A Framework for Financial Benefit-Cost Analysis of Individual Development Accounts at the Experimental Site of the American Dream Demonstration

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Abstract

The American Dream Demonstration is an evaluation of whether Individual Development Accounts are likely to achieve their intended purposes cost-effectively. Financial benefit-cost analysis is a key input into this overall evaluation. The framework here describes how to estimate the present value of changes in resource flows caused by IDAs for seven groups of stakeholders: IDA participants, non-participants, the federal government, state and local government, employees of IDA programs, private donors, and society as a whole. The goal of the framework is to make sure that the financial BCA considers the most important issues and that the analysts know the logic of the BCA well enough to catch and to fix flaws in the plan once they are in the field. Although the framework emphasizes the types of benefits and costs expected to matter most for IDAs, it could also be applied to other public interventions.

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1. Introduction

How do Individual Development Accounts (IDAs) affect resource flows? The financial benefit-cost analysis at the experimental site of the American Dream Demonstration (ADD) uses a standard present-value, cash-flow framework to answer this question from the points of view of seven groups of stakeholders: IDA participants, non-participants, the federal government, state and local government, employees of IDA programs, private donors, and society as a whole. Each group has its own roles and its own goals, and so each group experiences its own benefits and costs. If IDAs are to help low-resource people to improve their lives and if IDAs are to improve social welfare, then each group of stakeholders must play its part. In turn, this requires that each group perceive that its own benefits exceed its own costs.[1]

Financial benefits and costs are not the only benefits and costs, and thus financial benefit-cost analysis (BCA) is just one of many inputs into the overall evaluation of whether IDAs in ADD achieve their goals cost-effectively. Although financial BCA omits many non-financial costs and benefits, it is still useful because cash flows are one of the few things that can be estimated quantitatively and because

[1] Each of the seven groups has some veto power over the success of the whole project. For example, if participants believe that their benefits from participation are less than their costs, then IDAs will fail, even if—given that someone would participate—benefits would exceed costs for the other six groups. Schreiner (1997) discusses the rationale for project evaluation from multiple points of view.

cash flows are a large share of total benefits and costs. Furthermore, government policymakers often judge programs strictly by their fiscal effects.

This framework estimates, for all seven groups, not only whether financial benefits exceed costs (sign of impact) but also by how much (size of impact). Also, the process of doing the financial BCA should shed light on the causes of the sign and size of impact; perhaps the most important output of ADD—perhaps even more important than the judgement of cost-effectiveness—is improved knowledge of how to increase total benefits and decrease total costs through such things as improved policy, better contract design, more appropriate technology of supply, more relevant financial education, stronger organization, and more efficient provision of IDA-related services.

The paper proceeds as follows. Section 2 places the financial BCA in the context of the overall evaluation. Section 3 describes the basic analytic tools used to compute the present value of changes in resource flows caused by IDAs. Section 4 is the analysis plan for each of the seven groups of stakeholders.

2. Rigorous Financial BCA in Context

This section makes two points. First, financial BCA is just one small and simple part of the overall evaluation. The overall evaluation inevitably rests both on relatively quantitative estimates from the financial BCA and from the experimental design and on relatively qualitative judgements from other sources and other methods.[2] Second, the goal of rigor constrains the possibility of subjective excesses because it demands transparency in the assumptions, experiences, evidence, and logic that support the inevitably subjective judgements. Rigor is meant to make subjective judgements more susceptible to critique and thus more likely to be improved through time.

2.1 Context

Figure 1 shows where financial BCA fits within the overall evaluation. The overall evaluation itself is fundamentally a cost-effectiveness analysis. Because public funds are scarce and because IDAs are just one of many tools that might be used to help the poor and to improve social welfare, IDAs must be judged on whether they give more bang for the buck than alternative programs. If IDAs are to be worthwhile from the point of view of society as a whole, then it is not enough that they produce benefits, nor is it enough that they produce more benefits than costs; IDAs must produce a

[2] Quantitative estimates are often viewed as objective, while qualitative estimates are often viewed as subjective. The connotation is that objectivity and quantitativeness are to be preferred. The point of this section is that even seemingly objective and quantitative estimates are ultimately subjective and qualitative.

greater surplus of benefits over costs than would the best program left unfunded in the current government budget.

The overall cost-effectiveness evaluation uses both qualitative and quantitative data. Financial benefits and costs are quantitative, but other benefits and costs may be either quantitative or qualitative. The quality of "qualitative" or "quantitative" inheres not in the benefit or cost itself but rather in its measurement. *Qualitative* benefits and costs are either unmeasured, unmeasurable, or measured in units without high inter-personal reliability; *quantitative* benefits and costs are measured in units with high inter-personal reliability. Quantitative analyses are easier to subject to cross-checks, and so, compared with qualitative analyses, they depend less on the unique experience and judgement of the specific person who does the measurement.

Quantitative estimates may have dollar units (such as changes in income) or non-dollar units (such as changes in the probability of voting). This BCA framework is "financial" because it counts only benefits and costs measured in terms of dollars. Thus, the analysis is incomplete; it misses all benefits and costs (qualitative or quantitative) not measured in units of dollars.[3]

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[3] Appendix 1 discusses average financial cost analysis, a way to compare quantitative outcomes in non-dollar units to financial costs. The overall evaluation of ADD uses multiple methods—including in-depth interviews with participants, an organizational process analysis, and the analysis of program administrative data—to triangulate qualitative effects (Sherraden *et al.*, 1995).

Because financial BCA considers only a small subset of all benefits and costs, it cannot do all the work of the overall cost-effectiveness analysis.[4] For example, IDAs could lead to net financial losses but still be cost-effective overall if non-financial benefits (quantitative and qualitative) exceed non-financial costs enough to compensate. The simple and objective financial BCA cannot substitute for the difficult and subjective overall cost-effectiveness analysis.

2.2 Rigor

In practice, however, financial BCA is sometimes asked to do all the work of the overall cost-effectiveness analysis. For example, analysts may choose to ignore all non-financial costs and benefits and to base their judgements of overall cost-effectiveness only on financial BCA. There is nothing wrong with this, as long as the analysis explicitly acknowledges the assumption of zero non-financial benefits and costs.[5]

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[4] Furthermore, the financial BCA looks only at outcomes, not the process that leads to outcomes. Financial outcomes are only a small part of the whole story, but its quantitative veneer may attract disproportionate emphasis.

[5] Examples are Schreiner (1999a and 1999b), Benus *et al.* (1995), and Drury, Walsh, and Strong (1994). The best example is the first financial BCA of IDAs (Clones *et al.*, 1995). Although Clones *et al.* use almost no empirical estimates because data on IDAs were sparse at that time, the *pro forma* analysis is nonetheless uncommonly rigorous. Clones *et al.* carefully enumerate different sources of financial benefits and costs for different groups of stakeholders and then discuss which benefits and costs they might measure, which they cannot measure, and the basis for the assumptions used to proxy for missing measurements.

Difficulties arise when judgements follow from implicit assumptions, unstated evidence, unexamined experience, and fuzzy logic.[6] The essence of subjectivity is non-transparency; objectivity requires statements in units with inter-personal reliability, but opaque or implicit factors lack explicit units and so must lack inter-personal reliability. This is dangerous because it might allow mistaken judgements to pass unchecked.

Rigor is the attempt to improve inter-personal reliability. Arguments built on exposed foundations are susceptible to improvement through discussion and criticism.[7] The heart of the social-scientific method is not experiments but explicitness.

The first step toward units with inter-personal reliability is to express all estimates explicitly. For example, debates whether qualitative non-financial net benefits compensate for estimated net financial costs are more productive if the high and low bounds assumed for net benefits are stated explicitly.

The second step is to measure as much as possible and then to point out those measurements with less inter-personal reliability. Of course, no analysis can pretend to quantify all benefits and costs. Such exhaustive measurement would be a hopeless task, and more measurement has decreasing returns. Knowledge in the real world is always incomplete and imperfect. Furthermore, many benefits and costs are psychological and unquantifiable even to those who experience them.

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[6] Schreiner (1999c) gives examples from the evaluation of microenterprise programs in the United States.

[7] McCloskey (1998).

Some subjectivity is inevitable. The goal is not to wipe out all subjective estimates but rather to root out those that can be nudged toward objectivity and to highlight the subjective contours of those that remain. Often, simply making explicit the factors that influence a judgement provokes ideas for improvement or spotlights gaps in logic. A rigorous analysis examines the factors behind a judgement, improves them when it can, and makes them explicit so as to be subjected to further discussion.

The framework here measures as much as it can, and it is particularly simple and inexpensive to measure cash flows. Many effects of IDAs, however, are complex and expensive to measure because they are subtle, diffuse, and psychological. For example, perhaps the most important hypothesis in asset-based welfare theory is that IDAs spark hope.[8] That is, people with IDAs expect to have greater resources in the future, and this expectation changes their choices and efforts now. Hope is real; unfortunately, it is difficult to squeeze down to a single number. Whether IDAs are cost-effective, however, may hinge on judgements of the worth of their effects on hope. The inevitable subjectivity of these judgements, however, does not remove the need to explain carefully and explicitly how the judgements were made and to point out where people might reasonably differ.

[8] Sherraden (1991, p. 6) says that "while incomes feed people's stomachs, assets change their heads."

The danger comes from subjective factors left in the dark or, worse, subjective judgements presented as if they were objective. These common faults of rigor fall into four basic patterns. First, because arithmetic is incontrovertible, analysts tend to present mathematical results as if they were objective, and readers also tend to take them in this way. But even seemingly objective numbers have large subjective elements. For example, the analyst chooses whether or not to consider the time value of money. Furthermore, the analyst judges what types of benefits and costs are worth the effort of measurement. For example, one analyst may believe that a certain type of cost can be safely assumed to be zero, while a second analyst will go to great lengths to measure it. The exactness of numbers crunched through formulae seem to imply a correctness that belies the probable inexactness and incorrectness of the numbers and of the formulae itself. A financial BCA with flawless arithmetic that omits important types of benefits and costs is not less flawed than an analysis with perfect data riddled with arithmetic mistakes.

Second, some measurements are inexact. For example, no one knows the correct discount rate for resource flows at different points in time. Furthermore, the market value of assets is a guess unless the asset has just been sold. Likewise, reported income depends on the personal rapport between the respondent and the interviewer, on the honesty of the respondent, and on fallible human knowledge and memory.

Third, the ability to quantify an effect says little about its importance or size. For example, the effect of IDAs on public outlays for unemployment insurance is relatively simple to measure. The size of the effect, however, may be much smaller than that of increased hope, but hope is difficult to measure. The feasibility of measurement should not lead the evaluation to focus on effects on the cash flows linked to unemployment insurance and to ignore the effects on hope.

Fourth, readers often take the absence of caveats to mean that the analysis needs no caveats. In fact, the absence of extensive caveats might mean that the analyst did not recognize (or did not want to make explicit) the subjectivity beneath the surface. Ironically, the lack of rigor as signaled by a lack of caveats may be mistaken for a signal of strength.

The point is that even if the overall cost-effectiveness evaluation could ignore qualitative factors (which it cannot), it would still inevitably have important subjective elements. Cash flows are not the only thing that matters, even if they are straightforward to estimate. In the end, the analysis must weigh all the factors—both quantitative and qualitative—and pronounce a judgement. The judgement will be inevitably subjective, but this subjectivity is not bad. Good subjective judgements, however, are not matters of mere opinion. Rather, they are supported by experience and estimates, both qualitative and quantitative, and buttressed by logic and

arguments based on explicit assumptions. Good subjective judgements are susceptible to reasoned debate.

Rigor aims to make the subjective factors behind a judgement of cost-effectiveness as transparent to others as they are to the analysts. This is useful for two reasons. First, the attempt at rigor forces analysts to check their own logic. Second, if others disagree with the analysts, then the explicit basis of the judgement promotes reasoned talk that could lead to improvement. Rigor whittles away unneeded subjectivity and highlights unresolved subjectivity.

3. Present Value of Resource Flows

The heart of the financial BCA is the estimation of the present value of resource flows due to IDAs as seen by the seven groups of stakeholders. Given a point of view, the framework counts resource outflows as costs and resource inflows as benefits. All flows are discounted by when they take place in time. Benefits net of costs for society as a whole is the sum of benefits net of costs for the other six groups of stakeholders. The effect of IDAs is the sum of benefits net of costs with IDAs minus the sum of benefits net of costs without IDAs.

This section describes the basic analytic tools for the present-value framework. It discusses the question addressed, the time frame, the discount rate, the social weights of benefits and costs, the interpolation of cash flows between surveys, the measurement of changes in cash flows at the experimental site, and the appropriateness of a cash-flow framework. It also compares the present-value approach with the return-on-human-investment approach.

