes, nontaxable income is defined as Y17, total "public" transfer payments. Adjusted gross income is then total gross current money income, Y19, less Y17. In addition to nontaxable income in the previous tax year, the Pell Grant computation also adds one-half of the Veteran's Educational Benefits which the student expects to receive over the course of the school year. However, since the focus here is on *parental* financial capacity, this element of annual adjusted family income is ignored.

year,[2] "effective family income" in the year is obtained. Effective family income is then reduced by (1) a family size offset,[3] (2) an unusual medical expense offset,[4] (3) an employment expense offset,[5] and (4) an offset for unreimbursed elementary and secondary school tuition and fees.[6] After deduction of the various offsets, what is referred to as "parents' discretionary income" is obtained. If positive, the "standard parental contribution from income" is equal to 10.5 percent of discretionary income. Parents' net assets provide the basis for the determination of the expected parental contribution from wealth. "Available parental assets" are defined as total net assets less an "asset reserve" of $25,000,[7] and the standard contribution from assets is

---

[2]As discussed further below, Federal Personal Income Tax liabilities are based on a rather complicated set of calculations. On the basis of adjusted gross income, as defined in the previous footnote, an estimate of itemized deductions other than interest expense is made, utilizing grouped data for 1980 published by the U.S. Internal Revenue Service, *Statistics of Income, Personal Income Tax Returns, 1980* (Washington, D.C.: Government Printing Office, 1982). To this is added the estimate of interest expense, as developed in Chapter 2 of this study, to obtain total itemized deductions. From total itemized deductions the minimum standard deduction is subtracted, the result being set to zero if otherwise negative. This net deductible amount is then subtracted from adjusted gross income, as is the product of the number of personal exemptions times $1,000. The resultant estimate of taxable income is then utilized to obtain the total tax liability, using the tax tables for married couples filing jointly or for unmarried heads of households, as appropriate. The foregoing procedure is followed precisely when the conventional accounting system, using current money income, is employed. When the alternative accounting systems are utilized, adjusted gross income is set equal to the sum of adjusted gross income as previously defined plus the (positive) difference between total income under the alternative measure and total income under the comprehensive current income accounting system (AY).

[3]The family size offsets are as follows:

Fam. Size	Offset	Fam. Size	Offset
1	$3,650	6	$10,250
2	5,000	7	11,350
3	6,050	8	12,550
4	7,700	9	13,750
5	9,050	10	14,850

plus $1,150 for each additional family member over 10.

[4]Medical expenses in excess of 20 percent of effective family income are deductible. Although the HS&B parent survey did inquire, in the case of parents reporting "financial difficulties," concerning the source of these difficulties, including medical expenses as a possible response, the absence of any estimate of medical expenses virtually forced a decision to ignore this exclusion in the present analysis.

[5]In the case of two employed parents, the employment expenses offset is 50 percent of the earnings of the lower-earning spouse, with a maximum offset of $1,500. In the case of a single-parent family, the earnings of the single parent substitute for those of the lower-earning spouse in this computation.

[6]In the case of parents of high school seniors, for whom the number of younger children was reported, in any case in which the senior HS&B sample member had attended a private school, it was assumed that younger siblings also attended private schools and that tuition rates were identical for all children in the family, permitting an imputation of private schooling costs utilizing the school-reported level of tuition and fees (assuming no tuition reimbursement). While this undoubtedly somewhat overstates the total private school expenses of most families, in that some children may be in public schools, lower levels of schooling usually entail lower tuition charges and some reimbursement may be received, the overstatement should have only minor consequences for the analysis.

specified as five percent of this amount. After reducing the contribution from assets by the absolute value of negative discretionary income, the expected parental contribution is equal to the sum of the discretionary-income and available-wealth components.

The overall maximum award under the Pell Grant program (for the 1980-81 academic year) was $1,750[8] and the maximum award for which any student was eligible was $1,750 less the expected parental contribution as just derived. However, the grant award could not exceed one-half of the total costs of schooling, and receipt of an award was contingent on eligibility for an award in excess of $150, i.e., no award of less than $150 was made.[9]

In this study we explicitly take into account the following elements of the Pell grant formula:

[1] Total income- In this study we consolidate the two components of total income identified in the Pell Grant formula, adjusted gross income and nontaxable income. When the conventional accounting system is employed, total income is defined as total current money income (Y19), consisting of adjusted gross income (Y19 - Y17) plus nontaxable "public" transfer payments (Y17). In the case of the alternative accounting systems, total income is as defined in each [comprehensive (AY), potential ... (P...AY)].

[7]Additional offsets against wealth are permitted for parents with assets devoted to a business or farm. Because of the lesser apparent reliability of the data concerning business and farm assets and liabilities, the relatively small proportion of families reporting business and farm assets, and the questionable desirability of this more favorable treatment of business and farm assets, the more complicated treatment of these components of wealth were not incorporated in the present analysis.

[8]The legislatively scheduled maximum award for the 1980-81 academic year was $1,800. However, as part of the Carter Administration's anti-inflationary economic program, total outlays under the Pell Grant program were reduced by reducing all grant awards by $50. As noted below, the minimum award was scheduled to be $200 (with any entitlement below this level set to zero); however, this minimum was also reduced by $50, to $150.

[9]For all practical purposes any student whose expected parental contribution was zero was entitled to an award of at least $750, regardless of the out-of-pocket costs of schooling, simply because living expenses of $1,100 and miscellaneous educational expenses (books, laboratory supplies, etc.) of $400 are permitted for all students, including those commuting to school from their parents' home.

[2] Parents' Federal Personal Income Tax Liability- This is determined on the basis of an estimate of (actual or potential) taxable income. Deductions from an appropriate estimate of adjusted gross income (conditional on the accounting system) are made for personal exemptions and for itemized deductions, and Federal personal income tax liabilities are then imputed.[10]

[3] Family size offset- This adjustment is made according to the Pell Grant specifications, as previously described.

[4] Employment expense offset- Again, the Pell Grant specifications are strictly followed. When, in the case of the alternative accounting systems, an imputation of potential labor income is made, the estimate of potential labor income is utilized in this calculation.

[5] Elementary and secondary school tuition deduction- As indicated previously, this is incorporated for members of the senior HS&B sample but not for sophomores (for whom the ages and schooling statuses of siblings were not available), assuming that younger siblings of a senior in a private school were also in private schools charging comparable tuition.

[6] Parents' net assets- These are specified as total wealth (W).

