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Using an Economic Balance Sheet for Financial Planning

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Why is a *household balance sheet* an important tool for setting the investment policy and strategy of an individual or family? First, a balance sheet contains information about wealth — information that is missing from the traditional financial planner's comparison of income to expenses. Moreover, as we shall see below, the exercise of building a household balance sheet provides a quick scorecard or reality check that helps to determine whether the household is able to afford its goals and which trade-offs it may have to make to do so.

A balance sheet, in particular an *economic balance sheet* containing market (rather than book) values and embracing all assets including intangibles such as human capital, provides a snapshot of a household's overall financial strength and contains information that cannot be conveyed in any other way. While balance sheets are old hat to accountants and financial economists, their use is unfamiliar to many in the financial planning community. This essay is about market value balance sheets and how they help solve financial planning problems.

A balance sheet compares assets to liabilities. We argue that the income stream that a would-be retiree expects to need is that person's *liability;* some economists call it the consumption liability.[1] The investor accumulates assets to pay this liability. It is more conventional to think that the investor's goal is to produce enough *income* to match, in size and timing, the income requirements making up the liability; but income is simply a transformation over time of assets into liquidity, the "fruit" of the asset "tree."

Thus, lifetime financial planning, including retirement planning, is an asset-liability management problem — not just an income management problem. This is quite important because many advisors act only to manage income or cash flows, projecting out into the future all of the relevant cash inflows and outflows and then seeing what it takes to make them equal. Because an economic balance sheet reports on the value of one's assets and liabilities, it is the basic tool of asset-liability management.

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[1] See, for example, Huang, Huaxiong, and Moshe Milevsky, "Lifetime ruin minimization: should retirees hedge inflation or just worry about it?" *Journal of Pension Economics and Finance,* volume10, issue 03 (July 2011), pp. 363-387.

Here is a greatly simplified balance sheet for an individual:

Figure 1
Basic Form of Balance Sheet

Assets	Liabilities
Human capital	Consumption liability (present value of expected future consumption)
Financial capital	Mortgages and other debts
	Surplus (Deficit)

To most people, the balance sheet in Figure 1 is strange indeed — enough so that if there are accountants among our readers, they might want our accounting license revoked. But we don't have one — we're financial economists. Figure 1 is an *economic* balance sheet, not an accounting one, and is the relevant one for financial planning.

The accountant's main objection is: "How can you count, as an asset, a sum of money that hasn't been generated yet?" The answer is that an economic balance sheet compares the economic value of assets to that of liabilities — and the economic value of an asset is based on the income an asset can generate, while the accounting or book value is based on what you paid for the asset (minus depreciation). Economic assets include, most importantly, human capital, which is the present value of expected future labor income. Human capital has no book value because you did not pay for the brain inside your head, or the agility of your hands and the strength of your body, but it has economic value because the brain and hands and body can be used to generate income.

Other economic assets include real estate and businesses owned by the investor; expected pension benefits, bonuses, severance pay, and stock option profits; annuities and insurance policies; expected non-cash benefits, such as post-retirement medical care; and expected transfers (Social Security and other government benefits, inheritances, and gifts). On an economic balance sheet, the market value of these assets is added to the value of conventional financial assets such as stocks, bonds, and cash.[2]

Economic liabilities include the present value of expected future consumption, taxes, and gifts and bequests to others. Like economic assets, these are added to ordinary accounting liabilities such as mortgage balances and other debts.

Note that we have repeatedly used the word "expected." "Expected" means "averaged across all scenarios, where the weights are the likelihood of each scenario occurring." We have also emphasized present value, meaning that the relevant

[2] By "stocks," "bonds," and so forth, we mean, of course, mutual funds and ETFs that hold these securities on behalf of the investor, as well as stocks and bonds directly held.

number in each case is the value today, discounted back from the future at a properly risk-adjusted rate, of whatever it is we are trying to measure.[3]

"I'm Not Broke, I'm Rich!"

The real-life importance of all this — the "wow" moment — came to one of us as an unemployed business-school graduate about 35 years ago. With tens of thousands of dollars in student loans, we felt broke. We then made up a balance sheet including human capital. (You do learn a few valuable skills in business school.) We were worth millions of dollars!