3.1 The question asked

The financial BCA of ADD asks one simple, important question: "How do IDAs affect the present value of resource flows for different groups of stakeholders?" It does not address other questions of policy import such as how the effects of IDAs in ADD compare to the effects of IDAs in other programs, nor how IDAs affect eligible individuals. This means that members of the control group who get access to IDAs

through another program will be thrown out of the sample. It also means that members of the treatment group who drop out of ADD will stay in the sample.

3.2 Time frame

Assets are resources that last through time. The effects of assets, like assets themselves, also can be expected to build through time.[9] Thus, ADD tracks outcomes for participants and controls for 42 months (3.5 years) after assignment.[10] The baseline survey is just before random assignment ($t = 0$), the first follow-up survey is 18 months ($t = 1.5$ years) after assignment, and the second follow-up survey is 42 months ($t = 3.5$ years) after assignment. The first participants enrolled in October 1998.[11]

Of course, the effects of IDAs may last beyond 3.5 years, and judgements of overall cost-effectiveness may hinge on these effects. Budget constraints prevent a longer period of data collection, but the analysis will report results under three sets of simple assumptions about extrapolation beyond year T. The type of extrapolation assumed may determine both the sign and the size of net benefits in the financial BCA.

The BCA plan for ADD considers three types of extrapolation: no extrapolation, extrapolation of levels, and extrapolation of changes. The examples below use Figure 2

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[9] Sherraden (1990).

[10] The last year of data collection is denoted T.

[11] Note that in October 1999, a newly assigned participant would be at $t = 0$, but a participant assigned in October 1998 would be at $t = 1$.

and a set of changes in net cash flows: –$1 in the six months before $t = 0.5$, –$3 in the year 1.5, –$4 in year 2.5, and –2 in year 3.5, the last year, $T = 3.5$.

3.2.1 No extrapolation

One possible assumption is that the effects of access to IDAs end after 3.5 years. This simple and unrealistic assumption is common in practice because all other extrapolation assumptions are just as arbitrary but more complex. In Figure 2, no extrapolation is shown by the dotted line at zero for all years after $T = 3.5$.

3.2.2 Extrapolation of levels

Under extrapolation of levels, the undiscounted impact on net cash flows in the final year of data collection is assumed to persist in each future year. That is, if γ_T is the change in the net cash flow in year T caused by access to IDAs, then $\gamma_{T+i} = \gamma_T$, $i \in \{1, 2, \ldots \infty\}$. In the example (Figure 2), the change in net flows in year 4.5 (and in subsequent years) is assumed to be –2, the same as the change in net flows in year 3.5.

3.2.3 Extrapolation of changes

Under extrapolation of changes, the change in the undiscounted change in the net cash flow in year T is assumed to be the change for each year in the future, or $\gamma_{T+i} = \gamma_{T+i-1} + (\gamma_{T+i-1} - \gamma_{T+i-2})$. In the example (Figure 2), the change in net cash flows is –4 in year 2.5 and –2 in year 3.5, so the assumed change in the change in net cash flows for year 4.5 is $-2 + [(-2) - (-4)] = 0$. Likewise, the change in net flows assumed for year 5.5 is $0 + [0 - (-2)] = 2$.

3.3 Discounting

The financial BCA discounts resource flows because different flows take place at different times. If IDAs change life courses and/or spark hope, then they will alter flows not only during participation but also afterwards, perhaps through decades or generations. Discounting recognizes that a benefit or cost today is worth more, from the point of view of today, than the same benefit or cost tomorrow.

The timing of resource flows matters for at least four reasons. First, even in the absence of inflation, a dollar invested today usually yields more than a dollar tomorrow. Second, although people who want to transfer resources from the present to the future can always save, people who want to transfer resources from the future to the present cannot always borrow because of imperfect credit markets or because of their own lack of creditworthiness. Thus, an extra dollar is worth more sooner than later to people who cannot borrow as much as they want. Third, people do not know what the future holds. They may often prefer earlier cash flows because they might die or because their fortune might unexpectedly improve. Fourth, imperfect human imagination may sometimes weigh current wants more than future wants. For psychological reasons, some people do not always care about the well-being of their future selves as much as their future selves would like.

All of this strongly suggests that a dollar in the hand today is not worth half of two dollars in the bush tomorrow. In fact, a dollar today plus a dollar tomorrow is not two dollars at any time.[12] Resource flows at different times have different units.

To compare, add, or subtract resource flows at different times meaningfully requires expression in a common unit. Discounting does this. It weighs flows less and less as they take place more and more in the future. All discounted resource flows have units of dollars as of the start of the time frame.

The financial BCA for ADD assumes that the discount rate r for all years is 10 percent per year in real terms. Of course, no one knows the correct discount rate, but the two biggest users of financial BCA both use 10 percent as a standard benchmark.[13] The analysis checks the sensitivity of the results to the assumed discount rate.[14]

Given a discount rate r, the annual discount factor δ is $= 1 / (1 + r)$. If a cash flow takes place at time t, then the present value as of the start of the time frame is the

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[12] Boulding, 1962.

[13] The default assumption is 10 percent both for the United State government (U.S. Office of Management and Budget, 1972) and for the World Bank (Belli, 1996). Quirk and Teresawa (1991) suggest that this figure is likely to be too low because most governments have unfunded projects with social rates of return in excess of 10 percent.

[14] In practice, the question of the "correct" discount rate is often moot. Suppose, for example, that financial BCA is used to select among alternative projects funded from a fixed budget. If the same discount rate is used to evaluate all alternatives, then the choice of projects is invariant to the exact rate assumed (Belli, 1996).

cash flow multiplied by δ^t.[15] Given $r = 0.10$, $\delta = 1 / (1 + 0.1) \doteq 0.9091$. Stakeholders are assumed to be indifferent between one dollar one year after the start of the time frame or about 91 cents at the start of the time frame.[16]

In practice, the analysis measures annual accumulated resource flows and does not have knowledge of exactly when flows take place during a year. A reasonable assumption is that the annual flow accumulated from a constant, even flow throughout the year. The discount factor to apply to the accumulated annual flow is about $\delta^{t-0.5}$.[17]

Discounting makes sense only if dollars are in units with constant purchasing power. Inflation changes the price level of goods and services, so all flows to be discounted must first be converted to constant-dollar units. In this evaluation, the standard for constant dollars is as of year T, the end of the time frame. Given a nominal dollar amount d_t at time t, the consumer price index CPI_t at time t, and the consumer price index CPI_T at time T, then the constant-dollar value f_t of d_t in units of dollars as of time T is $d_t \cdot (CPI_T / CPI_t)$.[18]

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[15] The t of "δ^t" is a mathematical exponent, not a notational superscript.

[16] In general, $0 \leq \delta^t \leq 1$, so given a resource flow f_t, the discounted flow is never larger than the undiscounted flow ($\delta^t \cdot f_t \leq f_t$). Furthermore, discounted flows are smaller as flows take place further in the future (for $\epsilon > 0$, $\delta^{t+\epsilon} \cdot f_t < \delta^t \cdot f_t$).

[17] Schreiner (1997). If the flow accumulates over six months instead of a year, then the discount factor is about $\delta^{t-0.25}$. For example, the discount factor for a flow that accumulates between random assignment and the end of the sixth month ($t = 0.5$) is $\delta^{0.5-0.25} \doteq 0.9091^{0.25} \doteq 0.9765$.

[18] Schreiner (1999b).

3.4 Social weights

To a given individual, the experience of a dollar of benefit or of a dollar of cost is worth a dollar. To society as a whole, however, a dollar of benefit or cost may be worth more or less than a dollar, depending on which specific individual experiences it. For example, if society has a preference for the poor or disadvantaged, then a given benefit or cost for a poor, disadvantaged person is weighed more than that same benefit or cost for a rich, advantaged person. The analytical tool that describes social preferences for benefits and costs across different people is the *social-welfare function*.[19]

Unfortunately, the social-welfare function is unknown. To follow standard practice, the financial BCA assumes that a dollar has the same social worth regardless of who gets it. The overall cost-effectiveness evaluation, however, may choose to weigh the poor more than the rich. This is as it should be, as long as the weights are explicit.

3.5 Present value versus return on human investment

The financial BCA of ADD uses a present-value framework, whereas the only other financial BCA of IDAs uses a return-on-human-investment framework.[20] What are the differences between the two frameworks, and why use present value?

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[19] Deaton (1997) is an excellent discussion.

[20] Clones *et al.* (1995).

Return-on-human-investment analysis (ROHI) computes an annual rate of return on changes in resource flows caused by IDAs. If net cash inflows in year t are benefits b_t and if cash outflows are costs c_t, then the annual rate of return is:[21]

$$\text{ROHI} = \frac{1}{\text{Years}} \cdot \frac{\text{Inflows} - \text{Outflows}}{\text{Outflows}} = \frac{1}{T} \cdot \left(\frac{\sum_{t=1}^{T} b_t - \sum_{t=1}^{T} c_t}{\sum_{t=1}^{T} c_t} \right). \qquad (1)$$

In contrast, present-value analysis (PV) computes the dollar worth of the changes in cash flows caused by IDAs as seen from the start of the time frame:

$$\text{PV} = \text{Discounted inflows} - \text{Discounted outflows} = \sum_{t=1}^{T} \delta^t \cdot b_t - \sum_{t=1}^{T} \delta^t \cdot c_t \qquad (2)$$

PV differs from ROHI in three important ways. First, ROHI does not discount, but PV does. This means that ROHI overstates the apparent return for projects (such as IDAs) in which most costs are bunched toward the start of the time frame and in which most benefits are bunched toward the end of the time frame. A dollar of cost at $t = 1$ is not offset by a dollar of benefit at $t = 3$, but ROHI assumes that it does. Discounting matters less in short time frames, but IDAs have effects through long time frames.

Second, ROHI produces a rate of return, but PV produces a number of discounted dollars. Unlike dollar amounts, rates of return are invariant to project size.

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[21] Brizius (1991), as cited in Clones *et al.* (1995).

If the analyst prefers to work with rates of return, however, then the best rate is not the one defined by the ROHI formula but rather the *internal rate of return*, defined as the discount rate r that makes the present value of cash flows exactly zero:

$$\text{PV} = 0 = \sum_{t=1}^{T} (1+r)^{-t} \cdot b_t - \sum_{t=1}^{T} (1+r)^{-t} \cdot c_t \qquad (3)$$

Furthermore, PV produces a compound rate, whereas ROHI produces a flat rate. In the real world, rates compound. Also, the absolute value of the flat rate is bigger than the absolute value of the compound rate, so ROHI again inflates the apparent rate of return.[22]

Third, the name of ROHI contains the words *human* and *investment*. In practice, however, what matters are the level and timing of resource flows, not whether outflows are labeled as *costs* or as *investments*. Likewise, what matters from the financial point of view taken in both PV and ROHI is not whether outflows are invested in humans or elsewhere but rather whether the outflows bear fruit in terms of inflows.

In all three dimensions, PV is technically better than ROHI For non-technical reasons, however, ROHI is more likely to make a given project look good. Because the

[22] For example, if there is one outflow of \$100 at $t = 0$ and one inflow of \$200 at $t = 10$, then the flat rate of return in ROHI is 10 percent per year (Equation 1). In contrast, the compound rate in PV is about 7 percent per year (the solution of Equation 3, the discount rate r that solves $0 = -(1 + r)^{-0} + (1 + r)^{-10} \cdot 200$ is 0.0714). Given their definitions, both rates are meaningful, but the flat rate is bigger and ignores the timing of cash flows.

goal of the evaluation of IDAs is not more IDAs but rather more well-being, this framework uses PV.

3.6 Measurement of changes in cash flows

The financial BCA measures benefits and costs as the changes in cash flows caused by IDAs. The difficult task is to distinguish between changes caused by IDAs and changes caused by other forces.

For all groups of stakeholders except participants, benefits (costs) are assumed to be all cash inflows (outflows) to (from) an IDA program or to (from) an IDA participant. This makes sense because, in the absence of IDAs, none of these flows would have taken place. That is, IDAs are assumed to cause all cash flows directly related to IDAs and not to affect any cash flows not directly related to IDAs.

Cash flows for participants are more complex. Of course, the presence of IDAs changes IDA-related cash flows for participants, but IDAs may also change cash flows only indirectly related to IDAs.[23] For example, an IDA may help someone to complete a degree, to earn higher wages, and/or to require less public assistance. Thus, the indirect effects of the IDA on cash flows might be to increase income from employment and/or to decrease income from public assistance. Likewise, IDAs may instill a savings habit

[23] If IDAs had only direct effects, then they would be nothing more than cash transfers.

that indirectly leads to greater investment and less consumption in the short term but greater cash inflows and more consumption in the long term.

Because participants have IDAs, the analysis cannot observe what their non-IDA-related cash flows would have been without IDAs.[24] Instead, the non-IDA-related flows of a control group proxy for the flows of participants, had they not participated.

In ADD, random assignment of applicants to the treatment or control groups is intended to ensure that the joint distribution of all observed and unobserved characteristics (other than access to IDAs) that might affect cash flows are the same for the two groups. If random assignment succeeds, then all differences in outcomes between the two groups can be attributed to access to IDAs.[25, 26] If, however, randomization does not purge all differences in characteristics between the two groups, then differences in outcomes might be due to these differences rather than to the differences in access to IDAs.