Thus, the only factors entering into the parental component of the Pell Grant formula which are ignored here are (1) the student's Veteran's Educational Benefits (which the Pell formula includes in adjusted family income), (2) unusual medical expenses (which, in the Pell formula, are deducted from adjusted family income), and (3) net business farm assets (for which the Pell formula provides additional asset reserves). In the vast majority of cases, however, the grant computations underlying this

[10] As discussed in a previous footnote, the estimate of adjusted gross income in the case of any of the alternative accounting systems is equal to adjusted gross income under the conventional accounting system (Y19 - Y17) plus the difference (if positive) between total income under the alternative and total income under the comprehensive accounting system (AY). Thus, adjusted gross income for tax purposes is identical under the conventional (Y) and comprehensive (AY) accounting systems, and is greater than this amount under the alternative (potential) accounting systems only if the potential total income measure (P...AY) exceeds the comprehensive total income measure (AY).

analysis conform extremely closely (subject to reporting error) to the actual computations which would be observed for the families in question.[11]

2. Actual Pell Grant Eligibility and Outlays

The foregoing provides an overall description of the Pell Grant program as it confronted the members of the HS&B senior cohort, graduating from high school in 1980. In this section we first examine grant eligibilities and outlays, given the financial characteristics of families and the provisions of the program as they were operationally applied. We then turn to the issue of tradeoffs between various programmatic features (e.g., income and wealth "tax rates"), conditional on unchanged total outlays. In both cases the various underlying family financial variables are defined to correspond as closely as possible to those actually employed in the Pell Grant program. Subsequent sections of this chapter will then examine the implications of a replacement of these financial variables (corresponding, essentially, to the conventional "money-income" accounting system) by financial variables drawn from the alternative accounting systems developed in this study.

2.1. Pell Grant Baseline: Conventional Financial Accounting

As noted, the existing program effectively employs the conventional "current money income" accounting system in the assessment of parental financial capacity for purposes of determining eligibility for Pell Grants. Thus, application of the Pell Grant formula, as described above, to the conventional accounting system provides a fairly precise indication of the potential distribution of benefits under the program as currently structured and applied.[12] Table 5.1 describes the distribution of the expected parental

[11]The Pell Grant computations also take into account the income and assets of the student and the student's spouse (if any) and treat differentially "dependent" and "independent" students. For present purposes it was impossible to differentiate between independent and dependent students. Moreover, because the focus of interest in this study is *parental* financial capacity, the analysis is restricted to the parental components of the Pell Grant formula. Thus, in the estimate of the actual grant award for which a student is eligible, (a) it is assumed that actual schooling costs are incurred, but (b) student earnings and savings are ignored.

[12]As will be apparent, application of the Pell Grant formula to estimates of the financial variables of a representative sample of parents/students to obtain estimates of total outlays, entitlements and particips-

contributions for the HS&B population (sophomores and seniors).

Table 5.1
Parental Contribution Distribution: Actual Pell Program

Parental Contribution		Percent Distribution
	Zero	11.3%
$0 -	$750	20.2
750 -	1,500	19.6
1,500 -	2,250	13.9
2,250 -	3,000	8.9
3,000 -	3,750	6.4
3,750 -	4,500	5.4
4,500 -	5,250	3.3
5,250 -	6,000	2.4
6,000 -	6,750	1.8
6,750 -		6.9

Note: Percentages may not add to 100 due to rounding.
Ranges exclude lower bound (column one).
Estimates based on weighted sample.

As can be observed, more than 10 percent of high school students are expected to receive no parental contribution, the median contribution is less than $1,500 (roughly the out-of-pocket cost of commuting to a four-year public college), and for fewer than fifteen percent would the expected parental contribution exceed $4,500 (a lower-bound estimate of the gross out-of-pocket cost of attending a four-year private residential college). Thus, the distribution of the expected parental contribution is extremely positively skewed, with the vast majority of high school students falling in the compressed lower portion of the distribution.

The distributions of grant award eligibilities (for those members of the senior HS&B sample undertaking postsecondary education), maximum and actual (i.e., conditional on actual schooling costs), are indicated in Table 5.2. As can be observed, over 60 percent of those in school are eligible for no award, and for another four percent the maximum award is between $150 (the lower bound on actual awards) and $400.

tion rates will result in an upper bound set of estimates, simply because all potentially eligible individuals will be assumed to participate. By comparison to actual outlays, entitlements and participation rates, these estimates permit at least order-of-magnitude estimates of rates of nonparticipation of eligible individuals.

For those eligible for awards, the median award is $985. The mean award of $955 (conditional on receipt of an award) implies total outlays (assuming that all eligible individuals applied for grants) of $600.7 million.

Table 5.2
Maximum and Actual Pell Awards, Conventional Accounting

Award Range	Percent Eligible	
	Maximum	Actual
Zero	61.2%	61.2%
150 - 400	3.9	5.0
400 - 600	4.4	4.3
600 - 800	4.1	5.0
800 - 1,000	3.4	5.6
1,000 - 1,200	4.3	8.8
1,200 - 1,400	4.4	2.8
1,400 - 1,600	3.6	3.5
1,600 - 1,750	10.7	3.7

Conditional on Positive Actual Award

Distribution	Actual Grant
5th percentile	$271
10th	349
25th	619
50th	985
75th	1,230
90th	1,588
95th	1,750
Mean	$955
Std. dev.	436
Coef. of var.	45.6%
Interquart. range	$610
Percent of mean	61.9%
Total outlays	$600.7 million

Note: Percentages may not add to 100 due to rounding.
Ranges exclude lower bound.
Estimates based on weighted sample.

Because this analysis is restricted to persons graduating from high chool in 1980 and attending an institution of postsecondary education in the fall of that year, the foregoing estimates of program participation on the part of and total outlays to

members of the indicated population cannot be compared to estimates of actual aggregate program participation and outlays. Roughly comparable estimates are, however, available from the 1980 freshman survey of the Cooperative Institutional Research Program (CIRP).[13] While these surveys represent slightly different populations (HS&B the population of 1980 high school seniors attending college in the Fall of 1980, CIRP the population of Fall 1980 first-time college freshmen regardlesss of the date of high school graduation), their comparison should provide reasonable estimates of the rate of Pell Grant nonparticipation on the part of those actually eligible for positive grants and of the consequent reduction in program outlays.

According to the 1980 CIRP survey, 33.5 percent of first-time freshmen received Pell Grants in 1980-81, while the present study indicates that 38.8 percent of 1980 high school graduates attending college were eligible for awards. This suggests nonparticipation on the part of 13.7 percent of those actually eligibe for awards. The mean actual award of the CIRP recipients, $969, is less than 1.5 percent greater than the estimate here of the mean award for which the HS&B college attending population was eligible, $955. Together, these estimates suggest actual outlays to the HS&B population of $562.2 million, $38.5 million (12.4 percent) less than the 100 percent participation total of $600.7 million. In summary, of all 1980 high school graduates attending college, 5.3 percent were eligible for, but did not receive, Pell Grants, with the mean value of these unreceived grants equal to approximately $867, roughly 10 percent less than the mean grant of actual recipients.

2.2. Iso-Outlay Tradeoffs within the Pell Grant Program

Before turning to the implications for the Pell Grant program of a replacement of the the conventional current-money-income accounting system by either a comprehensive or potential income accounting system, it is useful to examine the

[13]The CIRP estimates presented below are taken from unpublished tabulations provided by the Office of Planning, Budget and Evaluation, U.S. Department of Education.

interrelationships between the various programmatic features of the program as it existed in 1980-81. As has been described, the important elements of the Pell Grant formula include (1) the tax rate on discretionary family income, (2) the tax rate on available assets (actually, wealth), (3) the employment expense ceiling, (4) the fraction of earnings subject to deduction as an employment expense, (5) the level of the family size offsets, and (6) the asset reserve which is deducted from wealth prior to application of the wealth tax rate.

