Economic Budgeting for Endowment-Dependent Universities

John Y. Campbell, Jeremy C. Stein, and Alex A. Wu

March 2024

Abstract: To understand their financial position, universities need to understand the long-term implications of their operating revenues and costs in relation to the financial assets they have available. Standard budgeting procedures that focus on one or two years at a time and use generally accepted accounting principles (GAAP) do not do this. We present an alternative framework that discounts cash flow forecasts over the infinite future and compares the present value of operating obligations to the value of the university's endowment net of any debt it has issued. We illustrate the potential of this framework using recent data from Harvard's Faculty of Arts and Sciences (FAS).

This paper is in preparation for the NBER Conference on the Financing of Higher Education, funded by the Alfred P. Sloan Foundation, on April 4-5, 2024, in Cambridge, Massachusetts. We are grateful to Jay Herlihy, Scott Jordan, Susan Duda and the financial staff of the Harvard Faculty of Arts and Sciences for their consistent support of this project.

I. Introduction

Universities with substantial endowments are fortunate to have financial assets that generate capital income to support research and teaching activities that would otherwise be unaffordable. Instead of relying entirely on tuition, state subventions, or sponsored research funding, these universities can spend endowment distributions to bridge the gap between external funds and the costs of their operations.

A standard view of endowment spending is that it must be sustainable in the sense that it is expected to be no smaller in the future than it is in the present. As James Tobin put it in a famous 1974 article, "The trustees of an endowed institution are the guardians of the future against the claims of the present. Their task is to preserve equity among generations. The trustees of an endowed university like my own assume the institution to be immortal. They want to know, therefore, the rate of consumption from endowment which can be sustained indefinitely."[1]

Whether or not this sustainable spending policy is followed, it is an inescapable truth that spending more from the endowment today reduces the resources available to be spent tomorrow. Richer academic discussions of endowment management such as Hansmann (1990) and Campbell (2012), and formal models such as Gilbert and Hrdlicka (2015), Dybvig and Qin (2021), and Campbell and Sigalov (2022) capture this intertemporal tradeoff.

Although the intertemporal constraints on endowment spending are easily understood by economists, they are harder for some other observers to grasp. Some members of the university community and some outside observers interpret the endowment as if it were a discretionary fund, available to spend on new activities, which will be refilled if depleted.[2]

[1] Or, as Harvard University puts it on its website, "Many endowments, including Harvard's, are structured to exist in perpetuity, meaning that the institution must continue to rely on the endowment's earnings forever. Because of this, our endowment is not only for today's generation, but is for all future generations of Harvard students and scholars. Guided by this principle of intergenerational equity, Harvard's endowment is carefully managed in order to ensure that future generations will enjoy its benefits just as much as the current one." https://www.harvard.edu/about/endowment/, accessed on February 6, 2024.

[2] In other words the distinction between wealth and the income from wealth is ignored. Consistent with this, the value of large endowments is sometimes compared with national incomes as a rhetorical device to emphasize the wealth of universities. Writing for CBS Moneywatch, Aimee Pichee recently wrote "Harvard's endowment, at more than $50 billion, is the biggest among U.S. universities and is larger than the GDP of more than 120 nations, including countries such as Tunisia, Bahrain and Iceland." (https://www.cbsnews.com/news/harvard-endowment-2023-harvard-president-salary/, December 12, 2023.)

From this point of view, having a large endowment is a sign that a university has failed to make good use of its donors' generosity and is simply hoarding cash without using it for the good of the university community or society.

Such a perspective naturally leads to calls for universities to spend more aggressively. As Derek Bok, former president of Harvard, put it in a recent article in the *Chronicle of Higher Education*, "Although large endowments were a blessing for the universities that possessed them, they brought disadvantages as well. Among liberals, such accumulations of wealth led to demands on these universities to use their money to achieve social goals."[3] Pressures of this sort do not come only from the left; several Republican senators currently advocate taxing large endowments to give universities an incentive to run them down.[4]

Even within a university, standard budgeting procedures foster this attitude. It is common for university budgeting processes to consider one year at a time, and to treat endowment distributions within that year as a source of income that is discretionary—at least to the university's trustees if not to the administrators working on the budget. Within a setup like this, a budget deficit can always be "solved" by increasing the endowment distribution. The long-run consequences of higher endowment spending today, which are lower endowment spending in the future, are obscured by this procedure. The one-year budgeting framework fosters a similar attitude towards debt since proceeds from new debt issues are treated as income while repayment of debt is treated as an expense. Yet debt issuance simply moves resources from one year to another, but does not change the present value of the resources available to the university over the long term.