Of course, we also had a consumption liability of millions of dollars, plus the aforementioned loans. But the key insight was that the imbalance, or negative net worth, was trifling as a percentage of total wealth. The problem could easily be rectified by getting a job, so that is what we did.

Why Balance Sheets are Relevant to Financial Planning

In financial planning, the liability is all you really care about. The only reason that one bothers to gather assets is to pay that liability. For most households, their investment assets are a means to an end, rather than an end itself. Thus, it is vitally important to compare assets to liabilities in meaningful economic terms and to keep the balance sheet up to date. We envision a world in which households will receive a periodically (at least quarterly) updated balance sheet along with, or perhaps instead of, their investment asset statements.

An economic balance sheet provides a holistic view of a person's overall financial status that cannot otherwise be easily obtained. It captures, in a snapshot, the financial strength of a household including its future earning power and future spending needs or plans. If household spending goals are summed up over time, and a present value is calculated and treated as a conceptual "liability," the goals can be assessed for realism by comparing the liability to the assets available to pay it.

A balance sheet sums up information over time (potentially over a whole lifetime) rather than focusing, as an income statement does, on the resources generated and consumed over a given short period of time. Based on the information in an economic balance sheet, one can start talking more meaningfully about the household's debt capacity and risk capacity, so that one can make realistic judgments about what financial commitments can and cannot be made.

The balance sheet approach makes sensitivity or "what-if" analysis easy and meaningful. One can also make forecasts of future balance sheets. In addition, balance sheets can be used to make meaningful across-household comparisons. To sum up, the balance sheet is a sort of scorecard that captures a wealth of knowledge that is not revealed by an income statement or by other planners' tools such as forward projections of asset values invested at different rates. It enables the planner to answer questions like these:

[3] Thus, a tax that must be paid is treated as a certainty and discounted to a present value at the risk-free rate. A highly uncertain stock option profit that may or may not occur is discounted at a much higher rate.

- Will my wife be able to live comfortably without my income?
- How much life insurance should I buy?
- Should I sell my vacation home? Would it help me reach my goals?
- Can I afford to give $100,000 to charity?
- How large a bequest can my children expect? What might cause this forecast to be wrong?
- Can I afford a new car *and* the cost of my daughter's wedding?

Balance sheets are not the only tool a planner needs. A financing decision, for example the decision as to whether to take on a mortgage, requires the information in an income statement, since debt needs to be serviced with cash flow. A household that is asset-rich, but poor in cash flow, might be induced to overspend using balance sheet information alone since the balance sheet does not provide insight into "liquidity traps." But, by using a balance sheet, we can accumulate basically all the information we need to come up with an investment policy for an individual or household saving for retirement and other expenses.

What is Human Capital? Is it a Balance Sheet Asset?

First, let's establish that human capital is an asset, worthy of being counted on a balance sheet. Benjamin Franklin rhetorically asked, "Of what use is a baby?" He meant that something (in Franklin's case, the concept of travel by lighter-than-air craft) — or someone — might have value even if the value has not yet been realized.

A stock is worth $x because you can get $x for it, but why can you get $x for it? Because other people believe that the company will generate a stream of earnings, dividends, residual value, etc., out into the future. This is true whether the company has any book value or not. Now, a human being is also expected to generate earnings, not with certainty but the company's earnings aren't expected with certainty either, and the human being's earnings can be capitalized — reduced to a present value at an appropriate risky discount rate — just like the company's. Thus it is just as economically sensible to put a person's human capital as it is to put a stock on a balance sheet.

The present value of a person's consumption liability is an equally valid balance sheet item. Think of the person's consumption as the stream of cash flows needed to finance the human-capital asset. Food, shelter, health care, fine wine (OK, kidding) are the inputs the person needs in order to produce whatever he or she produces.

We can extend these principles to anything that is expected, with a nonzero probability, to put money in the person's pocket at any time in the future. (We could, with equal justification, put anything that generates utility — sunsets, visits from one's grandchildren, etc. — or disutility — taking out the garbage — on the balance sheet, but since we are financial planners, not utility planners, we'll skip that appealing step. But we'll note that utility planning might be a promising occupation for somebody.) Thus expected inheritances, government transfers, etc., are economic assets.