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[24] Moffitt (1991).

[25] This maintains the common assumption that the impact of treatment is constant across individuals.

[26] All else constant, an experimental design serves best the purposes of the financial BCA. No other design is as simple to explain to the public or to policymakers, and no other design controls as well for factors beyond the control of the analyst (Manski, 1995). Experimental designs are not bulletproof, but non-experimental designs have all the weaknesses of experimental designs, plus other weaknesses. In ADD, the experimental site is the Community Action Program of Tulsa County in Oklahoma.

Members in the treatment or control groups are indexed by i and j, where $i \in \{1, \ldots, N_j\}$, where $j \in \{x, c\}$, and where x is *treatment* and c is *control*. The surveys collect data for the previous twelve months just before random assignment ($t = 0$), 18 months after random assignment ($t = 1.5$), and 42 months after random assignment ($t = 3.5$). The net cash flow for member i of group j in year t is y_{jit}, defined as cash inflows b_{jit}, minus cash outflows c_{jit}, plus pure net appreciation α_{jit}.[27] If random assignment does purge all differences between the two groups in the distributions of characteristics that might affect outcomes, then an estimate of the average change in net cash flows in year t caused by IDAs γ_t is the average net cash flow for treatments minus the average net cash flow for controls:

$$\gamma_t = \frac{1}{N_x} \cdot \sum_{i=1}^{N_x} y_{xit} - \frac{1}{N_x} \cdot \sum_{i=1}^{N_c} y_{cit}. \quad (4)$$

In ADD, 537 treatments and 566 controls completed the baseline survey. With survey non-response, about 400 from each group will probably complete both of the follow-up surveys. By the standards of a social-science experiment, 400 cases is a large sample. Still, sampling variation may cause differences in the joint distribution of observed and unobserved characteristics between treatments and controls in spite of randomization.[28] In this case, measurement of the impact of IDAs requires techniques to

[27] The next section describes pure net appreciation in detail.

[28] For example, random assignment will, on average if repeated many times, produce treatment and control groups with the same average age. In any given instance

control for differences between the two groups in terms of observed characteristics, unobserved characteristics, or both observed and unobserved characteristics.

3.6.1 Observed characteristics are not randomized out

Even if randomization does equate the joint distribution of unobserved characteristics between treatments and controls, it may not—in a finite sample—equate the joint distribution of observed characteristics. For example, the luck of the draw may lead to the average treatment having more education (and a greater likelihood of higher cash inflows from employment) than the average control, regardless of access to IDAs.

Simple regression analysis can control for observed differences. Define $y_{jit} = b_{jit} - c_{jit} + \alpha_{jit}$ as the net resource flow in the previous year. The dependent variable y_{jit} is assumed to be a linear function of a (k x 1) vector of observed characteristics X_{ijt}, dummies $d_{ji1.5t}$ and $d_{ji3.5t}$ that mark access to IDAs, and an error term e_{jit}. The dummy $d_{ji1.5t}$ is unity for treatments after the first follow-up survey ($t = 1.5$) and zero otherwise, and $d_{ji3.5t}$ is defined likewise. Observed characteristics in X should include the standard

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of random assignment, however, the luck of the draw may make one group younger than the other. If age affects cash flows, then the differences in the distribution of age between the groups could cause differences in cash flows that should not be attributed to differences in access to IDAs but rather to differences in age.

list of demographic, educational, and financial traits as well as dummies for the year and month of assignment.[29]

Let β be a (1 x k) vector of average effects on net cash flows of unit changes in observed characteristics in X. Likewise, let $\gamma_{1.5}$ and $\gamma_{3.5}$ be the scalar estimates of the average effects on net cash flows of participation in a given year as marked by $d_{ji1.5t}$ and $d_{ji3.5t}$. The β and γ coefficients may be derived from a multivariate estimator based on:

$$y_{jit} = \beta \cdot X_{jit} + \gamma_{1.5} \cdot d_{ji1.5t} + \gamma_{3.5} \cdot d_{ji3.5t} + e_{jit}. \quad (5)$$

Equation 5 is indicated instead of Equation 4 only if random assignment fails to equate the joint distributions of observed characteristics across the two groups. A simple test for whether this is the case compares the mean of $\beta^* \cdot X_{xi0}$ with the mean of $\beta^* \cdot X_{ci0}$. If the p-value of a statistical test of the equality between treatments and controls of the mean effect of the observed characteristics on the outcome of interest is less than 0.50, then the analysis should control for observed characteristics.[30, 31]

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[29] Applicants are randomized into treatments and controls on a rolling basis, so different treatments start at different times. Coefficients on the dummies for the year and month of assignment will pick up idiosyncratic effects due to shifts in the local macroeconomy as well as the effects of growth and learning by the IDA program.

[30] A p-value of 0.50 makes sense here because the test is whether the effects of observed characteristics on net resource flows differs between treatments and controls in this particular social experiment. The test is not whether observed characteristics would differ between groups in repeated sampling. Indeed, random assignment ensures that, in average and in repeated samples, they would not.

[31] The concept of condensing the effects of the distribution of observed characteristics to a scalar propensity score has roots in Heckman, Ichimura, and Todd (1997) and in Rosenbaum and Rubin (1983).

3.6.2 Unobserved characteristics are not randomized out

Randomization may equate observed characteristics across treatments and controls but yet fail to equate unobserved characteristics. For example, the average treatment may, by chance, have more innate desire to save ("oomph") and to improve long-term well-being than the average control. Failure to account for this would incorrectly attribute differences in effects on net resource flows across treatments and controls to differences in access to IDAs instead of to differences in oomph.

The analysis makes the standard assumption that unobserved oomph λ_{ji} does not vary from year to year (and thus has no time subscript) and that unobserved oomph λ_{ji} affects net resource flows linearly. Thus, total net flows are the sum of flows in the absence of any special oomph y_{jit} plus the effects of oomph λ_{ji}. Equation 4 omits the λ_{ji} because it assumed that all differences in the distribution of oomph between the two groups were successfully randomized out.[32] If not, then Equation 4 becomes:

$$\gamma_t = \frac{1}{N_x} \cdot \sum_{i=1}^{N_x} (y_{xit} + \lambda_{xi}) - \frac{1}{N_x} \cdot \sum_{i=1}^{N_c} (y_{cit} + \lambda_{ci}). \quad (6)$$

Because the distribution of oomph λ_{xi} and λ_{ci} might differ between treatments and controls and because oomph is unobserved, it is swept out by lagging each side of

[32] Successful randomization implies that the distribution (and thus the average) of λ for treatments is the same as the distribution (and thus the average) of λ for controls.

Equation 6 and then subtracting the result from the original equation.[33] An estimate of the average effect on net cash flows of access to IDAs is then $\Delta\gamma_t$:

$$\gamma_t - \gamma_{t-1} = \left(\frac{1}{N_x} \cdot \sum_{i=1}^{N_x} (y_{xit} + \lambda_{xi}) - \frac{1}{N_x} \cdot \sum_{i=1}^{N_c} (y_{cit} + \lambda_{ci}) \right) - \left(\frac{1}{N_x} \cdot \sum_{i=1}^{N_x} (y_{xit-1} + \lambda_{xi}) - \frac{1}{N_x} \cdot \sum_{i=1}^{N_c} (y_{cit-1} + \lambda_{ci}) \right), \tag{7}$$

$$\Delta\gamma_t = \frac{1}{N_x} \cdot \sum_{i=1}^{N_x} \Delta y_{xit} - \frac{1}{N_x} \cdot \sum_{i=1}^{N_c} \Delta y_{cit}.$$

It is impossible to test whether random assignment successfully equates the distribution of unobserved oomph for treatments and controls. A conservative strategy is to compute effects with both Equation 4 and Equation 7. If the estimates are close in some metric, then use Equation 4 because it is simpler. If the estimates differ, use Equation 7 because it drops the assumption that randomization worked.

3.6.3 Both observed and unobserved characteristics are not randomized out

The weakest assumption is that randomization fails for both observed and unobserved characteristics. With finite samples, this is not unlikely. The technique to estimate effects uses multivariate regression as in Equation 5 and lagged data as in Equation 7. When unobservables λ_{ji} are not randomized out, Equation 5 becomes:

$$y_{jit} = \beta \cdot X_{jit} + \lambda_{ij} + \gamma_{1.5} \cdot d_{ji1.5t} + \gamma_{3.5} \cdot d_{ji3.5t} + e_{jit}. \tag{8}$$

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[33] Lagged values are denoted with a delta ("Δ"). For example, $\Delta f_{jit} = f_{jit} - f_{jit-1}$. ADD does not measure lagged net cash flows f_{jit-1}; their interpolation is described below.

To sweep out unobservables, lag each side of Equation 8 and then subtract the lagged value from the original equation:

$$\begin{aligned} y_{jit} - y_{jit-1} &= (\beta \cdot X_{jit} + \lambda_{ij} + \gamma_{1.5} \cdot d_{ji1.5t} + \gamma_{3.5} \cdot d_{ji3.5t} + e_{jit}) - , \\ &\quad (\beta \cdot X_{jit-1} + \lambda_{ij} + \gamma_{1.5} \cdot d_{ji1.5t-1} + \gamma_{3.5} \cdot d_{ji3.5t-1} + e_{jit-1}), \\ \Delta y_{jit} &= \beta \cdot \Delta X_{jit} + \gamma_{1.5} \cdot \Delta d_{ji1.5t} + \gamma_{3.5} \cdot \Delta d_{ji3.5t} + \Delta e_{jit}. \end{aligned} \tag{9}$$

The average effects of access to IDAs on net cash flows are then the estimates of $\gamma_{1.5}$ and $\gamma_{3.5}$ from a multivariate regression. Note that $\Delta d_{\text{ji1.5t}}$ is unity for treatments in year 1.5 and zero otherwise and that $\Delta d_{\text{ji3.5t}}$ is unity for treatments in year 3.5 and zero otherwise.

How does the analyst know if randomization failed for observables, unobservables, or both? Given that all of the estimates in Equations 4, 5, 7, and 9 are straightforward to compute, a conservative and robust strategy is to compute all four. If the results are similar, then randomization probably worked and the simplest estimates may be reported. If they differ, however, then the estimates that impose the weakest assumptions about the effectiveness of randomization should be reported.

3.7 Interpolation

ADD surveys treatments and controls just before random assignment, 18 months after assignment, and 42 months after assignment. Each survey asks about cash flows in the previous 12 months, so ADD lacks data on cash flows in months 1-6 nor in months 19-30. Thus, some flows must be interpolated.

Interpolation serves two purposes. First, the estimation of the effects of access to IDAs on net cash flows in years 1.5 and 3.5 ($\gamma_{1.5}$ and $\gamma_{3.5}$) requires lagged values of y_{jit} and X_{jit}, but the surveys do not capture these lagged values. Second, the 42-month time frame of the present-value analysis requires estimates of not only $\gamma_{1.5}$ and $\gamma_{3.5}$ but also of $\gamma_{0.5}$ and $\gamma_{2.5}$.

A simple assumption is that the missing values are the average of known values from the two surveys that bookend the missing months. Thus, the interpolated net flow $y_{ji2.5}$ in the year before $t = 2.5$ is the average of flows in the first and second follow-up surveys, or $y_{ji2.5} = 0.5 \cdot (y_{ji1.5} + y_{ji3.5})$. For example, suppose that the measured net cash flow y_{ij0} in the baseline year was \$10, that $y_{ji1.5}$ fell to \$5 as cash flowed from the household into IDA accounts, and that $y_{ji3.5}$ was \$15 as cash flowed into the household from IDA accounts and matches. Then $y_{ji1.5} = 0.5 \cdot (\$5 + \$15) = \$10$.

To interpolate the net flows $y_{ji0.5}$ in the 6 months previous to $t = 0.5$,[34] the analysis uses the average of half the net flows in the baseline survey and the first follow-up survey, or $y_{ji0.5} = 0.50 \cdot [0.50 \cdot (y_{ji0} + y_{ji1.5})]$. In the example, $y_{ji0.5} = 0.50 \cdot [0.50 \cdot (\$10 + \$5)] = \$3.75$.

Observed characteristics $X_{ji0.5}$ and $X_{ji2.5}$ are interpolated in the same way.[35] Given measurements and interpolations of net flows and of observed characteristics, the

[34] Flows at $t = 0.5$ are unique in that they refer only to the previous six months.