Variations in each of these dimensions might be examined in isolation, in which case the consequence of any programmatic change would be indicated by a change in total estimated outlays. In general, however, it can be argued that total outlays, at least in order of magnitude, are determined prior to the determination of specific programmatic features, i.e., that programmatic determinations are made so as to equate outlays to a predetermined budgetary outlay target. In fact, this has been explicitly the case with reference to Pell Grants, in which various apportioning devices have been employed to conform actual outlays to budgetary targets.[14] Under these circumstances it is more realistic to examine tradeoffs between programmatic features which hold total outlays constant. And entirely apart from budgetary realism, a meaningful analysis of the distributional implications of changes in various programmatic features depends critically on the stipulation of unchanged total outlays. Only by holding outlays constant is it possible to determine which classes of families would gain and which would lose as a result of a change in any dimensions of the program.

For the foregoing reasons the present analysis examines a range of programmatic

---

[14]As has been noted, this adjustment of the award-determining formula to reduce actual outlays to a predetermined level was utilized in 1980-81, with the reduction of maximum, actual, and minimum awards by $50, notwithstanding an original legislateive formula which would have provided for minimum and maximum awards of $200 and $1,800, respectively. In light of the recurrent recouse to such adjustments (downward), Pell Grants differ significantly other examples of from what are generally characterized as "entitlement" programs, in which not only one's eligibility for an award but also the amount of the award are effectively guaranteed. Over time, however, Pell Grant appropriations do appear to have been determined primarily with reference to anticipated outlays, given the structure of the program and specific programmatic determinations.

variations which are stipulated in each case to result in outlays identical (subject to a margin of rounding error)[15] to those actually estimated above for the cohort of 1980 high school graduates. The following tradeoffs are identified:

[1] tax rate on wealth versus tax rate on income;

[2] tax rate on wealth versus asset reserve;

[3] employment expense ceiling versus tax rate on income;

[4] employment expense as a fraction of earnings versus tax rate on income;

[5] general level of family size offset versus tax rate on income; and

[6] general level of family size offset versus tax rate on wealth.

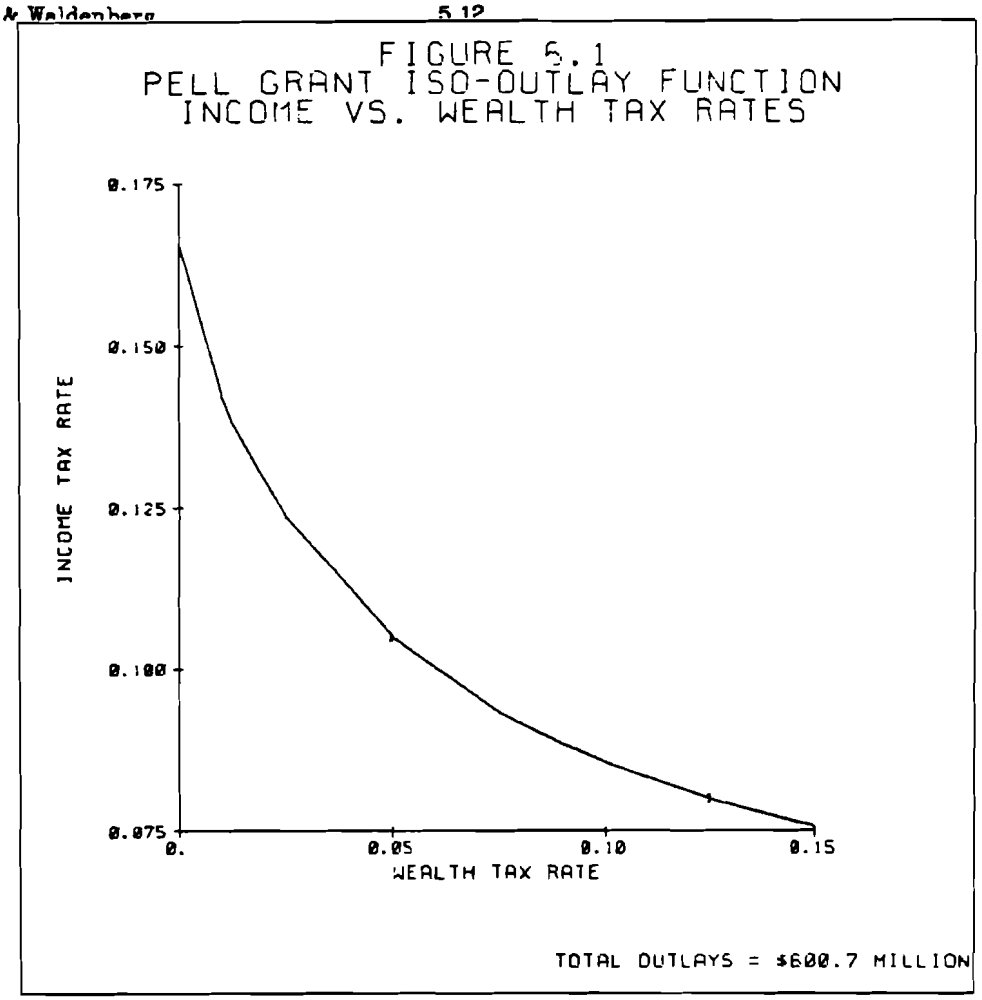
Tradeoffs between each of these pairs of programmatic parameters are indicated in Figures 5.1 through 5.6.

The tradeoff between the income and wealth tax rates, as portrayed in Figure 5.1, is quite revealing. From a *status quo* with an income tax rate of 10.5 percent and a wealth tax rate of five percent, it would be possible in the limit to reduce the wealth tax rate to zero by increasing the income tax rate to 16.6 percent. However, even if the wealth tax were increased dramatically, it would not be possible to reduce the income tax rate below about 7.5 percent, subject to the requirement of unchanged total outlays. This difference demonstrates the substantially greater significance of the income tax rate to the financial performance of the program, reflecting the relatively low levels of wealth of parents of college students, at least by comparison to income.

The relatively low levels of parental wealth are also reflected in the tradeoff between the wealth tax rate and the asset reserve, as portrayed in Figure 5.2. To