Harvard's Faculty of Arts and Sciences (FAS) employs two of the authors of this paper, John Campbell and Jeremy Stein. In 2021 Claudine Gay, then Dean of the FAS, asked Stein to co-chair a faculty study group to develop a better understanding of the FAS financial position and explore strategic options for the management of the FAS. Within this larger effort, Campbell chaired a working group to develop an economic budgeting framework that would

[3] Derek Bok, "Why Americans Love to Hate Harvard," *Chronicle of Higher Education*, January 4, 2024.

[4] Endowments exceeding $500,000 per student at schools with over 500 students currently pay a 1.4% excise tax on endowment income under the Tax Cuts and Jobs Act of 2017. Proposals for considerably more aggressive taxation of large endowments have been made by Senators Tom Cotton and J.D. Vance, among others.

address the deficiencies of standard year-by-year budgeting.[5] The goal was to think about university finances like economists rather than accountants, and to present the university's budget constraint in an intertemporal context.

This paper explains the framework the working group developed, and illustrates it with actual numbers that describe the FAS in fiscal year 2023. We are grateful for the consistent support of FAS financial staff in refining the framework and providing us with the updated data we show here.

The remainder of the paper is organized as follows. In Section II, we describe the traditional accounting-based approach to budgeting that has been used by the FAS for many years, and examine some of the potential drawbacks of relying too heavily on such an approach for decision-making. In Section III, we introduce our alternative economic approach based on the intertemporal budget constraint, and walk through a specific application using recent FAS numbers. In Section IV, we put this approach through its paces, doing a number of sensitivity analyses that help to illustrate the key drivers of long-term financial health for the FAS. In Section V, we explore the implications of our economic budgeting framework for the Harvard endowment—more specifically, we ask how the endowment's risk tolerance should be shaped by what we learn from the economic budgeting exercise. Finally, Section VI concludes.

II. A Traditional GAAP Approach to Budgeting

The usefulness of our explicitly intertemporal approach can be motivated by first reviewing a more traditional approach to university budgets. To make this discussion concrete, we describe the methods that have been used for years at Harvard FAS, but we suspect that similar methods are common in other university settings.

Figure 1 shows a simplified representation of the Harvard FAS budget for the fiscal year 2023, prepared according to generally accepted accounting principles (GAAP). This budget adds together a number of sources of "operating revenue," then subtracts various items that are deemed "operating expenses," to arrive at a net GAAP budget surplus or deficit. And importantly for management purposes, running a GAAP surplus—or at least avoiding a significant GAAP deficit—has long been considered an important metric of financial health

[5] The other members of the working group were Stephen Blyth, then Professor of the Practice of Statistics, Jay Herlihy, then FAS Associate Dean for Finance, and Thomas Hollister, then Harvard University Chief Financial Officer and Vice President for Finance. We are grateful for their contributions to this analysis.

for the FAS. Indeed it is not an exaggeration to say that in past years, targeting this metric, i.e., aiming to balance the budget in GAAP terms, has been a primary goal of FAS financial management.

Figure 2 shows that according to this GAAP budget-balance metric, Harvard FAS generally looks to be in solid shape. Since 2017, the budget measured this way has either been in surplus or quite close to it—even in the pandemic year of 2020—and forecasts for the next few years are generally encouraging even though there are a few years of modest anticipated deficits later in this decade.

However, from the perspective of an economist interested in the university's intertemporal budget constraint, this GAAP surplus/deficit construct is misleading in several ways. First, it mixes financial flows with the real-side revenues and expenses that reflect the physical economics of the university. Most obviously, the distribution from the endowment is treated as a form of revenue. But of course, increasing the payout from the endowment does not improve the university's long-run financial position in the same way that, e.g., increased tuition income does. Rather, it just represents a transfer of a portion of a fixed pool of resources from the future to the present. Similarly, the proceeds of new debt issuance are treated as revenue while interest and principal payments on existing debt are treated as an expense. This confuses matters, because it suggests that borrowing more or delaying the repayment of debt would improve the university's financial position. Again, this is not correct, because these actions simply increase the debt payments that must be made in the future.

A second drawback of the GAAP approach is that it treats depreciation as an expense, even though depreciation—which depends on a somewhat arbitrary accounting judgement—does not represent a cash outflow in any sense. The other side of this accounting treatment is that annual capital expenditures on plant and equipment are *not* directly captured in the GAAP presentation, even though these do represent real dollar outflows. To be clear, one would not want to load all of a given year's capital expenditures into that year's budget, especially if management decisions are heavily influenced by the goal of attaining budget balance on a year-by-year basis. Doing so would run the risk of encouraging deferrals of needed maintenance and upkeep, deferrals that might be highly uneconomic over the longer run.