[35] Non-flow characteristics should not be halved to adjust for the six-month period.

estimated effects of access to IDAs on net flows $\gamma_{1.5}$ and $\gamma_{3.5}$ are computed. Finally, $\gamma_{0.5}$ and $\gamma_{2.5}$ are interpolated as $\gamma_{0.5} = 0.5 \cdot [0.5 \cdot (\gamma_0 + \gamma_{1.5})] = 0.25 \cdot \gamma_{1.5}$ (because $\gamma_0 = 0$) and as $\gamma_{2.5} = 0.5 \cdot (\gamma_{1.5} + \gamma_{3.5})$. Given that $\gamma_{0.5}$ covers only six months and assuming extrapolation of levels beyond 3.5 years, the present value to participants of IDAs is:

$$\text{PV} = \delta^{0.25} \cdot \gamma_{0.5} + \sum_{t=1}^{3} \delta^{t} \cdot \gamma_{t+0.5} + \sum_{t=4}^{\infty} \delta^{t} \cdot \gamma_{3.5}. \tag{10}$$

If extrapolation of changes is assumed, then Equation 10 becomes:

$$\text{PV} = \delta^{0.25} \cdot \gamma_{0.5} + \sum_{t=1}^{3} \delta^{t} \cdot \gamma_{t+0.5} + \sum_{t=4}^{\infty} \delta^{t} \cdot [\gamma_{3.5} + (t-3) \cdot \Delta\gamma_{3.5}]. \tag{11}$$

As an example, suppose that all the changes the net cash flows in the previous example were caused by access to IDAs. In other words, average net flows y_{cit} for controls are \$10 in all periods, and average net flows for treatments are $y_{\text{xi0}} = \$10$, $y_{\text{xi1.5}} = \$5$, and $y_{\text{xi3.5}} = \$15$. If randomization worked, then $\gamma_{1.5} = -\$5$ and $\gamma_{3.5} = \$5$. Interpolating gives $\gamma_{0.5} = -\$1.25$ and $\gamma_{2.5} = \$0.00$. With extrapolation of levels:

$$\begin{aligned} \text{PV} &= \delta^{0.25} \cdot (-\$1.25) + \delta \cdot (-\$5) + \delta^{2} \cdot (\$0) + \delta^{3} \cdot \$5 + 7.51 \cdot \$5, \\ &= -\$2.02 + \$37.55, \\ &= \$35.53. \end{aligned} \tag{12}$$

The estimate of present value depends strongly on the assumed extrapolation. With the simplest assumption that all effects beyond $t = 3.5$ are zero, the present value of IDAs in this example is negative (–\$2.02). The assumption of extrapolation of levels, however, produces a positive present value (\$35.53). The assumption of extrapolation of changes in Equation 11 increases the present value to \$448.77.

3.8 The appropriateness of a framework based on cash flows

In the evaluation literature, the appropriateness of discounted cash-flow analysis is unquestioned. The framework rests on massive precedent, and its use in practice is standard. Indeed, governments—and sometimes other stakeholders—often count their own benefits and costs explicitly in terms of cash flows.

3.8.1 Cash flows versus resource flows

The ideal BCA, however, would look at resource flows rather than cash flows.[36] A *resource* increases the ability of people to improve their well-being, that is, to do or to be what they have reason to want. Cash is a resource, but, for example, so is human capital (skills from education and experience that increases the ability to do valued work) and social capital (relationships that facilitate valued work). Cash flows are but a small subset of all resource flows.

Resources may produce goods and services sold on the market, but they may also produce non-market goods and services shared within the household. Furthermore, some resources have *existence value* because people like to savor the thought of their

[36] This section expands on Schreiner (2000a).

very being.[37] Likewise, some resources have *psychic value* because they affect the structure of the internal gains and costs that people mentally impose on themselves.[38, 39]

In financial BCA, assets are nothing more than possible ways to move resources through time. Of course, assets are much more than just frozen cash stored for future consumption or kept as a buffer against risk. For example, assets are often means of production. Plant and equipment are valuable not so much because they are efficient ways to store resources nor because they act as insurance but rather because, when combined with human time and effort, they produce more resources for consumption or investment. Likewise, human capital is more than just a way to convert a childhood invested in schoolwork into cash inflows from an adulthood spent in wage work. Furthermore, people also get pleasure from the humanistic value of accumulated wisdom and from the state of being educated. Likewise, a home provides shelter, and home ownership also seems to change how people think and act.[40] In sum, human

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[37] For example, some people are happier if they know that the Alaskan shoreline is pristine, even though this does not serve to provide them with more or better goods or services.

[38] Maital (1986) argues much of joy and pain result from mental rewards and punishments that are self-imposed.

[39] The discussion of existence value and psychic value at the level of the individual in no way implies that the effects of these values, when combined among individuals in a society, do not produce social values and effects that can be more or less than the sum of the individual values and effects.

[40] Scanlon (1999 and 1996); Page-Adams and Vosler (1997); Cheng and Page-Adams (1996); Page-Adams and Sherraden (1996).

behavior imbues resources with worth distinct from their usefulness in production and consumption.

If resources in the form of IDAs do not have psychic worth apart from their economic worth, then IDAs are little more than traditional cash-transfer programs in sheep's clothing. IDAs increase the size of transfers to the poor, and if IDAs are to be more than just bigger, post-dated welfare checks, then they must also affect the hearts and minds of participants in ways that go beyond the economic effects of increased cash transfers.[41]

In his seminal work on assets and the poor, Sherraden (1991) argues that assets are indeed much more than mere factors of production, stores of potential consumption, and buffers for shocks. In his view, the ownership of assets may produce *asset effects*, that is, non-economic psychological and social changes in expectations and internal-reward systems that serve to improve well-being in the long term.

3.8.2. Amount of transfer versus form of transfer

What distinguishes IDAs from traditional cash assistance is not so much the amount of the transfer but rather its form. Like public education, Medicaid, and food stamps, IDAs attempt to transfer resources to the poor not as unrestricted cash but

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[41] In other words, IDAs cannot help but benefit the poor, just like any resource transfer that enable greater consumption or, if part of the transfer is saved, greater productivity, greater ability to bear risk, or greater storage of consumption. The relevant question is thus not whether IDAs have positive effects but whether they have positive effects that go beyond those of any other type of resource transfer.

rather in non-cash forms thought to improve long-term well-being both for the recipient and for society as a whole. The form of the transfer is what may spark asset effects; this explains the requirement that users of IDAs save through time (and thus to savor the savings and their expected use) and also the attempt to restrict the use of IDA withdrawals to purchases of assets unlikely to be sold for cash. In essence, IDAs try to transfer not cash but rather homes, educations, and small firms. They also try to spark the hope felt by owners and by expectant owners.

Of course, all forms of resources are convertible to other forms, so it may not always be clear why a dollar is transferred in the form of an IDA might spark more asset effects than would a dollar transferred in the form of a traditional welfare check. In principle, someone could convert an IDA into drink if they buy a house with an IDA, sell the house, and drink the proceeds. Likewise, someone could save the resources from a traditional welfare check.

In practice, however, most people do not usually act as if all forms of resources are convertible to all other forms. First, conversion has frictional costs of time and effort. Transaction costs are lowest for cash and highest for illiquid, lumpy assets.[42]

Second, if a household would have saved on its own and then bought assets that meet IDA rules even in the absence of IDAs, then the extra resources from the IDA do

[42] For example, a whole home may be sold all at once, but not half a home. Likewise, skill and experience (human capital) cannot be sold all at once but rather only through time in the workforce.

not cause the intended asset purchase but rather just relaxes the budget constraint and allows the household to spend more for other purposes.[43] Most people, however, do tend to link mentally the sources of resources with their uses.[44] Furthermore, most targeted participants would not, in the absence of IDAs, have bought a house, gone to college, or strengthened a small firm because their budgets are too small for much more than physical and cultural subsistence.

Third, the attempt to restrict the use of IDAs suggests to participants that resources are not convertible, and the power of suggestion is strong. After all, most people are honest and do not try to subvert the aims of programs meant to help them. Furthermore, IDAs may allow participants, often for the first time in their lives, to believe that college or home ownership is within their grasp. The financial education linked to IDAs also teaches that IDA-approved assets are good purchases. This lesson is not just paternalistic propaganda: the bulk of middle-class America rose through education and home ownership, and most IDA participants recognize that the

[43] Von Pischke and Adams (1980) discuss this concept of fungibility.

[44] Beverly and Sherraden (1998), Beverly (1997), Thalor (1990), Shefrin and Thalor (1988), Thaler and Shefrin (1981).

purchases allowed by IDA rules are also the best purchases in terms of their own self-interest.[45] Some participants may divert IDA resources to unintended uses, but most of them will not.

3.8.3 Financial BCA in the presence of psychic asset effects

The dilemma—and the irony—is that the standard present-value framework counts improvements in well-being only in terms of increases in net resource flows. In its failure to count the psychic asset effects caused by the restricted form of IDA transfers, the financial BCA of IDA programs resembles the typical evaluations of the so-called manpower programs. These programs transfer skills to help workers to get and to keep jobs, but the evaluations measure the return to the transferred asset of human capital exclusively in terms of changes in employment and wages rather than also in terms of changes in outlook and behavior.

The BCA framework for ADD defers the challenge of the measurement of the worth of psychic and behavioral changes in units with high inter-personal reliability.[46] It uses a cash-flow framework despite its weaknesses because it is the only way to compare net benefits for participants and for other groups of stakeholders. Thus, it

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[45] Microenterprise is a possible exception. See Bhatt, Painter, and Tang (1999), Schreiner (1999d and 1999e), Ehlers and Main (1998), Bates (1997), and Bendick and Egan (1987). The first IDA proposals (Sherraden, 1988 and 1990) did not discuss microenterprise as an approved use.

[46] The issue is less *what* to measure than *how* to measure, given budget constraints.

assumes zero worth for effects of IDAs that do not change cash flows. Because IDAs do aim to help people to build assets and thus to change thoughts and behaviors, this approach may miss much of what may be the most important effects of IDAs.

3.8.4 A framework for the measurement of psychic asset effects

What might be the rough contours of a conceptual framework that could guide attempts to measure the indirect psychic effects of asset accumulation? The key departure from financial BCA is the distinction between *income* as an inflow of resources in a time frame and *assets* as a level of resources kept through time. The measurement of assets must explicitly incorporate ownership through time. Furthermore, an asset-based framework must carefully distinguish between indirect psychic effects due to changes in thoughts and behavior and direct economic effects due to greater productivity, better storage of potential consumption, and greater ability to bear risk.[47]

The task is then to link changes of assets with changes in thought and behavior unrelated to the changes in economic opportunities that are also linked to the changes in assets. The first step is to measure assets in units of resources held through time. Define a *dollar-year* of assets as a $1 of resources kept for 12 months. For example, a $2 shirt kept for 3 months is 0.5 dollar-years of assets. A simple estimate of the dollar-

[47] The term *psychic effects* refers to changes in thoughts and behavior due to the ownership of assets. The results of these psychic effects on the outcomes of interest, however, could be either psychic themselves (for example, greater hope or happiness) or economic (for example, higher income or better insurance).

years of resources held in a year is the average of the stocks of assets at the start of the year and at the end of the year, $\bar{a}_t = (a_t + a_{t-1}) / 2$.[48]

To distinguish the psychic effects of assets on expectations and behavior from the economic effects of assets on productivity, consumption, and risk-bearing, $\bar{a}_t$ should include only assets that the household cannot choose to use in current production, consumption, or insurance. Thus, $\bar{a}_t$ might include balances in the match account of IDAs, balances in tax-advantaged retirement accounts, and/or expected receipts of bequests. These assets are too illiquid to affect current productivity, consumption, and risk-bearing directly.[49]

Define z_{jit} as an outcome in year t for member i of group j. This could be a net cash flow, or it could be a non-financial outcome such as the number of hours spent in volunteer work. Then, as in Equation 9, a regression to measure the indirect effects of assets is:

$$\Delta z_{jit} = \beta \cdot \Delta X_{jit} + \gamma_{1.5} \cdot \Delta \overline{a_{ji1.5t}} + \gamma_{3.5} \cdot \Delta \overline{a_{ji3.5t}} + \Delta e_{jit}. \quad (13)$$

Observed characteristics X_{jit} must include all factors correlated with $\bar{a}_t$ that also affect the outcome z_{jit}. This includes income and consumption as well as all types of

[48] The concept extends to non-financial assets. Human capital, for example, could be measured in terms of year-years for human capital as proxied by age or in terms of grade-years for human capital as proxied by education.

[49] Skills and experience are also illiquid, but they still have strong direct effects on current outcomes.

assets excluded from $\bar{a}_t$ because, all else constant, more resources increase the ability to produce resources and thus the ability to realize a given positive outcome z_{jit}.[50]

In practice, it is difficult to ensure that seeming asset effects are not spuriously caused by factors omitted from X_{jit} but correlated with both z_{jit} and $\bar{a}_t$.[51] One fix is random assignment. If the distribution of characteristics other than $\bar{a}_t$ is the same for both treatments and controls, then regression with Equation 13 without the $\beta \cdot \Delta X_{jit}$ term will estimate the psychic effects of assets.