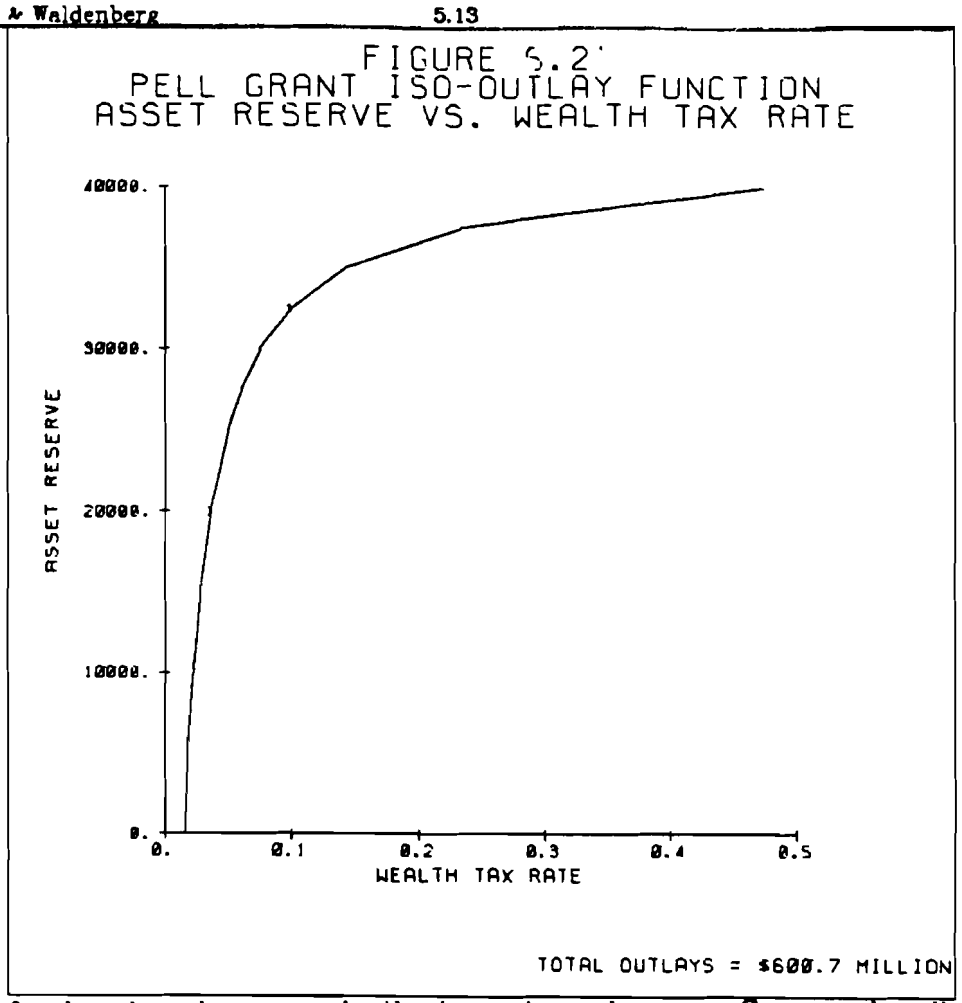
---

[15]Points on the iso-outlay loci where determined iteratively, fixing the value of one parameter and searching for the value of the other which would result in total outlays equal to those estimated for the Pell grant baseline. Equality was defined for these purposes as outlays within $\pm$0.5 million. Given baseline outlays of $600.7 million, this implies a margin of error (of outlays) of no more than 0.08 percent.



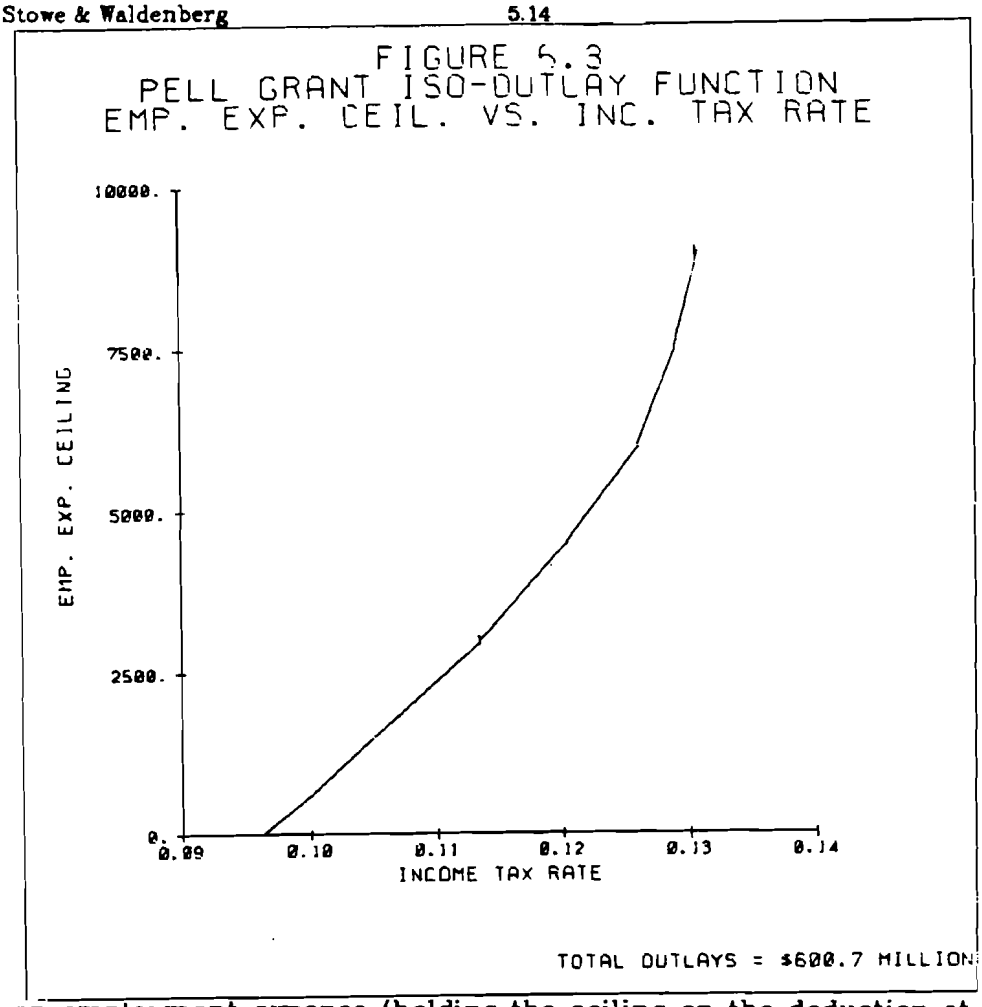
increase the asset reserve from $25,000 to $40,000 would require a virtually confiscatory 47 percent tax on those few persons who would still be found to have positive available wealth. On the other hand, the wealth tax rate could be cut by about two-thirds, from five to 1.6 percent, if the asset reserve were reduced to zero.

That the employment expense ceiling of $1,500 is relatively innocuous is clearly indicated in Figure 5.3, in which it is demonstrated that a doubling of the ceiling to $3,000 would require an increase of less than one percentage point in the tax rate on income (from 10.5 percent to 11.3 percent). Further increasing the employment expense ceiling to $6,000 would require increasing the tax rate only to 12.6 percent, and an increase to $9,000 (equivalent to effective elimination of the ceiling), but continuing to restrict the deduction to 50 percent of the earnings of the lower-earning spouse or single parent, could be achieved by a tax rate of only 13.1 percent. In short, increases in the ceiling on the employment expense deduction can be purchased at