This brings us to the third issue with the GAAP approach, namely that an excessive focus on current budgets—or even on budgets a few years into the future—is inherently myopic, and

potentially at odds with optimal long-term stewardship of the university's financial position. This point is underscored by the pressures that can arise from such an approach when there is a large transitory shock, such as occurred when the COVID-19 pandemic put a major dent in tuition revenues. From the perspective of a single annual budget cycle, this shortfall was so big that maintaining budget balance would have required drastic cutbacks in other areas. But given that the shortfall was expected to be transitory, a rational approach to budgeting would suggest a significant degree of intertemporal smoothing of the shock—i.e., allowing a deficit to emerge temporarily, to be offset by a series of small surpluses in the future.[6]

III. An Intertemporal Approach to Budgeting

The intertemporal approach to budgeting developed by our working group can be understood by analogy to the planning problem of a retired household. In this example, the household has a given level of accumulated wealth, and uses this wealth to fund a sequence of consumption expenditures into the indefinite future. The intertemporal budget constraint is then simply the requirement that the present value of the planned consumption expenditures, discounted at an appropriate discount rate, not exceed the current level of wealth. Similarly, for a university, there is a sequence of anticipated net expenditures, in this case given by spending on salaries and benefits, supplies and equipment, capital expenditures and the like, less income from net tuition revenue, government research sponsorship, and other fees. One can take the present value of these net expenditures, compare it to the current value of the endowment (adjusted for debt and anticipated future philanthropy), and ask whether the university is on track to satisfying its long-run budget constraint.

Crucially, this approach does two things differently from the conventional budgeting method. First, it does not rely on accounting judgements, in that accounting depreciation never shows up in the analysis; rather, actual cash outlays on capital spending are captured in the year they are expected to occur. Second, it fully separates real and financial flows. The real operating economics of the university are captured in the present value of the net expenditures,

[6] And indeed, in the particular case of the pandemic, the need for this sort of smoothing was well-recognized by university leadership, who allowed for bigger draws from the endowment at the height of the pandemic. For example, the endowment share of FAS operating revenue increased from 50% in FY19 to 53% in FY20 and 54% in FY21. Note, however, that given that such endowment draws are counted as revenues, the underlying operating deficit created by this smoothing policy does not fully show through in the conventional budgeting framework.

which do not include anything having to do with debt issuance, interest expense, or endowment payouts. And financial resources are fully captured by the current value of the endowment in excess of debt obligations. There is no need to ever explicitly model borrowing and lending decisions, or the timing of endowment payouts, since these purely financial choices do not change the present value of the university's underlying wealth—only how it is distributed over time.

Framing things this way has several advantages. It makes clear that the size of the endowment must be compared with the sequence of obligations that the endowment is expected to support. It removes the temptation to think that financial engineering of various sorts can solve fundamental economic problems, and instead focuses attention on the real-side decisions that university leadership must make—decisions about revenue generation (e.g., policies regarding tuition-setting), operating costs such as headcount, salaries, and benefits, and the path of capital expenditures. And it makes transparent how alternative assumptions about each of these affects financial sustainability. In so doing, it can highlight the most important drivers of intertemporal budget balance, and clarify the policies and combinations of policies that are likely to be most effective in achieving budget balance.

In order to implement our approach, we need to make a series of modeling assumptions. To generate real-side operating cashflows, we rely on the FAS multi-year financial plan for fiscal years 2024 through 2028, which projects line-item spending and revenues in granular detail. Because we need to forecast these cashflows over an infinite horizon, we then make simple constant growth rate assumptions for the years that extend beyond the FAS planning horizon. Working in nominal-dollar terms, we assume an inflation rate of 2%, based on the premise that the Federal Reserve will roughly hit its inflation target over time. For a base case, we then assume, consistent with past history, that there will be real growth in compensation, maintenance costs, and net tuition; we set real growth for each of these at 1%. Other sources of income, such as sponsored research and other fees, are assumed to be constant in real terms.

To discount these cashflows, in the base case we use a nominal discount rate of 7%. Given our 2% inflation assumption, this corresponds to assuming a 5% real discount rate. We choose this value because it is consistent with Harvard's long-term endowment payout rate of 5%. In order to be able to sustain a payout rate of 5% without depleting the endowment in real terms, it must be that the endowment is able to earn a 5% real rate of return in expectation. If that is

in fact the case, then it makes sense to use a 5% real discount rate to present-value the operating cashflows.