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[50] Furthermore, $\bar{a}_t$ decreases in some years—for example, when IDA matches are withdrawn— so $\Delta \bar{a}_t$ will be negative. The decrease implies an increase in consumption and/or in other assets. If these factors were excluded, then IDAs might appear to have negative indirect effects even if their true indirect effects are positive.

[51] Yadama and Sherraden (1996) attempt to use panel data to check whether assets in 1968 precede (Granger-cause) attitudes in 1972. They measure assets, however, as the value of housing and of financial savings. Thus, their finding that more assets preceded better attitudes might reflect the direct economic effects of assets on attitudes rather than any indirect psychic effects. Of the three ways that assets in 1968 might be correlated with attitudes in 1972, Yadama and Sherraden (1996) do not rule out the two ways that are economic. First, it is possible that the ownership of assets in 1968 changed attitudes in 1972 for purely non-economic reasons. Second, because the level of assets owned in 1972 is probably correlated with the level of assets owned in 1968, attitudes in 1972 might be due not to the non-economic effects of assets in 1968 but rather to the economic effects of assets in 1972. Third, attitudes likely persist through time, so attitudes caused by the economic effects of assets in 1968 might persist to at least some extent into 1972.

4. Plan of Analysis

This section describes the sources of data and the analysis plan. Benefits and costs are measured from the points of view of the seven groups of stakeholders.

4.1 Sources of data

4.1.1 Survey of treatments and controls

Treatments and controls are asked identical sets of questions by telephone by trained enumerators just before assignment, 18 months after assignment, and 42 months after assignment.[52] The survey covers the previous 12 months and captures demographic data as well as information about financial and non-financial outcomes. In particular, it asks a battery of questions designed to detect changes in expectations, attitudes, and behaviors.

4.1.2 MIS IDA monitoring instrument

Cash flows in IDA accounts are tracked by the Management Information System for IDAs (MIS IDA). Staff of the IDA program copy bank statements to MIS IDA monthly. They also use MIS IDA to collect demographic and financial data from participants at enrollment. Furthermore, staff record resource flows in and out of the program itself every six months.

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[52] The survey was revised slightly between the baseline and first follow-up, in part to reflect the requirements of the this BCA plan. A copy of the baseline survey is in Appendix D of Mills *et al.* (2000).

For cash flows in IDA accounts, MIS IDA is the authoritative source because the data come straight from bank records. The survey serves only as a cross-check. For all other data on treatments and controls, however, the survey is the authoritative source. Also, MIS IDA covers only treatments, but the survey covers both treatments and controls. Comparisons between the two groups require a single, consistent source of data. Finally, the survey—but not MIS IDA—asks about expectations, attitudes, and behaviors. These data are needed to test for the psychic effects of assets.

4.1.3 Desk review of tax laws

Changes in cash flows due to changes in tax liability are a large part of the financial benefits and costs of IDAs for participants, for private donors, and for federal, state, and local governments. Neither the survey nor MIS IDA collects tax data. Instead, taxes are estimated from income and asset data from the survey and from a desk review of federal, state, and local tax law. Estimates of how income and investment affect tax liability are derived from relationships published in the literature.

4.1.4 Site visits to the IDA program

Program staff use MIS IDA to record self-reports of resource flows—both in-cash and in-kind—between the IDA program, private donors, and government. It is possible, however, that staff conceptions of what constitutes a resource flow (and of the worth of in-kind flows) may not match perfectly with the conceptions required for the financial BCA. Thus, a series of site visits will clarify definitions and cross-check (but not audit)

the data in MIS IDA.[53] The analyst, due to greater knowledge of the purposes and methods of the financial BCA, may, upon review of budgets, letters associated with grants to the program, class syllabi, financial statements, and bank records, detect resource flows that were inadvertently overlooked or double-counted in MIS IDA.[54] In particular, in-kind flows are often overlooked or undervalued, so the site visit will attempt to price in-kind flows. For example, the analyst will ask landlords about the market price of discounted office space, volunteers about their wage rates, and program partners about the cost of free services.

Site visits last about one week. Visits are annual because most organizations produce budgets and tax returns annually.

4.1.5 Interviews with government and private donors

Mail or phone interviews with government agencies and with private donors will act as cross-checks on the reports of cash disbursements and technical assistance recorded in MIS IDA. These interviews will also ask for estimates of administrative costs related to the experimental site. If private donors are taxable, then a good estimate of the worth of their gifts is the tax write-off claimed. As with the site visit, the purpose is not to audit but rather to cross-check sources of data to ensure that all resource flows are recorded and valued as required for the financial BCA.

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[53] Furthermore, site visits reinforce to staff the importance of careful self-reports.

[54] Schreiner (2000b) suggests activities and questions for the site visit.

4.2 Data-analysis plan

4.2.1 Treatments and controls

4.2.1.1 Costs

The financial BCA of ADD measures costs for treatments and controls as net resource outflows. "Costs" can be positive (increases in outflows) or negative (decreases in outflows). Of course, negative costs are like benefits. MIS IDA provides records of cash outflows from treatments to IDAs, and the survey provides records of all other outflows from both treatments and controls. Table 1 summarizes the different types of outflows.

4.2.1.1.1 IDA deposits

Deposits from participants to their IDA accounts are cash outflows and thus count as costs when they take place. That deposits are counted as costs may come as a surprise, but the present-value framework treats all cash outflows—whether for consumption or for investment—as costs. Of course, cash inflows from IDA withdrawals count as benefits when they take place.

Accrued interest on IDA deposits is, for participants, neither an inflow nor an outflow and thus neither a benefit nor a cost. Accrued interest is like a withdrawal that is deposited right back in the IDA account. The inflow and outflow cancel each other out. Of course, accrued interest is counted as a benefit for participants when it is withdrawn. MIS IDA collects data on deposits and accrued interest.

4.2.1.1.2 Taxes paid

Taxes are outflows and thus count as costs for participants. If IDAs do help participants to earn more income, accumulate more assets, and become more self-sufficient, then participants will probably pay more taxes. If IDAs cause taxes to decrease, then the effect will show up as a negative cost.

4.2.1.1.2.1 Federal taxes

At the federal level, treatments and controls pay tax on income from wage jobs and from self-employment. They also pay FICA (social security) taxes.

The amount of income tax paid may be estimated from income data in the survey and from I.R.S. rules. Income may also be linked to tax liability through published relationships estimated from national surveys.[55] Tax estimates also should incorporate the effects of IDAs on income (and thus on receipt of the Earned Income Tax Credit), on home-ownership (and thus on the use of the home-mortgage interest deduction), and on the purchase of other tax-advantaged assets (such as Individual Retirement Accounts).

Deposits and accrued interest in IDA accounts are not tax-deductible, and so withdrawals for unapproved uses have no tax penalty. Withdrawals of IDA matches (and interest accrued on matches) are counted as gifts and thus are not taxed.[56]

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[55] Clones *et al.* (1995) do this.

[56] Boshara (2000). This tax treatment may change.

If a household owns all or part of a business, then profit taxes are computed as net income before taxes, multiplied by the profit-tax rate, multiplied by the share of ownership in the business. Data on business income and on ownership shares come from the survey, and the tax rate comes from the I.R.S. code.

Both households and businesses pay FICA taxes. For wage jobs, FICA taxes are computed as the personal FICA-tax rate multiplied by wage earnings from the survey. For businesses, FICA taxes are computed as the business FICA-tax rate, multiplied by the business's payroll, multiplied by the share of ownership in the business.

4.2.1.1.2.2 State and local taxes

Households and businesses may also pay state and local taxes on income, property, and purchases. State and local income taxes are computed based on state and local tax law just like federal income taxes.

Sales taxes are computed as earnings from wage jobs and self-employment net of changes in holdings of financial assets, multiplied by the sales-tax rate.[57] The survey records earnings and financial assets, and the site visit will record the sales-tax rate.

State and local property taxes are computed as local mill rates (gathered in the site visits) multiplied by the value of land, homes, and other taxable assets (gathered in the survey).

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[57] It is assumed that all income not spent on financial assets is spent on something subject to sales tax.

4.2.1.2 Benefits

The framework measures benefits for treatments and controls as net resource inflows. "Benefits" can be positive (increases in inflows) or negative (decreases in inflows). Negative benefits are like costs. Except for IDA withdrawals, all inflows for treatments and controls come from the survey. Table 2 lists the types of inflows.

4.2.1.2.1 Withdrawals from IDAs

Whether used for an approved purchase or not, withdrawals by participants of own deposits and accrued interest are inflows and thus are counted as benefits for the participant. Any balances left at the end of the time frame are assumed to be withdrawn.

Participants who make approved purchases receive inflows from IDA match accounts. These are counted as benefits. MIS IDA records all withdrawals of own deposits, interest, or matches.

4.2.1.2.2 Earnings

IDAs may affect earnings from wage jobs (through greater post-secondary education), from self-employment (through greater resources earmarked for microenterprise), and from other work not commonly thought of as a "business" (such as infrequent yard work or babysitting). The survey captures all three types of earnings.

Earnings are cash inflows and thus are benefits. In the case of wage jobs, however, IDAs may decrease earnings in two ways. First, IDAs decrease the cost of post-secondary education; at least in the short term, this may draw people out of the workforce and into school. Second, IDAs decrease the cost of microentrepreneurship and thus may draw people out of wage jobs into self-employment where they may earn less than would comparable workers in wage jobs.[58]

4.2.1.2.3 Public assistance

Receipts of public assistance are cash inflows that benefit treatments and controls. Of course, if IDAs increase incomes and/or assets, then they may decrease receipts of means-tested public assistance. The survey records inflows from public assistance.

Access to IDAs may reduce the use of Temporary Assistance for Needy Families (TANF), Supplemental Security Income, or General Assistance if it propels current recipients into self-sufficiency or if it helps to keep current non-recipients from becoming future recipients.[59] In contrast, the prospect of eligibility for the resource transfers embodied in IDAs may encourage some households to choose to decrease their earnings

[58] Schreiner (1999e).

[59] Sherraden *et al.* (2000) analyze how current and former welfare recipients can save in IDAs.

(and use more public assistance) so as to get access to IDAs or to maintain access to IDAs longer.[60]

IDAs likewise might increase or decrease the use of Medicaid. The survey asks about coverage by Medicaid, but not for the cost or value of that coverage. The cost is computed from published data on the average Medicaid expenses for people in a given range of income.[61]

Like other in-kind transfers, food stamps free up cash that the household would otherwise have spent on food. Thus, an inflow of food stamps is a benefit like any other inflow of cash.

Access to IDAs may affect the receipt of unemployment insurance either through its effects on self-employment (microenterprise) or through its effects on wage jobs (post-secondary education).

If IDAs are used to buy homes, then they may decrease receipts of housing assistance. The survey records the use of public housing or Section 8, the actual rent paid, and the hypothetical rent that would be paid in the absence of public assistance. The cash inflow is computed as the difference between hypothetical and actual rent.

Finally, IDAs may affect the receipt of other forms of means-tested public assistance such as cash subsidies for utility bills.

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[60] Moffitt (1986).

[61] This technique was used by Clones *et al.* (1995).

4.2.1.2.4 Pure net appreciation of assets

Pure net appreciation is a change in the worth of an asset for reasons unrelated to maintenance or consumption. Pure net appreciation is realized as a resource flow when an asset is sold. Appreciation is central in this evaluation because IDAs try to promote asset ownership.[62] To understand its measurement requires a discussion of resource conversions, whether from cash to non-cash forms or vice versa, from assets to the consumption of asset services, or from cash to consumption.

4.2.1.2.4.1 Resource conversions

Purchases of assets, sales of assets, maintenance of assets, and consumption of the services of assets are not flows of resources in and out of a household but rather conversions of resources between different forms within a household. For example, total resources are unchanged if a household buys a $100 house with $100 cash; resources in the form of cash are converted to resources in the form of a house. Likewise, a

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[62] For homes, businesses, stocks, and land and rental property, the survey asks for market worth at the time of the survey, purchases and sales since the previous survey, and cash expenditures for maintenance since the previous survey. Households may own three other major forms of non-human-capital assets: financial assets with fixed returns (such as cash, savings accounts, and bonds), consumer durables (such as furniture, clothes, and appliances), and vehicles. These assets do not appreciate, and they depreciate due to the consumption of their services. Thus, the worth of these assets either does not change or changes for reasons other than pure net appreciation. Thus, the financial BCA omits them. IDAs do affect the worth of human capital through purchases and maintenance (for example, through post-secondary education and through financial-literacy classes), but the effects of access to IDAs on the returns to human capital are realized as changes in levels of income or of consumption through time. Thus the survey already captures the effects of assets on human capital.

household that spends $30 on asset maintenance (for example, to convert $30 cash and a $100 house with an old roof into a $130 house with a new roof[63]) does not transfer the $30 cash to the outside world but rather converts it into a better roof. Resource conversions are not resource flows, so they do not enter the financial BCA as benefits or costs.