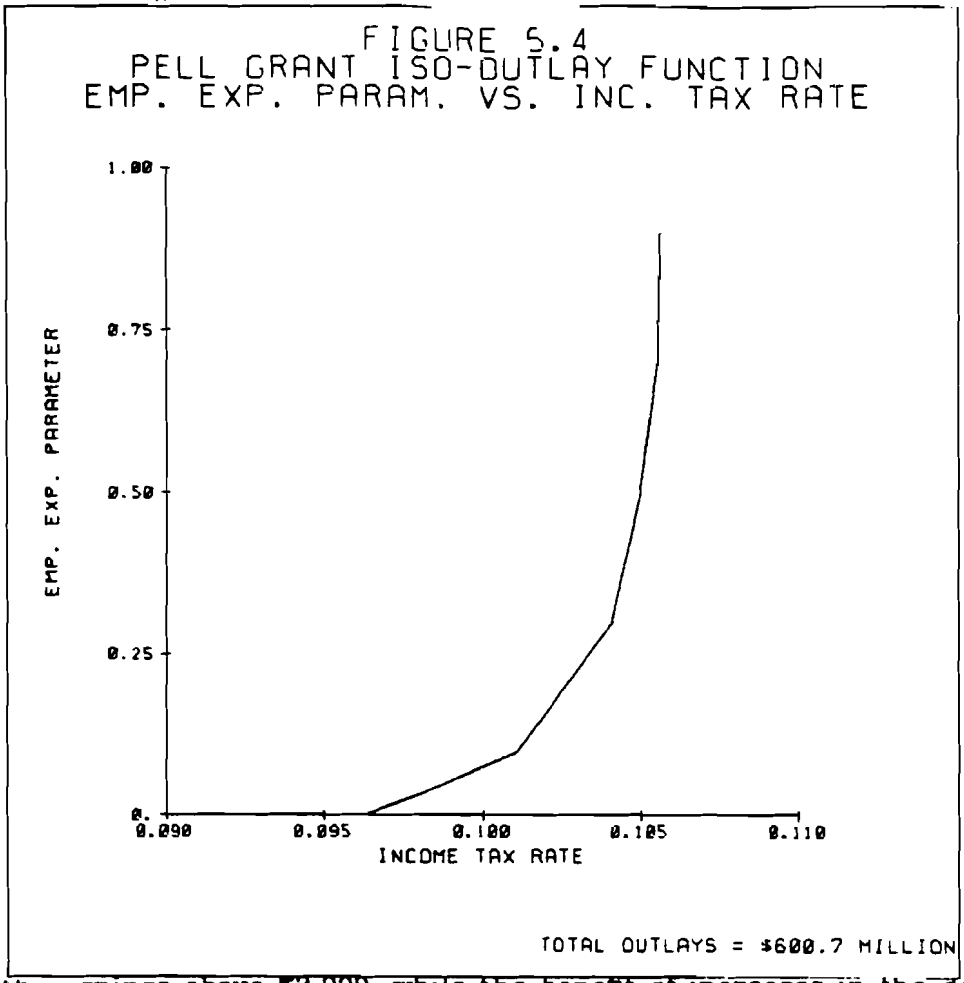
the price of only minor increases in the tax rate on income. Conversely, elimination of the employment expense deduction would permit a reduction in the income tax rate only from 10.5 to 9.6 percent. Obviously, the employment expense deduction could be substantially increased with little consequence for the required tax on income. Thus, for example, if it were demonstrated that relatively high marginal rates of taxation (direct and indirect) have a significantly negative impact on the labor force participation of secondary family workers (primarily women), then the contribution of the Pell Grant program to these high rates of taxation could be significantly reduced by increasing the employment expense offset; the required increase in the general tax rate on income would be trivial by comparison to the effect of the higher ceiling on the employment expense deduction, especially for low-wage secondary workers.

Figure 5.4 explores the relationship between the proportion of earnings deducti-



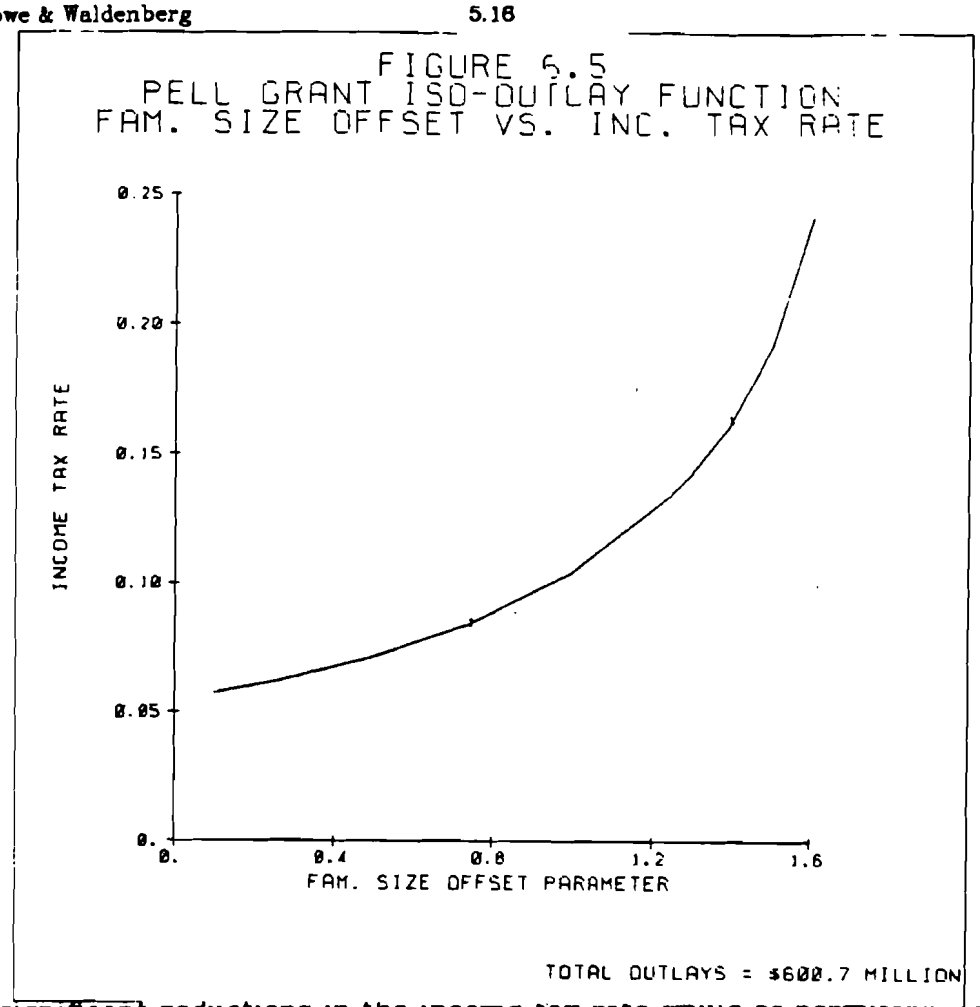
ble as an employment expense (holding the ceiling on the deduction at $1,500) and the tax rate on income. Clearly, an increase in the deductible proportion of earnings could be achieved with trivial consequences for the income tax rate. Thus, increasing the deductible proprotion to 100 percent (up to earnings of, in this case, $1,500) would require an income tax rate of less than 10.6 percent, 0.1 percentage points above the base rate. Conversely, lowering the deductible proportion to 30 percent would permit only a minor 0.1 percentage point reduction in the income tax rate, while elimination of the deduction would (as discussed with reference to the employment expense ceiling) permit the income tax rate to be reduced only to 9.6 percent.