Of course, there is no guarantee that a 5% expected rate of return on the endowment can actually be achieved without taking undue levels of risk in the current market environment, so it is going to be critically important to stress-test this assumption. As we will see, given that the FAS is highly endowment-dependent, relatively small changes in the assumed rate of return on the endowment have large consequences for financial sustainability. Indeed, this is one of the most important conclusions of our analysis. With this observation in mind, we also work with an alternative scenario in which the real return on the endowment is 4%, corresponding to a nominal discount rate of 6%.

Figure 3 summarizes these modeling assumptions. Figure 4 gives a high-level overview of our analysis, and Figure 5 provides more line-item detail. Let us begin by focusing on the first column of Figure 5, which corresponds to the base-case assumption of a 7% nominal discount rate. With this assumption, the present value of all revenues—which are driven primarily by net tuition revenues (net of financial aid) and by sponsored research funding—add up to $16.07 billion. While this is a large number, it is far less than the present value of all operating costs, almost two-thirds of which are for compensation and benefits, and which total $36.23 billion. In addition, the present value of planned capital expenditures is $8.28 billion. Putting it all together, the net present value of all operating and capital cashflows in the base case is -$28.44 billion (16.07 - 36.23 - 8.28 = -28.44). In other words, in keeping with the household analogy, the FAS has present-value obligations of $28.44 billion to fund its future stream of planned consumption. This large number arises because tuition and other revenue, substantial as it is, is not nearly enough to cover anticipated expenditures on personnel, research support and the physical plant.

How do these obligations compare to the wealth available to support them? In column (1) of Figure 5, we see that the FAS share of Harvard's endowment stands at $17.84 billion. This value needs to be adjusted in a few ways in order to present a more complete picture of total wealth. There are some unspent endowment distributions which must be added back, and some existing debt that the FAS owes which reduces net wealth. Finally, the FAS has an important off-balance sheet asset, namely future philanthropy, which is expected to bring in a present

value of $4.21 billion.[7] Putting it all together, the total on and off-balance sheet wealth of the FAS is estimated to be $21.9 billion.

With these numbers in hand, it is now straightforward to assess the overall financial balance of the FAS. With present-value obligations of $28.44 billion, and total wealth of $21.9 billion, the FAS faces an estimated present-value shortfall of $6.54 billion. To translate this value into something that is more easily interpreted, one can annualize it by multiplying by the real discount rate of 5%, yielding an annualized structural deficit of $327 million. In other words, given our assumptions, in order to achieve what we would consider to be long-run structural budget balance, the FAS would have to generate an additional $327 million per year in real terms (i.e., growing by 2% per year in nominal terms) through some combination of revenue increases or cost cutting measures. This figure can be compared to FY 2023 total operating costs of $1.56 billion to get a sense of magnitude; one might thus say that in our base case, the FAS has a structural budget deficit of something like 21%. Given how inflexible much of the cost structure is in the short-to-medium run, this is a meaningful number.

Thus, a first conclusion that emerges from our work is that this economic approach to university budgeting can, depending on the circumstances at hand, yield quite different conclusions than the traditional GAAP-based approach. Recall that in Figure 2, the GAAP-based approach painted a considerably rosier picture of the FAS financial position, forecasting several years of budgetary surpluses.

To be clear, the $327 million estimate of the structural budget deficit in our base case is just that—an estimate. And it is subject to very significant modeling uncertainty, given how difficult it is to make anything like accurate forecasts of either revenues or costs so far out into the future. Rather than thinking of it as a decisive final answer, we believe it is more pragmatically useful as a point of departure for a discussion of the drivers of long-run fiscal sustainability and the levers university leadership has at its disposal as it pursues this goal. To illustrate this point, we turn next to a series of scenario analyses.

[7] In modeling future philanthropy, it is important to only count *budget-relieving* gifts, i.e., gifts that come without a requirement to commensurately increase expenditures, by, e.g., launching a new center that would not have been otherwise launched under the baseline plan.

IV. Scenario Analyses and Interpretation

As noted above, one of the most important uncertainties in our analysis has to do with the expected return on the endowment, which shows up in our framework as the rate used to discount FAS operating income and expenditures. Column (2) keeps everything else the same as in column (1), but changes the nominal discount rate to 6%, which now maps into assuming a 4% real rate of return on the endowment as opposed to the 5% in the base case. As can be seen, this makes a dramatic difference to our results: the present value of the budget shortfall jumps from $6.54 billion to $13.15 billion, and the corresponding annualized structural deficit goes from $327 million to $526 million: over one third of the $1.56 billion currently budgeted for annual spending. A proportional structural deficit of this magnitude looks daunting indeed. Simply put, even a modestly lower return on the endowment fundamentally changes the long-run financial sustainability of the FAS.