Pure net appreciation is a resource flow. An example of pure net appreciation is when the worth of a house increases from $100 to $150 because a vacant lot next-door is turned into a park. Likewise, pure net appreciation may arise from the use of non-asset resources (such as time and effort) to fix up a house (apart from increases in worth due to conversions of cash to construction materials).

Finally, consumption of the services of an asset—whether through cash spent on goods or services or through depreciation due to the use of the services of a non-cash asset—is not a resource outflow but rather a conversion. This conversion is not a loss to net out of the financial BCA because resources consumed by a household stay within the household. Furthermore, consumption, far from being a loss, is a goal; most people—except misers—work and save so as to consume more, whether now or later.

Suppose, for the moment, that cash spent on consumption (or the depreciation of non-cash assets due to the use of their services) were a resource outflow. Then, all else constant, financial BCA would imply that a household that earns and spends

[63] The BCA assumes that all cash spent on maintenance translates directly into greater asset value.

$1,000,000 in a year is just as well off as a household that earns and spends $1. Likewise, it would imply that a household that drives a new luxury car into the ground is as worse off than a household that drives an old clunker into the ground. But a household is better off, all else constant, if it consumes $1,000,000 instead of $1 or if it uses a new car instead of an old car. Consumption is much of well-being.[64] If the financial BCA intends to measure well-being, then it cannot count resources converted to consumption as outflows.

The rhetoric of IDAs tends to discuss consumption as if it were opposed to asset accumulation. In the short term, the dichotomy is real, because more assets now do require less consumption now simply because current resources must be allocated between assets and consumption. In the long term, however, the dichotomy dissolves; more assets now usually means both more assets and more consumption in the future because assets are not only stores of resources but also producers of additional resources. The tight link between assets and consumption through time is one of the most fundamental elements of most economic theories of growth and development.[65]

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[64] As discussed earlier, assets do have pure existence values. But the pleasure from the contemplation of ownership or existence can be seen as a form of consumption of asset services that does not reduce the worth of the asset in other uses.

[65] For example, see Ramsey (1929); Hubbard, Skinner, and Zeldes (1995); Dercon (1998); or Schreiner, Graham, and Miranda (1999).

None of this contradicts in any way the goals of IDAs. From the point of view of IDA programs, the goal is to help households to increase the amount of resources saved through time, so asset accumulation is an end in itself. From the point of view of households, however, the goal is greater consumption in the long term, and asset accumulation is only a means to this end, not an end in itself.

4.2.1.2.4.2 Pure appreciation, net of resource conversions

Like standard BCA frameworks, this framework computes pure net appreciation indirectly as a residual in an accounting identity that describes how the worth of assets evolves through time.[66] With the subscript for people and groups suppressed, assets at the end of the year a_t are equal to assets at the start of the year a_{t-1}, plus pre net appreciation α_t, plus cash expenditures on asset maintenance m_t, plus cash expenditures on asset purchases p_t, minus cash proceeds from asset sales s_t. Rearrangement gives pure net appreciation in terms of data collected in the survey:

$$\begin{aligned} a_t &= a_{t-1} + \alpha_t + m_t + p_t - s_t, \\ \alpha_t &= (a_t - a_{t-1}) + (s_t - p_t) - m_t. \end{aligned} \tag{14}$$

Pure net appreciation is the change in asset levels ($a_t - a_{t-1}$) not due to net sales ($s_t - p_t$) nor to maintenance (m_t). The survey records all the variables on the right-hand side of Equation 14.

[66] See Gittinger (1982).

The net resource flows y_t available for consumption or investment are cash inflows b_t, minus cash outflows c_t, (with cash spent on consumption excluded), plus pure net appreciation α_t:

$$y_t = b_t - c_t + \alpha_t. \quad (15)$$

Together, Equation 14 and Equation 15 give an expression for net resource flows y_t in terms of data collected in the survey:

$$y_t = b_t - c_t + (a_t - a_{t-1}) + (s_t - p_t) - m_t. \quad (16)$$

This assumes that resource flows from pure net appreciation are realized at the end of each year. Without this assumption, the formulae become very complex because they must track each individual asset rather than total assets.

4.2.1.3 Summary of costs and benefits for treatments and controls

In financial BCA, benefits and costs for treatments and controls are resource flows. Outflows are costs and include IDA deposits and taxes paid. Outflows do not include resource conversions within the household nor cash spent on consumption. Inflows are benefits and include withdrawals of IDAs deposits, of interest, and of matches; earnings; and receipts of public assistance. Pure net appreciation is also a benefit.

4.2.2 Non-participants

Non-participants are all people except treatments and IDA employees. The standard assumption in financial BCA is that there is zero impact on non-participants. This is the assumption adopted here. No data is collected on non-participants other than controls.

Nonetheless, IDAs may in fact affect non-participants. The main point of the discussion below is that the long-term effects of widespread access to IDAs for the average person in a population may differ from the short-term effects for participants because long-term, widespread access may change the overall context within which individuals act. These general-equilibrium adjustments could, from the point of view of society as a whole, attenuate the size of the impact of IDAs or even reverse its sign.[67] Of course, the general-equilibrium adjustments might also accentuate the positive effects on participants and have social effects whose benefits spill-over to non-participants. The central point here is that, although the BCA analysis assumes that non-participants are unaffected by IDAs, in fact there will be unknown effects on non-participants in the long term.

In principle, IDA programs might affect non-participants in two ways. First, non-participants pay taxes that support IDA programs. In the absence of IDAs, taxes

[67] Pollack (1998).

might be cut, or public funds might be spent on something else that would benefit non-participants (and perhaps even participants) more.

Second, IDAs subsidize the purchase of some types of assets. The subsequent increase in the demand for these assets might increase the market prices faced by non-participants. In particular, if only some of the poor use IDAs, then subsidies for them (probably the least poor of the poor) may act as taxes on other poor people without IDAs (probably the poorest of the poor). Of course, in the long term, higher prices will attract greater supply and perhaps even induce innovation that reduces the cost of a given supply (Hayami and Ruttan, 1985).

As an example of how IDAs might affect market prices in equilibrium, suppose that Figure 3 shows the supply and demand for low-cost houses.[68] Price is on the vertical axis, and quantity is on the horizontal axis. The demand curve slopes down from left to right because lower prices prompt more people to buy low-cost homes. The supply curve is vertical because, at least in the short-term, the number of homes in a given place is fixed; even if prices skyrocket, it takes time to find land, design plans, and construct.[69]

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[68] Figure 3 could also be interpreted as the market for skilled jobs, or as the market for customers for goods and services from microenterprises.

[69] Of course, if prices increase, then current homeowners are more likely to put their homes on the market. In practice, however, the short-term supply of low-cost homes (or of skilled jobs, or of customers for microenterprise) is not very price-sensitive because people are not quick to abandon their homes (or their jobs, or their current suppliers) in response to the chance to make a small increase in profits.

Without IDAs, supply and demand cross at price P^* and quantity Q^*. With IDAs, more people have more resources earmarked for the purchase of low-cost homes, so, at any given price, more people want to buy. Figure 3 shows this as a rightward shift of the demand curve. The supply of low-cost homes, however, stays stuck at Q^* in the short term. To balance supply and demand, prices rise to P^0. In this scenario, access to IDAs does help IDA participants to buy low-cost homes and to improve their long-term well-being, but it also pushes up the price of a low-cost home. This squeezes some non-participants out of the market, and this decreases their long-term well-being.[70] Of course, if higher prices in the short term induce innovation that decreases prices in the long term, then access to IDAs for IDA participants may actually increase access to low-cost homes for non-participants in the long term.

In the long term, higher prices increase profits and attract greater supply. Figure 3 shows this as a rightward shift of the supply curve to either Q^1 or Q^2. IDAs will indeed increase the long-term quantity of low-cost homes (or of skilled jobs, or of customers of microenterprise) to some unknown extent. Exactly where the equilibrium price settles is an empirical matter; it could be $P^1 > P^*$ or $P^2 < P^*$. Thus, IDAs may help or hurt poor non-participants.

[70] Non-participant homeowners would benefit from pure net appreciation.

IDAs for microenterprise may also harm non-participant entrepreneurs.[71] If markets for the goods and services of microenterprises have little slack, then subsidies for some owners of small firms are taxes for other owners of small firms, at least in the short term if not also in the long term. In fact, the standard assumption in government evaluations of microenterprise programs in Great Britain is that 50 percent of net benefits to participants come at the cost of displacement of non-participants.[72]

Likewise, the short-term supply of jobs that require post-secondary skills is probably less than perfectly elastic. Thus, some participants who use IDAs to acquire skills will displace some non-participants with the same skills.

Just as some benefits for participants are transfers from government and so have no effect (otherwise than deadweight costs) on the well-being of society as a whole, some benefits for participants may also be transfers from non-participants with no net effect on social welfare.[73] Unlike transfers to participants from government, however, transfers to participants from non-participants are very difficult to measure because

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[71] Bates (1997) suggests that subsidized loan programs meant to foment microenterprise in the inner city often merely displaced those firms that were not lucky enough to get a loan or that were not dishonest enough to default.

[72] Bendick and Egan (1987).

[73] For example, pure net appreciation may sometimes only transfer resources from people who want to buy assets to people who already own assets (Browne and Gleason, 1996).

they depend on the unknown elasticities of supply and demand, on spillover effects between markets, and on long-term general equilibrium.

The story told here is purposely simplified to make a simple point; IDAs have long-term, general-equilibrium effects on the markets for the assets that they subsidize and therefore cause benefits and costs not just for participants but also for non-participants. The real world is more complex than has been suggested here; for example, some participants may leapfrog the market for low-cost homes, or supply may be more elastic than supposed here. Furthermore, IDAs may benefit participants and/or non-participants in non-market ways. For example, home ownership has positive effects on the neighborhood, not only on property values but also on the behaviors of children.[74] IDAs may also promote a culture of saving and ownership with myriad positive, self-reinforcing effects for all citizens, as seems to have happened in Singapore.[75] Likewise, the economy as a whole may become more productive and efficient because IDAs help microentrepreneurs to prospect new market niches and because IDAs increase the supply of skilled workers. The community-level impact analysis in ADD may give some insight into the qualitative nature and magnitude of these benefits and costs.[76]

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[74] Boshara, Scanlon, and Page-Adams (1998).

[75] (Sherraden *et al.*, 1995).

[76] Sherraden *et al.* (1995).

As stated above, the financial BCA of ADD makes the standard assumption that IDAs have no effect on non-participants. Effects on non-participants, while real and important, are simply too difficult to measure with any reasonable degree of confidence.

4.2.3 Federal government

For the federal government, costs result from cash outflows for disbursements to IDA programs, for the administration of these disbursements, and for public-assistance programs. Benefits result from cash inflows from reimbursements from IDA programs and from tax receipts. Tax breaks for private donors to IDA programs reduce cash inflows from taxes and thus are negative benefits.

4.2.3.1 Costs to the federal government

4.2.3.1.1 Disbursements to IDA programs

The federal government incurs a cost when it disburses cash to IDA programs to pay for IDA matches and for program administrative expenses (Table 3).[77] MIS IDA records the amount disbursed, and this is cross-checked with government records and with program staff in the site visits.

[77] Evaluation expenses—such as the cost of the financial BCA—are omitted on the assumption that a "normal" IDA program would not incur them.

4.2.3.1.2 Administrative expenses

The federal government also bears costs for the payroll and administrative overhead of the employees who oversee IDA disbursements. The analysis asks government administrators to estimate the share of their time spent on IDA matters. This share is then multiplied by the payroll and overhead expense for the administrators as derived from agency budgets.

4.2.3.1.3 Public assistance

IDAs may increase self-sufficiency and thus decrease cash outflows for TANF, Medicaid, food stamps, unemployment insurance, supplemental security income, public housing, Section 8 subsidies, and other forms of means-tested public assistance. Such reduced cash outflows are like benefits for the federal government because they are negative costs. Changes in cash flows for public assistance from the point of view of the federal government mirror the changes in cash flows for public assistance from the point of view of participants, as already discussed above.

Benefits from decreased outflows accrue to federal, state, and local governments. The share of cash savings allocated to each level is proportional to the share of a given type of public assistance funded by that level. For example, if the federal government pays for 100 percent of food stamps, then it is allocated 100 percent of any change in outlays for food stamps.

4.2.3.2 Benefits to the federal government

4.2.3.2.1 Reimbursements from IDA programs

The analysis assumes that, at the end of the time frame, the IDA program reimburses all federal funds that are unspent and uncommitted to participant matches. This is a benefit for the federal government (Table 3). Federal funds recorded in MIS IDA are cross-checked with government records and with local IDA programs in the site visits.

4.2.3.2.2 Tax receipts

Federal income taxes and FICA taxes are transfers from participants to the federal government. Participants pay these taxes if they earn wages or if they own small firms. Taxes received by the federal government are equal to taxes paid by participants, as described above.