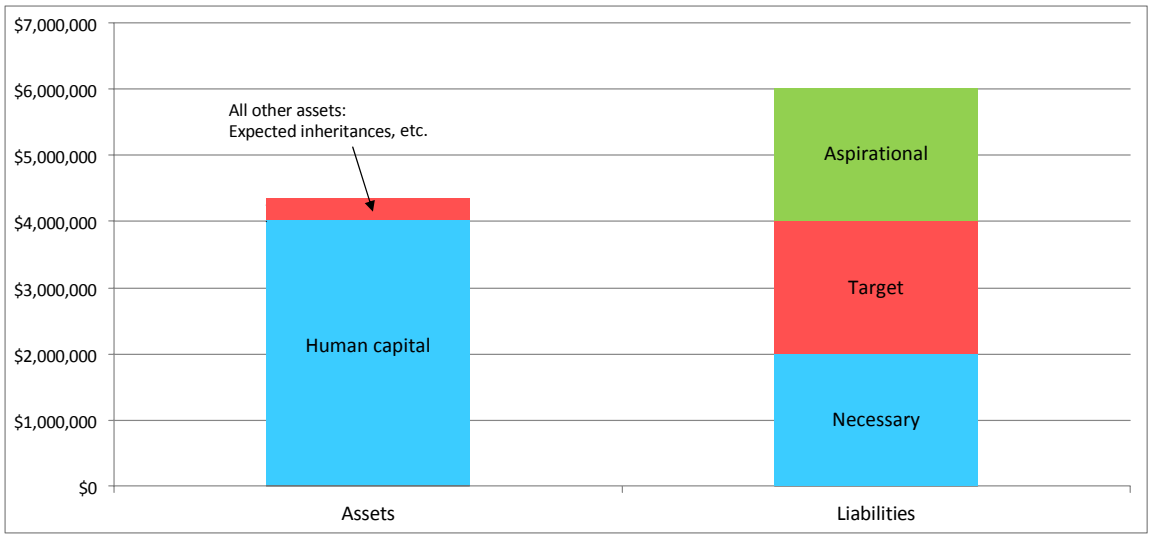
Finally, conventional investment assets are also economic assets. The values of these typically do not have to be estimated using discounted present value techniques; they can be observed in the market, and there is no uncertainty (to speak of) surrounding the estimates.

Next, we'll show how the economic balance sheet for a typical investor evolves over time.

The Human Timeline

Let's begin at the beginning, with Franklin's question, "Of what use is a baby?" The young individual is endowed with the ability to be productive, and earn income, in the future. Most babies are not born with much in the way of financial assets, so the asset side of the balance sheet for the baby investor consists almost entirely of human capital. The liability side is the expected consumption needed to support the baby's expected future productivity:

Figure 2
Economic Balance Sheet at the Beginning of Life

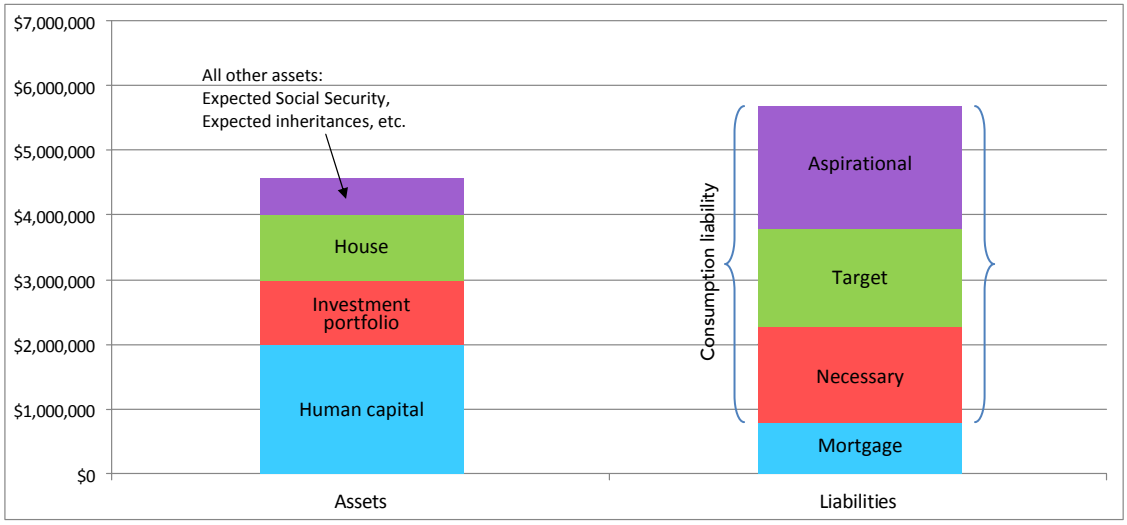


Note that we've parsed the consumption liability into necessary, target, and aspirational components, mostly because these categories will turn out to be useful later, when the investor is not a baby; it's hard to discern needs from wants in a youngster. In addition, one should note that the balance sheet is not in balance; the diagram is constructed, against accounting convention, so that one can have more than enough capital, or not enough capital, to meet any given level of consumption.[4]

In mid-career, when the investor has a better idea of how much he or she will produce or earn, we can draw a more detailed balance sheet diagram:

[4] We've also assumed that capital is not created or destroyed by the individual; all the individual does is to convert the human capital with which he or she is endowed at birth to financial capital (which is reduced by the amount consumed, and augmented by investment return) over time.
Most economists would quarrel with this assumption, saying that people exercise considerable discretion over how much human capital they have; the ability to generate income is partly acquired through effort, not endowed at birth. We agree, but think that our simplification is acceptable given that our goal here is to explain why financial planning should be done using household balance sheets, not to develop a lifecycle theory of human capital.

Figure 3
Economic balance sheet in mid-career



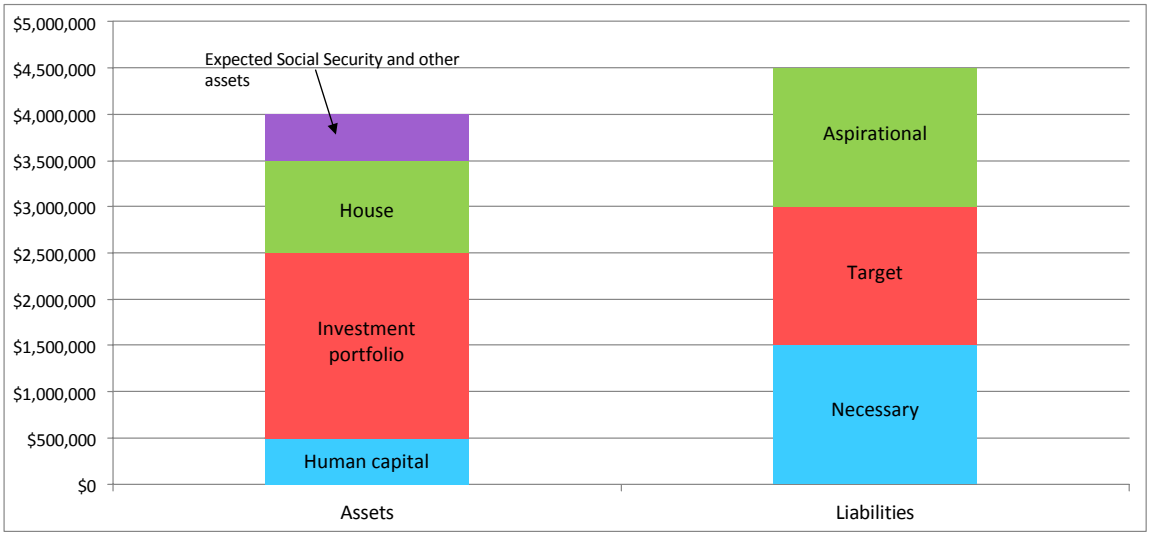
The investor now has significant financial capital, including real estate. Liabilities now include mortgage debt (which is partly attributable to past consumption) as well as future consumption.[5]

Most investors will not have all boxes filled in with a positive number. So many investors will have a "zero" in the defined-benefit pension category, for example, that we've left that box out of the diagram. Others may not own their own home. The diagram is intended as a template, not as a one-size-fits-all description of every investor's economic position, but one universal principle applies: In the end, the investor cannot spend more than he or she has.