While increases in the employment expense ceiling and the deductible proportion of earnings could each be achieved at the cost of only marginal increases in the income tax rate, the two possible changes would have a very different incidence. Increases in the ceiling would benefit only those lower-earning spouses or single indi-



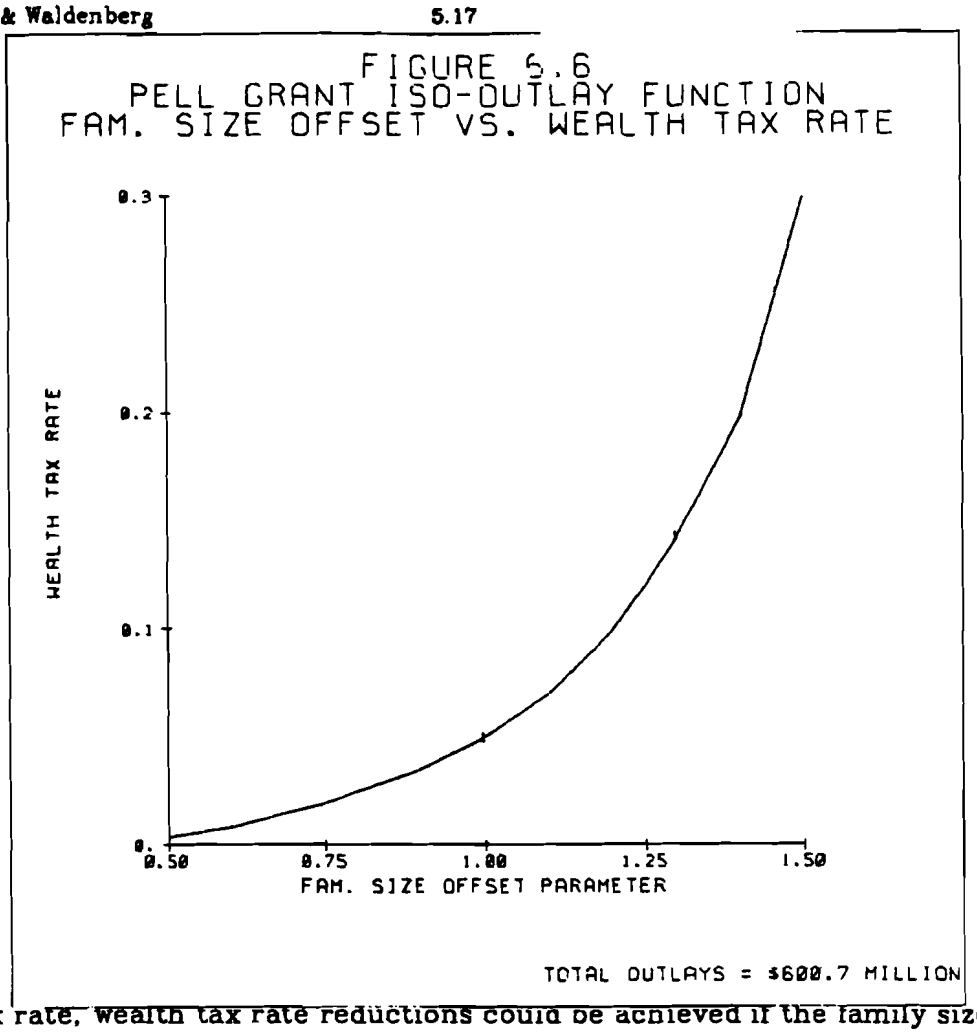
viduals with earnings above $3,000, while the benefit of increases in the deductible proportion of earnings (holding the ceiling constant) would concentrate the benefit at the lowest earnings level (below $3,000 as the deductible proportion was raised above 50 percent). Thus, very different distributional impacts would be implied.

Tradeoffs between the general level of the family size offset and the income tax rate are examined in Figure 5.5. The family size offset parameter in this and the following figure is simply a factor by which the base family siize offsets are scaled. Thus, a value of 1.5 indicates that the offset for each family size is increased by 50 percent. As can be observed, increases in the general level of the family size offsets would require substantial increases in tax rates on income. Thus, for example, to increase these offsets by 50 percent would require a virtual doubling of the income tax rate (from 10.5 percent to 19.2 percent), while an increase in the offsets of 70 percent would require more than a tripling of the income tax rate (to 31.8 percent). Con-



versely, significant reductions in the income tax rate would be permitted by a reduction in the family size offsets. Thus, a halving of the offsets could be accompanied by a reduction of about one-third in the income tax rate (to 7.2 percent). However, further reductions in the offsets would have only marginal effects as the income tax rate asymptotically approached about 5.5 percent.

A similar finding is revealed in Figure 5.6, in which the iso-outlay relationship between the level of family size offsets and the wealth tax rate is indicated. Again, increases in the various family size offsets would necessitate draconian increases in the wealth tax rate. For example, a 20 percent increase in all family size offsets would require a doubling of the wealth tax rate. While not indicated in Figure 5.6, an increase of 50 percent in the offsets would have to be accompanied by a six-fold increase in the wealth tax rate (to 29.9 percent), and an increase of 60 percent would require an almost-confiscatory wealth tax rate of 43 percent. As in the case of the



income tax rate, wealth tax rate reductions could be achieved if the family size offset were reduced. However, in this case, elimination of the wealth tax would be permitted by a reduction in the family size offsets of only 50 percent, and a 25 percent reduction in the offsets would permit more than a 60 percent reduction in wealth tax rates (to 1.9 percent).

Obviously, a number of more complicated tradeoffs in greater-than-two-dimensional- space could be examined. Also, for some purposes it would be desirable to examine the effects of changes in various programmatic parameters for program outlays, diverging from the iso-outlay analysis pursued here. However, given the basic analytical structure developed for this study, any specifiable changes in parameters of the program could be examined. Also, as indicated above, the important question in many of these cases concerns their ultimate distributional impacts, an issue which is also addressable on the basis of the data and analytical structure developed for this

study. The importance of a systematic, empirical approach to this issue can be appreciated on the basis of the differential distributional analysis presented in Chapter 4.

3. Pell Grants and the Comprehensive/Potential Accounting Systems

Although the previous section provides an introduction to perhaps the most practical uses of the data base and analytical system developed as part of this study, the conceptually most interesting aspects involve the comparison of the conventional current-money-income accounting system to the comprehensive system and to the potential-income and potential-wealth systems developed from it. This section provides an overview of the apparent implications of the biases incorporated in the conventional accounting system by comparison to more comprehensive and behaviorally-neutral accounting systems.

The manner in which these alternative measures of income and wealth were incorporated into the Pell Grant formula has been described previously. However, it is useful here to briefly summarize that discussion. For each of the alternative systems consistent measures of total income and wealth have been developed. In each case total income can be decomposed into labor, capital and transfer components. The capital income measure is dependent upon the wealth measure employed, while the measure of wealth may be dependent on the measure of labor income utilized. The measure of transfer income is common to all accounting systems (including the conventional current-money-income system).[16] PP Given mutually consistent measures of (a) total income (comprehensive, potential), (b) labor income (for each spouse), (c) capital income and (d) wealth, it is possible to replace the Pell Grant money-income

[16]In principle, receipts of transfer payments, especially public transfers, should have been modified in each case in which a measure of potential income (e.g., potential labor or capital income) replaced actually reported income. This is because most public transfer programs are means tested, i.e., the level of payment is inversely related to the levels of income from other sources and of assets. Because of the lack of detail concerning transfer payments, which would be required to decompose these into payments functionally related to other items of income and payments not so related, of the apparent importance of the latter class of payments (e.g., pensions), and of the relatively small number of families the finances of which would be affected, this issue was not addressed empirically. Thus, transfer receipts are assumed to be invariant with respect to other elements of income and to wealth.

concept of total income by the alternative, to replace reported money labor income of the approriate spouse by the appropriate spouse's comprehensive or potential labor income in the derivation of the employment expense offset, and to replace actual wealth by the alternative measure of wealth in the application of the wealth components of the Pell Grant formula. The only significant complication involves the derivation of the appropriate level of Federal income taxes to correspond to the potential income measures. Because Federal income tax liabilities, as derived here, are identical in both the current-money- and comprehensive-income accounting systems, the assumption is made that adjusted gross income in the case of the potential income and wealth accounting systems would exceed adjusted gross income under the other (conventional and comprehensive) accounting systems by the (positive) difference between the potential and comprehensive measures of total income, permitting the appropriate derivation of non-interest deductions and hence of the total tax liability.