4.2.3.2.3 Tax breaks for private donors

Grants from taxable donors to not-for-profit IDA programs are tax-deductible and may even qualify for tax credits.[78] The consequent decrease in tax receipts is like a

[78] The "Savings for Working Families Act of 2000" would give banks a 90-percent tax credit (and non-banks a 50-percent credit) for grants to IDA programs, up to $100 million per bank per year (Boshara, 2000). This might pump billions into IDAs, although the different credit rates for banks and non-banks seems odd. Because support for IDA programs helps banks comply with the Community Reinvestment Act, the proposed law might let banks substitute IDAs for some of their current non-IDA CRA efforts and still meet the mandate. Furthermore, instead of banks bearing 100 percent of the cost of their CRA efforts, taxpayers would foot 90 percent of the cost of IDA program, and non-participants might benefit from less CRA activity. Thus, the

cost for the federal government because it is a negative benefit. Grants to IDA programs from not-for-profits do not affect tax receipts because not-for-profits are not taxed anyway.

The analysis assumes that for-profit donors would not, in the absence of IDAs, have made similar donations to other not-for-profit causes. The level of tax breaks is computed from the I.R.S. code, data from MIS IDA, data from the site visit, and from interviews with private donors.

4.2.4 State and local government

Benefits and costs for state and local government (Table 4) resemble those of the federal government. The most important differences are that state and local governments collect sales taxes but not FICA taxes and that state and local governments do not contribute to some forms of means-tested public assistance.

4.2.4.1 Costs for state and local government

State and local governments incur costs for disbursements to IDA programs and for administration. These are measured as they were for the federal government.

State and local governments also contribute to TANF, general assistance, unemployment insurance, and other means-tested programs. These costs are computed as they were for the federal government. Changes in flows due to IDAs are allotted

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proposed law, although it would probably benefit poor people who get access to IDAs because of the law, might not benefit society as a whole or even the poor in general.

among levels of government in proportion to how the programs were funded.

4.2.4.2 Benefits for state and local government

State or local governments benefit from cash in the IDA program at the end of the time frame that is assumed to be reimbursed.

Furthermore, state and local government benefit from cash inflows from state and local income taxes from wage workers and firms and from sales taxes from households and firms. Income taxes are computed as the state or local tax rate multiplied by adjusted gross income as computed in the estimation of federal taxes. State and local taxes on net revenues from businesses are computed in the same way as they were for federal taxes. Inflows for state and local government from sales taxes mirror outflows computed for participants.

Finally, tax breaks reduce tax receipts from for-profit donors and thus are negative benefits. These are computed as were tax breaks at the federal level.

4.2.5 Employees and administrators of local IDA programs

The people who run IDA programs require that their benefits exceed their costs.[79] If not, no one will run the programs, or employees will divert program resources to perks or to a "quiet life".[80]

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[79] The analysis assumes that psychic benefits from altruism are part of the total benefits that employees compare to their total costs.

[80] Berger and Udell (1998), Schreiner (1997).

From the point of view of IDA employees, costs are the time and effort required by work in the program. Benefits include wages, perks, and the psychic rewards of helping the poor.[81] Employees compare these net benefits to net benefits in their best alternative job. The difference between the two choices is almost impossible to measure without a control group of people who are qualified and willing to be IDA employees but who are denied the chance to work as an employee in an IDA program through no fault of their own.[82]

The financial BCA of ADD follows common practice and assumes that benefits and costs for IDA employees are zero.[83] The framework explicitly mentions employees as a distinct group of stakeholders because an IDA program cannot be successful from the point of view of society as a whole unless it is also successful from the point of view of the employees who run the program.

4.2.6 Private donors

Private donors include foundations that give cash to IDA programs or that pay for consulting services; not-for-profits that discount services; individuals who give cash

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[81] In addition, some low-wage IDA employees are also IDA participants.

[82] Even if wages and perks in the best alternative job were known, psychic rewards would still be difficult to measure in units with inter-personal reliability.

[83] If employees do not quit, then they probably believe that their benefits exceed their costs (Schreiner, 1997).

or time; depository institutions that waive fees, boost interest rates, or modify systems to accommodate IDAs; and not-for-profit organizations that host IDA programs.

4.2.6.1 Costs

Private donors bear costs from outflows in-cash and in-kind to an IDA program (Table 5). In-kind transfers are equivalent to in-cash transfers because the donor could have made a cash grant restricted to a specific purchase. As a general principle, the measure of resource flows should be invariant to the arbitrary choice to transfer cash versus goods or services.[84]

As a rule, the analysis values in-kind transfers at the market price for equivalent goods or services. Donors estimate the likely market prices of their in-kind donations.

4.2.6.1.1 Disbursements to IDA programs

For private donors, cash disbursements to IDA programs are costs. They appear in MIS IDA and are cross-checked in the site visits and in interviews with donors. Documentation of cash disbursements should be excellent and simple to obtain.[85]

4.2.6.1.2 Administrative expenses of donors

Apart from donated resources, the act of donation itself requires resources for the payroll and overhead of those who administer relationships with recipient IDA

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[84] Schreiner and Yaron (1998).

[85] If not, then the program might not merit evaluation (Moll, 1997).

programs. The share of administrative expenses of private donors allocated to the IDA program is computed as for government donors.

4.2.6.1.3 Grants from the host organization

Most IDA programs are not housed in single-purpose IDA organizations. Rather, they are grafted into host organizations that do more than just IDAs. If the cash expenses of the IDA program exceed cash donations earmarked for IDA administration, then the host organization, perforce, makes up the difference from its own pocket. Resources put into the IDA program by the host organization are resources not put into other programs, so they are costs just like any other outflow from any other private donor.

The analysis derives grants from the host—as in the case of pure net appreciation for participants—as the residual in an accounting identity. Sources of resources earmarked for administration—from the host and from other public or private sponsors—must equal uses of resources in administration. Thus, grants from the host are computed as the administrative expenses of the IDA program minus funds from other sponsors earmarked for administration.[86]

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[86] An alternative is to ask the host how much it gives to the IDA program. Indeed, the site visits do this as a crosscheck, but it is usually difficult to isolate the cost of a single program within a multi-program organization (Rosenberg, Christen, and Helms, 1997; Inter-American Development Bank, 1994). The residual technique works because much—if not all—of the resource outflows from the host organization are in-kind and because it is simpler to measure resource outflows from the point of view of the IDA program than to measure resource outflows from the point of view of the host organization.

IDA administrative expenses recorded in MIS IDA are cross-checked in a site visit.[87] Disbursements from other sponsors earmarked for administration are measured in MIS IDA, the site visits, and interviews with donors.

4.2.6.1.4 Discounts on goods or services

Discounts are savings from lower-than-market prices. For example, a landlord might rent office space to an IDA program for $600 per month when the going rate is $1,000 per month. Discounts are like cash gifts; the landlord could transfer the same resources if she replaced the discount with a cash gift of $400 and charged $1,000 rent.

Discounts are computed as the market price minus the discounted price. The market price of resources not actually sold in the market is proxied by the price of similar resources that are sold in the market. The site visits ask the IDA program and donors about discounted transfers, prices paid by the IDA program, and normal market prices.

4.2.6.1.5 In-kind donations

In-kind donations have a 100-percent discount.[88] IDA programs often receive large transfers in-kind, so accurate measurement deserves great care. Some in-kind donations—whether adjustments by depository institutions, volunteer labor, or other

[87] Schreiner (2000b).

[88] In-kind donations are free gifts. In contrast, IDA programs pay something (but less than the market price) for discounted resources.

types—may be recorded in MIS IDA, but they will in any case be cross-checked in site visits and valued in interviews with donors at their likely market price.

4.2.6.1.5.1 Adjustments by depository institutions

Depository institutions that hold IDA accounts may adjust to accommodate IDAs. For example, they may send monthly account statements not only to participants but also to IDA administrators, write new software to send data electronically to the IDA program, or adopt new protocols to protect match funds from fraudulent withdrawal. Furthermore, they may waive minimum-deposit rules and maintenance fees for IDAs or even boost the interest rate paid on IDA accounts.

These services are in-kind donations because, if they were not free, then the IDA program would have to pay for them. The site visits enumerate adjustments made and their costs to the depository institution. Most costs are from foregone fees and from the time spent by employees on IDAs, valued as a share in total expenses for payroll and overhead. Tax write-offs for IDA work claimed by depository institutions provide excellent estimates of costs and of the implicit resource outflows from the IDA program.

4.2.6.1.5.2 Volunteers

IDA programs often use volunteer labor. Examples include full-time VISTAs, part-time individuals, and unpaid teachers of financial-literacy courses. Volunteers might also contact participants to encourage them, refer potential applicants to the IDA program, provide free or discounted services to participants referred by IDA

programs, advise participants on business plans or on tax returns, or provide translation services.

Volunteer labor is worth the cash price of similar labor on the market. IDA programs self-report hours of volunteer labor in MIS IDA. The site visits cross-check this and ask administrators and volunteers about the amount of volunteer labor and about its potential market worth.

4.2.6.1.5.3 Other in-kind donations

Other common in-kind donations include advertising space or air time, mailing lists, airfare and lodging at conferences or meetings with donors, and consultancies. MIS IDA does not record these, so the site visits check for their existence and importance through a review of program and donor records.

4.2.6.2 Benefits

Private donors benefit from reimbursements of funds previously transferred to IDA programs and from tax breaks linked to their donations (Table 5).

4.2.6.2.1 Reimbursements from IDA programs

Cash from a private donor unused by the IDA program is assumed to revert to the donor at the end of the time frame. For the donor, the inflow is a benefit. If the IDA program does not explicitly link the source and use of specific dollars, then reimbursement is computed as the total amount of unused donated funds, pro-rated

among public and private donors according to their original disbursements. Pro-rating is not needed if donated funds are administratively linked to specific uses.

4.2.6.2.2 Tax breaks

For-profit firms and individuals may claim tax write-offs for their donations. The reduction in tax liability is like a cash transfer from government. When possible, the specific tax write-off claimed—as reported in interviews with donors—is used in lieu of the estimates described above in the discussion of the estimation of the costs of the government.

4.2.7 Society as a whole

Financial benefits and costs for society as a whole are the aggregate of financial benefits and costs for the other six groups of stakeholders. In Table 6, the rows list types of flows, and the columns list groups of stakeholders. A minus sign ("–") marks costs for a given group, and a plus sign ("+") marks benefits. Empty cells mean that a given group is unaffected by a given resource flow. All effects for non-participants and for IDA employees are assumed zero.

For each type of flow, the rightmost column is the net benefit for society as a whole. This is the sum across columns for the other six groups of stakeholders. For example, IDA deposits are outflows (costs) for participants followed later by inflows (benefits). The sum for society is negative because the outflows take place first and so

are discounted less. For society, net flows from taxes, public assistance, and tax breaks are zero because they are simultaneous transfers among the other six groups.

The last row of Table 6 sums the column effects. Each stakeholder has benefits and costs, so the sign of the net effect is unknown, shown with a question mark ("?").

The bottom-right cell is the net effect for society as a whole. This is computed either as the sum across columns of the net effects for the other six groups of stakeholders or as the sum across rows of the net effects for each type of flow. Whether social benefits exceed social costs is unknown.

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Appendix 1: Average Financial Cost Analysis

IDAs are a single intervention with multiple effects.[89] Although many of these effects are quantitative, some quantitative effects are difficult to value in units of dollars and so cannot enter the financial BCA. The overall cost-effectiveness analysis, however, should consider them.

Average financial cost analysis is one tool to do this. It compares a quantitative change (for example, in the probability of voting) with net benefits from the financial BCA. Given a point of view, the average financial cost of a unit of impact is defined as the quantitative change divided by the net financial benefit.

For example, suppose that net financial benefits to participants per year of participation are –$50. Then suppose that a year of participation, in addition to the financial effects, increases the probability of voting by 5 percentage points and also increases the probability of expecting a child to attend college by 4 percentage points. Then the average financial cost of a 1-percentage-point increase in the probability of voting is 5 / $100 = $20. Likewise, the average financial cost of a 1-percentage-point increase in the probability of expecting a child to attend college is 4 / $100 = $25.

Average financial costs are not additive across effects. For example, a year of participation and $100 in financial costs provide both a 5-percentage-point increase in

[89] Sherraden (1999) says that this makes IDAs an example of "strong policy". Yadama and Sherraden (1996) attempt to test if asset ownership has multiple effects.

the likelihood of voting and a 4-percentage-point increase in the likelihood of expecting a child to attend college. In this sense, average financial costs are overstated; some of the $20 cost of a 1-percentage-point increase in voting is really part of the cost of the concurrent 1-percentage point increase in the expectation that a child will attend college. Average financial costs understate average total costs, however, because some costs are not financial and are thus ignored.

Average financial cost analysis is useful because it compares quantitative, non-cash effects to net financial benefits. In the example above, the overall judgement of the worthwhileness of IDAs would hinge not on the net financial loss of $50 alone but rather also on whether the increases in voting and in hope for children are great enough to compensate for the net financial loss.