At retirement, it's pretty clear how much the investor has produced (earned) and how much of that has been saved. It's also safe to say that most of his or her human capital has been used up, although it would be wrong to claim that he has *no* human capital left. Most of the human capital has been converted to financial or physical capital:

[5] Buying a house involves both consumption and investment. Thus, part of the mortgage debt used to acquire the house is attributable to a rent equivalent (consumption) and part to investment or savings (a "payment plan" for real assets).

Figure 4
Economic balance sheet at retirement



The diagram shows that the about-to-retire investor is fully funded with respect to the target liability, but only if he uses his remaining human capital and/or house to generate income. The mortgage has been paid off. The investment portfolio, at this point in life, may include pensions and annuities (not separately shown).

Three Layers of Consumption Liability

Note that we have not assigned a single dollar value to the liability. Instead, we've assumed that an investor has three levels of liability. The *necessary* liability represents a level of spending that would cause serious problems to the investor if breached. The *target* liability, a higher number, is the level of spending that the investor needs to maintain his or her current lifestyle (or a lifestyle deemed appropriate for post-retirement living). The *aspirational* liability is a level of spending that includes luxuries desired by the investor, bequests to family and charities, and other goals not captured by the other levels of liability.

To reduce future spending projections to a present value (which is the way the liability appears on an economic balance sheet), we use different discount rates for different liability measures. The necessary liability is discounted at the interest rates on the Treasury yield curve. The target liability is discounted at a higher rate, between Treasury bond yields and equity expected returns. The aspirational liability is discounted at the expected equity return.

The investor's asset mix is then derived from the mix of liabilities and from the funded ratio (the ratio of available resources, or assets, to liabilities). The second essay in this series will describe how we perform this derivation.

Why Many Important Balance Sheet Items are Often Ignored

While pretty much every economist would agree that market-value measures of assets and liabilities, including intangibles, are relevant to investment decision-making, it's unusual to see them explicitly considered in a financial plan and the basis for the investment strategy. Why the omission? The reason, as best we can tell, is the desire to simplify. If you take human capital, ongoing expenditures, and other hard-to-model assets and liabilities off the table, the problem becomes the familiar one of figuring out how much to save for the future and determining the "best" asset mix for the financial assets that have already been accumulated. This financial planner's answer is quite incomplete, in that it ignores what is, for most investors, both their biggest asset — human capital — and their biggest liability, ongoing consumption during one's working years.

Let's consider more carefully why some important balance sheet items are overlooked and how one might study them more carefully.

Social Security and pension benefits are provided as an income stream, and are not typically available to the householder as a lump sum. One's "inner accountant" balks at converting these income streams to present values, even though financial economics says that is exactly the right thing to. The conversion of expected income to current wealth (present value) is also made more difficult by the fact that people cannot predict how long they are going to live, so the length of the income stream is uncertain. Thus, to arrive at a present value, an actuarial adjustment needs to be made to each income payment, multiplying the size of the payment by the probability that one will survive to receive it.

Human capital is even more difficult to measure, because to do so requires an assessment of how much a given individual is likely to earn in the future, as well as for how long. Such estimates are subject to wide variation. However, for most people, especially younger ones, human capital is the largest component of wealth and it needs to be measured so that the household can make sensible decisions.

At any rate, just because something is difficult to measure does not mean you should not try to measure it. If the variable is important to the analysis, a rough estimate (along with a sense of how rough the estimate is) is much better than none at all. In this spirit, one way of resolving the imprecision of making rough estimates is to "net out" items from both assets and liabilities. For example, a common approach is to assume that the household's projected savings cash flows accurately represent after-tax income from human capital prior to retirement minus living expenses prior to retirement. Since typically households find it easier to estimate their ability to save over time than to estimate their income and living expenses, this approach eliminates two hard-to-estimate items from the balance sheet calculation.