3.1. Outlay and Eligibility Implications of the Alternatives

The consequences of applying these procedures to the comprehensive accounting system and to the five potential income/wealth systems are briefly summarized in Table 5.3. For comparison purposes, relevant statistics are also given for the conventional accounting system (underlying the "actual" Pell Grant program). These summary results are, in fact, quite stunning. Thus, consider the proportion of the enrolled population actually eligible to receive Pell Grant awards. Under the actual program (relying on current money income) 39 percent of 1980 high school graduates enrolled in postsecondary education are determined to be eligible for an award (in excess of $150). In contrast, with the comprehensive accounting system, which differs from the conventional system primarily by *including* in income implicit rental income on owner-occupied housing and secondarily by *deducting* interest expense from gross income, the grant-eligible proportion of the population declines from 39 percent to 34

percent. Although the mean grant, contingent on eligibility for an award remains virtually constant (declining from $955 to $936), as a result of the contraction in eligibility total outlays would decline from $600.7 million to $521.0 million, or by more than 13 percent.

Table 5.3
Pell Grants Under the Alternative Measures of Financial Capacity

Income/Wealth Measures	Percent Recipients	Mean Positive Grant	Total Outlays (Millions)	Percent Savings
Y, W	38.8%	$955	$600.7	0%
AY, W	34.4	936	521.0	13.3
PAWAY, W	34.6	942	528.4	12.0
PCAWAY, W	29.9	850	412.2	31.4
PLCAWAY, W	29.8	835	403.1	32.9
PCWAY, PCW	32.1	947	492.0	18.1
PLCPWAY, PLCW	26.1	849	359.2	40.2

This result for the comprehensive income measure deserves particular emphasis. In contrast to the various potential income/wealth accounting systems, to which objection might be made on grounds of both practicality and principle, the comprehensive system is effectively unassailable on grounds of principle and would in fact be relatively easy to implement operationally. Obviously, because grant awards decline, the effect of incorporating implicit rental income on owner-occupied housing is overwhelming the effect of deducting interest expense. While providing for the inclusion of the former would be somewhat more complex than providing for the deduction of the latter, the operational issue of including implicit rent is not exceedingly complex. If property can be assessed sufficiently adequately for real estate tax puposes, then an estimate of rental income (if only a reasonable interest rate multiplied by the market value of the housing) can certainly be derived. In fact, this component of income has indeed been subject to income taxation in several jurisdictions historically.[17] And, as noted, not only is this reform quite practical: It is also

unassailable on grounds of equity. Moreover, the equity issue extends beyond renters versus owners *per se*. As Kain and Quigley[18] have convincingly demonstrated, perhaps the primary explanation for the observed differences in wealth between otherwise comparable black and white families is the barriers to home ownership confronted by black families, since owner-occupied housing is not only the most important asset of most families (aside, perhaps, from their human capital) but is also the asset which historically has had the highest rate of return (especially as a result of financial market regulations which have discriminated in favor of home owners at the expense of persons whose savings are held in financial assets, especially non-home-owning savers who lack the resources and/or sophistication to invest in alternative, comparably-favored financial and real assets). Thus, it is hard to imagine any serious argument against the inclusion of an estimate of implicit rental income on owner-occupied housing. If the current system adequately measures the financial status of renting families, then a modification to incorporate implicit rental income would adequately measure the financial status of owners. Either the current system overstates the financial positions of renters or it must understate the financial positions of home owners. In short, a virtually unobjectionable change in the current system could reduce total outlays by in excess of 13 percent.

Somewhat surprisingly, by comparison to the comprehensive income measure incorporation of potential capital income conditional on actual wealth (as reflected in the PAWAY measure of total income) would slightly increase both potential participation (the grant-eligible proportion of the population), to 34.6 percent (from 34.4 percent) and the mean positive grant (from $936 to $942), thus reducing the savings in total program outlays from 13.3 percent to 12 percent. This superficially unexpected

[17]Thus, prior to the early 1960s implicit rental income on owner occupied housing was subjected to income taxation in the United Kingdom.

[18]John F. Kain and John M. Quigley, *Housing Markets and Racial Discrimination: A Microeconomic Analysis* (New York: Columbia University Press, 1975).

and contradictory result in fact can be easily explained. The primary positive adjustments to income made by the measure are at the upper income levels, where wealth is substantial but unrealized and/or unreported capital income is a substantial proportion of total capital income. Thus, a small number of individuals are removed from the grant-eligible rolls as a result of these positive changes in income. Note, however, that this measure also results in negative adjustments to income, specifically, in the case of interest expense in excess of interest income. Since this is more likely to be the case for low income families, children of which are already eligible for grants, the effect is to raise the grants for which they are eligible. As reflected by the increase in the mean (postive) award, this effect outweights the slight reduction in eligibility at the upper income levels. In short, this measure increases grants at low income levels but reduces or eliminates grants at high income levels.

Replacement of actual by potential current labor income, as reflected by PCAWAY, would have a further, very substantial impact on eligibility and outlays. Thus, the proportion of the population eligible to receive a grant would decline to 29.9 percent (by comparison an actual estimate of 38.8 percent), for a total contraction of the rolls by almost 25 percent. While the mean grant (conditional on receipt of a grant) would decline by only 11 percent, to $850, total outlays would decline by 31.4 percent, to $412.2 million. As can be observed, the effect of moving from potential current to potential lifecycle labor income would be marginal, reducing elgibility from 29.9 to 29.8 percent, the mean grant from $850 to $835, and total outlays from $412.2 million to $403.1 million (increasing the relative reduction in outlays from 31.4 to 32.9 percent).

As expected, given (a) the generally low levels of wealth, (b) the relatively large wealth deductible (asset reserve), and (c) the relatively low wealth tax rate, imputation of lower quartile potential wealth (leaving labor income unaffected, i.e., equal to that actually observed) would have a substantially lesser impact on total outlays than

would imputation of lower quartile potential labor income. Thus, outlays would decline only to $492 million (or by 18.1 percent), by comparison to $403.1 million (or 32.9 percent) with lifecycle potential labor income. The proportion of the population eligible for grants would rise (again by comparison to lifecycle potential labor income), from 29.8 percent to 32.1 percent, while the mean positive grant would rise from $835 to $947. Thus, it is apparent that the primary effect of this adjustment is exerted at upper income levels, for which the imputation of wealth results in a decline in eligibility and in award levels.