The survey captures the effects of IDAs on the following types of quantitative, non-financial outcomes. The effects are measured as the differences in outcomes between treatments and controls.

<u>Human capital</u>

- Education
  - Grades completed
  - Degrees and certificates earned
  - Participation in job-training
- Health
  - Health status
  - Coverage by private health insurance
- Mental health
  - Satisfaction with life in general
  - Respect from others
  - Feelings of self-esteem and self-efficacy

Employment

- Wage-employment status
  - Hours worked
  - Earnings per hour
- Self-employment status
  - Hours worked
  - Earnings per hour
  - Small-business start-up rate
  - Plans to start a small business

Physical capital

- Housing
  - Homes purchased
  - Home-ownership rate
  - Home maintenance and repair completed
  - Time spent in search of a house
- Ownership rate of rental property or land
- Ownership rate of durable household goods
  - Vehicle
  - Refrigerator
  - Stove
  - Computer
  - Clothes washer
  - Clothes dryer
  - Window air conditioner
  - Freezer
  - Dishwasher
  - Sewing machine

Financial capital

- Bank-account ownership
  - Balance in savings or checking accounts
  - Savings earmarked for education
  - Savings accounts held by children
- Satisfaction with financial capabilities
- Use of check-cashing outlets
- Savings habits
  - Propensity to save from a windfall
  - Use of budgets

    - Use of rules, goals, or plans for financial savings
- Stock ownership
- Debts owed
- Business assets
- Business net worth
- Household assets (net of business net worth)
- Household net worth (net of business net worth)

Social capital

- Family
    - Marital status
    - Divorce rate
    - Household composition
    - Quality of family relationships
    - Maturity in the resolution of household disputes
- Community
    - Parental involvement in school
    - Involvement in the neighborhood
    - Use of formal and informal support networks
    - Types of retail, grocery, and furniture stores used

Hope

- Expectations for the future education of children
- Expectations for the future financial situation of children
- Frequency of the discussion of the future with children

The overall cost-effectiveness analysis consider net financial benefits (a single number), quantitative non-cash effects and their average financial costs (a list of numbers), and qualitative benefits and costs and an explicit estimation of their likely importance (a verbal discussion). Whether benefits exceed costs overall is a judgement call, and the best that the analysis can do is to make the judgement carefully and explicitly so that improvements easier to make.

Table 1: Financial costs for treatments, controls

Cash outflow	Source of data
IDA deposits	MIS IDA, survey
Taxes paid	
Federal	
Income	
Job	Survey, I.R.S. code
Business	Survey, I.R.S. code
FICA	
Job	Survey, FICA law
Business	Survey, FICA law
State and local	
Income	
Job	Survey, state and local tax law
Business	Survey, state and local tax law
Property and sales	
Job	Survey, state and local tax law
Business	Survey, state and local tax law

Table 2: Financial benefits for treatments, controls

Cash inflow	Source of data
Withdrawals of IDA savings	
Deposits	
Approved	MIS IDA, survey
Unapproved	MIS IDA, survey
Interest earned	
Approved	MIS IDA, survey
Unapproved	MIS IDA, survey
Withdrawals of IDA matches	MIS IDA, survey
Earnings	
Wage employment	Survey
Self-employment	Survey
Other earnings	Survey
Public assistance	
TANF	Survey
Supplemental security income	Survey
General assistance	Survey
Medicaid	Survey, cost per user of Medicaid
Food stamps	Survey
Unemployment insurance	Survey
Public housing	Survey
Section-8 subsidies	Survey
Other (*e.g.*, utility assistance)	Survey
Appreciation of assets	
Home	Survey
Business	Survey
Property or land	Survey
Stocks	Survey

Table 3: Financial costs and benefits for the federal government

Cash outflows (costs)	Source of data
Disbursements to IDA programs	MIS IDA, govt. budgets, site visit
Administrative expenses	Govt. budgets, administrative estimates
Public assistance	
TANF	Survey
Supplemental security income	Survey
General assistance	Survey
Medicaid	Survey, cost per user of Medicaid
Food stamps	Survey
Unemployment insurance	Survey
Public housing	Survey
Section-8 subsidies	Survey
Other (*e.g.*, utility assistance)	Survey

Cash inflows (benefits)	Source of data
Reimbursements from IDA programs	MIS IDA, govt. budgets, site visit
Tax receipts	
Income	
Job	Survey, I.R.S. code
Business	Survey, I.R.S. code
FICA	
Job	Survey, FICA law
Business	Survey, FICA law
Tax breaks for private donors	Site visit, MIS IDA, I.R.S. code, interview with private donor

Table 4: Financial costs and benefits for state and local governments

Cash outflows (costs)	Source of data
Disbursements to IDA programs	MIS IDA, govt. budgets, site visit
Administrative expenses	Govt. budgets, administrative estimates
Public assistance	
TANF	Survey
General assistance	Survey
Unemployment insurance	Survey
Other (*e.g.*, utility assistance)	Survey

Cash inflows (benefits)	Source of data
Reimbursements from IDA programs	MIS IDA, govt. budgets, site visit
Tax receipts	
Income	
Job	Survey, state and local law
Business	Survey, state and local law
Sales	
Job	Survey, state and local law
Business	Survey, state and local law
Tax breaks for private donors	Site visit, MIS IDA, state and local law, interview with private donor

Table 5: Financial costs and benefits for private donors

Cash outflows (costs)	Source of data
Disbursements to IDA programs	MIS IDA, donor records, site visits
Administrative expenses	Donor records, interviews
Cash donations from parent organization	MIS IDA, program and donor records, site visit
Discounts on goods and services	Program and donor records, interviews
In-kind donations	
Adjustments to systems or accounts	Donor records, interviews
Volunteer time	Program and donor records, interviews
Other in-kind donations	Program and donor records

Cash inflows (benefits)	Source of data
Reimbursements from IDA programs	MIS IDA, donor records, site visits
Tax breaks	Donor and program records, interviews, federal, state, and local tax law

Table 6: Expected financial benefits and costs for six groups of stakeholders and for society as a whole

Flow	Participants	Non-participants	Federal govt.	State and local govt.	IDA employees	Private donors	Society as a whole
IDA deposits	–, +						–
IDA interest	+						+
IDA matches	+						+
Taxes	–		+	+			
Public assistance	–		+	+			
Earnings	+						+
Pure net appreciation	+						+
Tax breaks			–	–		+	
Disbursements			–	–		–	–
Reimbursements			+	+		+	+
Admin. expenses			–	–		–	–
Discounts						–	–
In-kind donations						–	–
Column sum	?		?	?		?	?

Figure 1: Financial BCA in the Context of the Overall Cost-Effectiveness Evaluation

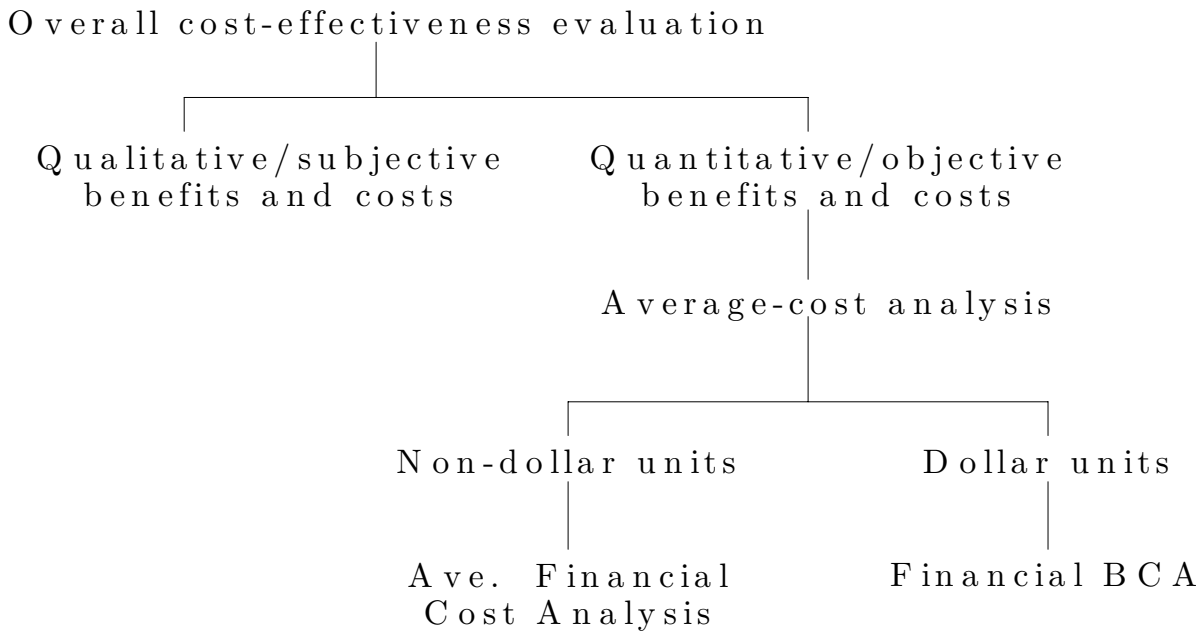

Figure 2: Example assumptions about extrapolation past time T

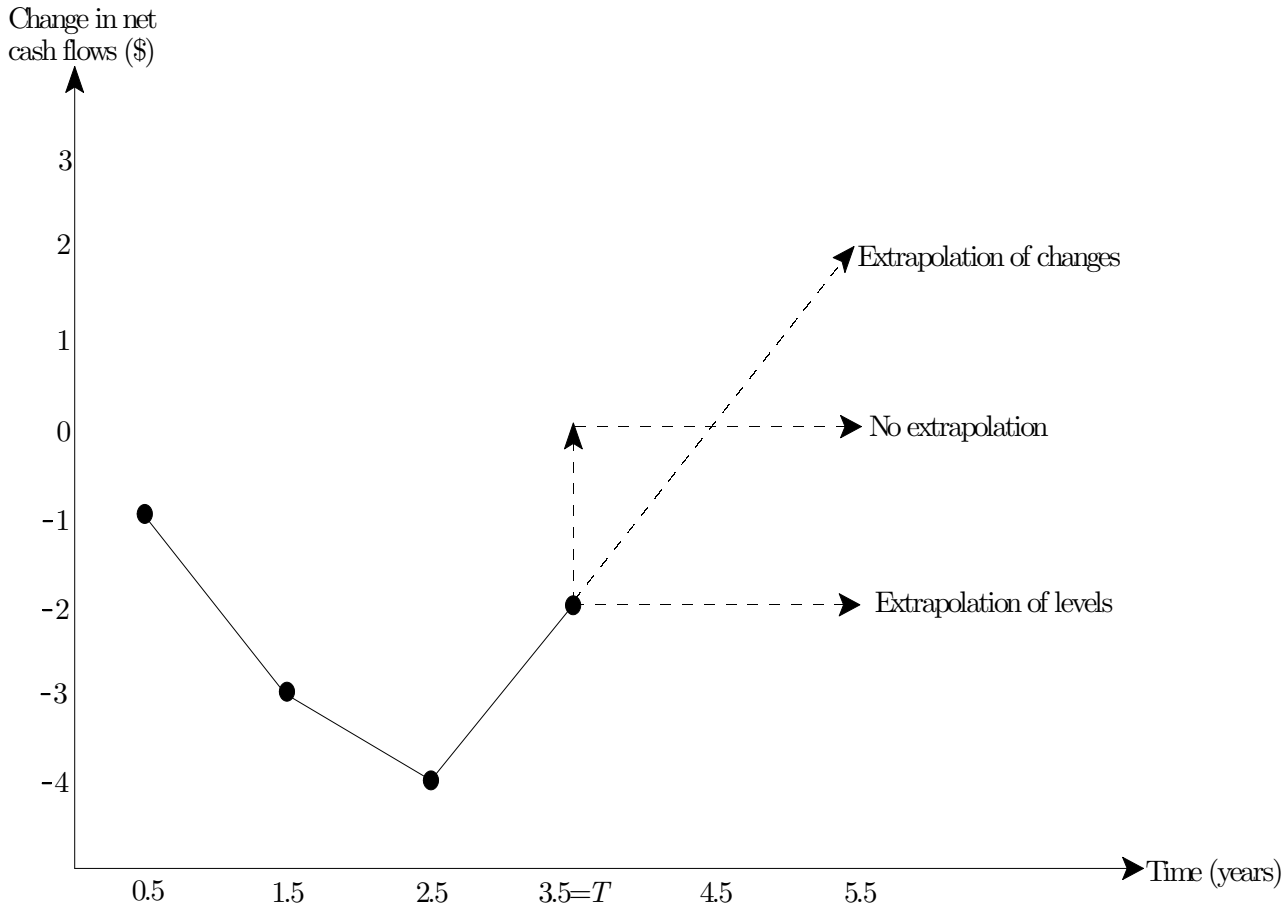

Figure 3: Possible General-Equilibrium Effects of IDAs on Market for Low-Cost Homes, Educated Labor, or Microenterprise