Further Work

Now that we've shown how to draw up an economic balance sheet for a household, and indicated why each of the balance sheet items is important for financial planning, we need to say how this information should be used to help build an investment portfolio. This will be the focus of the second essay in this series, "Building Goal-Based Investment Portfolios for Households." We refer to our approach as *goal-based* because it treats the matching of assets to each major liability component as a separate goal or investment objective.[6]

Briefly, we conceptualize the approach as building three portfolios: a defeasing portfolio, a risk-premium or growth portfolio, and a longevity hedge.[7] These do not correspond exactly to the three components of the liability but are related to them. Specifically, we defease (prepay) the necessary part of the liability using riskless investments.[8] We use the other two portfolios to satisfy the investor's additional goals. Longevity hedging is necessary for all but the wealthiest investors and cannot be separated from ordinary growth investing. This is a subject we explore in detail in our third essay.

In our second essay, we introduce the concept of *risk capacity*. Instead of relying on mostly useless psychological questionnaires to determine an individual's preferred risk level — or, worse yet, jacking up the risk to make up for underfunding — we assess his or her ability to increase income, cut spending, rely on other resources, or otherwise adjust to changed circumstances. A person who can suffer investment losses in this way and still be all right has greater risk capacity than someone who does not, and should take more investment risk.

Thus, asset-liability portfolio construction is different from asset-only portfolio construction. Goal-based investing, with multiple goals (allocated with necessary, target, and/or aspirational amounts), is even more different, building on the institutional practice of asset-liability management but adding wrinkles to cope with specific issues, such as income taxes, that apply to investing for individuals. In the third essay, "Securing Lifetime Income," we develop the idea of hedging longevity risk, the risk of running out of money before one dies. Most investors manage the spend-down, or decumulation, of their assets using a heuristic such as the 4% spending rule. Such inflexible rules have a small but significant possibility of failure.

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[6] Readers familiar with mean-variance optimization (MVO) will have already spotted the fact that it could be suboptimal to break down the liability into components or goals, each of which has a separate investment portfolio associated with it. MVO says you have to optimize across a single portfolio, taking advantage of the correlation structure across all of the assets in it. Our next essay will address this critique by showing under what conditions the tripartite, goal-based asset-liability approach produces portfolios that are identical with a single optimized portfolio, and argues that even if the result is formally suboptimal, offsetting benefits are obtained using the goal-based approach.

[7] Using the word "growth" as shorthand for a risk-premium portfolio does not mean that we buy *growth stocks*, but that we buy stocks, real estate, credit-sensitive bonds, etc. for portfolio growth at rates in excess of the riskless rate. The stocks, or some of them, could be value stocks.

[8] Following Waring and Whitney [2009], a "riskless investment" does not mean "cash," but a fixed-income investment free of credit risk that is cash-flow matched or duration matched to the liability with cash flows guaranteed for the life of the investor. The capital asset pricing model, or CAPM, can thus be understood as balancing holdings in this liability-matched riskless asset with holdings of the world market wealth portfolio of risky assets. Thus our goals-driven approach is consistent with the CAPM.

The consequences of failure — running out of money while one is still alive at an advanced age — are very dire, and can be easily prevented. Our essay will explore the use of immediate and deferred life annuities to do so.

Conclusion

As we've seen, by bringing Social Security and pensions, human capital, pre-retirement consumption, and other nonstandard assets and liabilities back into the analysis, we can get a *complete* solution to the individual's investment problem. This in itself is a valuable perspective because a solution derived from considering the multiple, important aspects of the client's problem is less likely to be rejected as inadequate. In fact, we argue that without building the client's balance sheet (or equivalent) it is not possible to construct an efficient investment strategy.

Other significant benefits accrue to both client and advisor from framing the client's investment problem in balance sheet terms. The balance sheet is a launch pad for discussions not only about the client's lifetime goals but also about their relative importance. These discussions can lead to further conversation about how the more important goals should be funded, perhaps at the expense of other goals. Clients typically find the visual display of a balance sheet both insightful and helpful, while technology allows household balance sheets to be updated and delivered to the client with a reasonable degree of automation. Such a delivery can often be made along with each asset statement, reinforcing client familiarity with the concept of a balance sheet. Scenario analyses and stress tests can also be performed easily, helping both advisor and client gain confidence by better understanding the potential areas of weakness in any plan.

Finally, clients find it specially empowering when the advisor and client come to an understanding of the client's goals and agreement on a strategy for reaching them. An economic balance sheet is an invaluable tool for achieving such an understanding. Worker-investors deserve at least this much consideration when figuring out how to keep and grow the fruits of their labor.