Finally, the imposition of lifecycle norms for both labor force participation and savings, as reflected in the PLCPWAY measure, would result in a dramatic decline in eligibilities and outlays. The proportion of the population eligible to receive an award would drop to 26.1 percent, implying a reduction of about one-third in the number of eligible recipients from the 1980 *status quo* level. This effect would be magnified by a decline of about eleven percent (to $849) in the mean award (conditonal on eligibility), implying a decline of 40.2 percent in total outlays, from $600.7 million to $359.2 million.

In summary, the discrimination of the existing program in favor of homeowners and against those with interest expenses (not in excess of interest income) accounts for about 13.3 percent of total program outlays and 11.3 percent of eligible individuals (comparing AY to Y). Failure to tax unrealized and/or unreported capital income is approximately offset by the failure to permit individuals to deduct net negative interest expense (comparing PAWAY to AY). Ending discrimination in favor of parents whose current labor force participation is below the norm would result in a further 12 percent reduction in eligibility and a 20 percent additional reduction in outlays (comparing PCAWAY to AY). Imposing labor force participation norms over the lifecycle would have virtuallyno effect on eligibility but would reduce outlays by a further 1.5 percent. If, instead of imposing norms on labor force participation, norms for wealth

accumulation were imposed, the effect (comparing PCWAY to AY) would be to obtain only an additional four percent reduction in eligibility and an additional five percent reduction in outlays. Finally, terminating discrimination in favor of parents whose lifecycle labor force participation *and* savings behavior diverge markedly from the norm would result (comparing PLCPWAY to AY) in a substantial additional reduction in both eligibility and outlays, with the former falling by more than 21 percent further, the latter by a further 27 percent. The overall effect of simultaneously imposing all of these changes designed to reduce discrimination (positive and negative) is thus to dramatically reduce the scope and cost of the Pell Grant program, with the eligible proportion of the population falling from 38.8 percent to 26.1 percent and with outlays falling from $600.7 million to $359.2 million (or by 40.2 percent).

3.2. Implications for Parental-Contribution and Grant Distributions

Implications of the alternative accounting systems for the distribution of the expected parental contributions are indicated in Table 5.4. As can be observed, substantial effects are exerted on the proportion of parents expected to make no contribution at all (which declines from over 11 percent in the case of actual Pell Grants, Y, to less than 5 percent in the most extreme case, potential lifecycle labor income and potential lifecycle wealth, PLCPWAY, for a decline of about 45 percent in the number of students expected to receive no parental contribution). On the other hand, the proportion of students expected to receive very substantial contributions (in excess of $6,750) also rises significantly, in the extreme by more than 50 percent (from 6.9 percent to 10.6 percent, comparing Y and PLCPWAY).

The distributions of Pell Grant awards implied by these parental contributions in conjunction with actually-incurred schooling costs are indicated in Table 5.5. Under the program as actually legislatively structured and administered, 7.2 percent of all students receive grants of between $1,400 and $1,750. This high-grant group would be modestly reduced (to between 5.8 and 6.1 percent, or by about 20 percent) as a result

Table 5.4
Alternative Expected Parental Contribution Distributions

Contrib.	Y	AY	PAWAY	PCAWAY	PLCAWAY	PCWAY	PLCPWAY
Zero	11.3%	9.6%	9.7%	5.1%	4.8%	9.5%	4.6%
$ 0- 750	20.2	18.9	19.0	17.6	17.3	18.2	16.5
750-1,500	19.6	17.8	17.3	19.0	19.2	16.5	17.6
1,500-2,250	13.9	13.8	13.7	15.1	15.1	13.6	14.5
2,250-3,000	8.9	9.7	10.0	10.9	11.1	10.2	11.7
3,000-3,750	6.4	7.3	6.9	7.6	7.5	6.9	7.5
3,750-4,500	5.4	5.4	5.5	5.7	5.9	5.7	6.4
4,500-5,250	3.3	4.3	4.2	4.3	4.3	4.5	4.5
5,250-6,000	2.4	2.9	3.1	3.4	3.5	3.1	3.8
6,000-6,750	1.8	2.2	2.0	2.1	2.1	2.4	2.4
6,750-	6.9	8.2	8.6	9.3	9.4	9.4	10.6

Note: Percentages may not add to 100 due to rounding.
Ranges exclude lower bound.
Estimates based on weighted sample.

of utilization of either the comprehensive (AY), the potential capital income (PAWAY) or the potential current wealth (PCWAY) measures. Moreover, the prevalence of large grants would be dramatically reduced under all other alternative accounting systems (specifically, those imposing either current or lifecycle norms on labor force participation, with or without imposition of savings norms), falling to 3.8 or 3.9 percent of the total student population.

Given the constrained range of actual grant awards (truncated at $150 and $1,750), perhaps the best measure of the dispersion of awards (conditional on actual receipt of an award) is provided by the interquartile range (expressed in dollars). By comparison to the actual program (Y) the alternative accounting systems would have relatively little impact, with the interquartile range varying between $577 and $622 (*versus* an actual-program range of $610). Because the alternative accounting systems would result in general reductions in the median award, the interquartile range relative to the median would rise in all cases, from 61.9 percent under the actual program to an extreme of 75.4 percent when lifecycle norms for both labor income and savings are imposed.

Table 5.5
Alternative Pell Actual Grant Distributions

Grant Range	Y	AY	PAWAY	PCAWAY	PLCAWAY	PCWAY	PLCPWAY
$ Zero	61.2%	65.6%	65.4%	70.1%	70.2%	67.9%	73.9%
150- 400	5.0	4.5	4.5	5.3	6.1	4.1	5.3
400- 600	4.3	4.1	4.1	4.0	3.7	3.8	3.3
600- 800	5.0	4.3	4.5	4.6	4.5	3.7	3.6
800-1,000	5.6	5.0	4.8	4.9	4.9	4.9	3.8
1,000-1,200	8.8	7.9	7.9	5.4	5.3	7.4	5.2
1,200-1,400	2.8	2.6	2.7	1.8	1.4	2.5	1.2
1,400-1,600	3.5	2.8	2.9	1.8	2.0	2.7	2.0
1,600-1,750	3.7	3.0	3.2	2.1	1.9	3.1	1.8
For Grant > 0:							
Mean	$955	$936	$942	$850	$835	$947	$849
Std. dev.	436	434	438	420	426	439	434
Coef. var.	45.6%	46.4%	46.5%	49.4%	51.0%	46.4%	51.1%
Q3 - Q1	$610	$602	$608	$577	$610	$609	$622
% of median	61.9%	63.2%	63.0%	69.9%	73.9%	62.0%	75.4%
Percentiles							
5th	$271	$233	$235	$231	$222	$232	$230
10th	349	347	350	310	274	341	289
25th	619	598	603	497	465	609	467
50th	985	952	965	825	825	982	825
75th	1,230	1,200	1,211	1,075	1,075	1,218	1,089
90th	1,588	1,575	1,575	1,450	1,450	1,575	1,450
95th	1,750	1,750	1,750	1,654	1,685	1,750	1,697

Note: Percentages may not add to 100 due to rounding!
Ranges exclude lower bound.
Estimates based on weighted sample.