This strong sensitivity to endowment returns reflects the relatively high level of endowment dependence of the FAS. This is illustrated in Figure 6, which displays a simple measure of endowment dependence—namely, the fraction of the current annual budget covered by payout from the endowment—for the FAS, for Harvard University as a whole, and for ten of Harvard's peers: Yale, Stanford, Princeton, MIT, Penn, Columbia, Chicago, Cornell, Dartmouth and Brown. Other than Princeton, the FAS, with an endowment dependence of 51% in fiscal year 2023, sits at the top of the pack on this metric, well higher than most of its leading peers. Also of note is that the FAS is considerably more endowment-dependent than Harvard as a whole. Several of Harvard's other schools, notably Harvard Business School, generate more than 80% of their income from non-endowment sources, such as tuition, executive programs, and publishing, and so are less vulnerable to variation in endowment returns.

Moreover, the comparison with Princeton in particular may actually understate the relative exposure of the FAS to its endowment performance. This is because, as Figure 7 shows, Princeton's endowment on a per-student basis is more than double that of Harvard. So while Princeton is relying on its endowment for a significant fraction of its current spending, Figure 7 suggests that that current level of spending is extremely generous on a per-student basis. Which in turn implies that all else equal, it might be less painful for Princeton to cut back on spending in a world with subdued endowment returns.

This discussion naturally raises the question of what levers university leadership might use to restore financial balance, if indeed endowment performance does disappoint and the structural deficit widens accordingly. Our framework is perhaps most useful in this regard, i.e., in helping to identify which levers have the most noteworthy first-order effects. For example, given that employee compensation is the single largest item on the cost side of the ledger, one might ask what adjustment to the growth of compensation is needed to achieve a given improvement in the structural deficit.

A simple calculation based on the model in column (1) of Figure 5 yields the following conclusion: suppose that compensation is untouched between now and FY 28, but thereafter grows at only 0.5% in real terms as opposed to the base-case value of 1.0%; this step-down could reflect either a slower growth of headcount, a more gradual trajectory of pay increases for existing employees, or some combination of the two. It turns out that this relatively modest change, even when implemented with a delay of a few years, is nevertheless quite powerful: it cuts the present value of the budget shortfall by $2.2 billion, and the annualized structural deficit by $112 million.

One caveat about this use of our framework is that it can be abused if university leaders succumb to the temptation to assume unrealistic cost control measures in distant future years. Just as it is all too easy for governments to set ambitious targets for carbon emissions reduction in the 2030s and 2040s while doing little or nothing in the 2020s, similarly the growth rates assumed in our analysis can be manipulated to obscure a university's long-run financial problems. Realism in the assumptions is absolutely critical for the validity of our analysis.

V. Implications for Endowment Risk Tolerance

In addition to being useful for budgeting and planning purposes, the methodology we have proposed here can also be of help in thinking about certain issues related to the management of a university's endowment. Two of us (Campbell and Stein) have served on the board of Harvard Management Company (HMC, the university's endowment manager), and Stein is a current board member. From 2019 to 2022 he chaired a sub-committee of the board that sought to create a framework for determining the appropriate level of risk for the endowment portfolio. The sub-committee was formed as a response to the observation that HMC had apparently been taking moderately less risk—i.e., had a modestly lower model-based estimate of the standard

deviation of its returns—than some of its leading peers. The question then posed to the sub-committee was whether HMC should increase its portfolio risk profile so as to come into closer conformity with these peers.

The primary insight that drove the sub-committee's work was the idea that it cannot make sense to think about the appropriate level of risk of the endowment in a vacuum, divorced from the underlying operating economics of the university. The two need to be analyzed in an integrated fashion.[8] In particular, if a university—or, as in the case of the FAS, a decentralized unit of the university—is heavily endowment-dependent, and thus would be forced to cut back sharply on crucial strategic investments in the event of a series of lower-tail return realizations, this should lead it to prefer a more conservative investment portfolio for the endowment, all else equal. The logic is similar to the argument for target date funds that reduce their risk exposure as their investors approach retirement and become more dependent on capital income relative to labor income.

Our framework can be used to quantify the impact of investment risk on the university's financial position, by calculating how the present value shortfall changes when the endowment return is better or worse than expected. Figure 8 illustrates how the deficit varies with the growth of the endowment's real value under our baseline scenario. The base case in the figure is zero real growth, which is achieved if the endowment earns the assumed 5% real return and distributes 5% of its value. Assuming the endowment return has an annual standard deviation of 15%, then over a one-year horizon, a one standard deviation lower return of -10%, which leads the real value of the endowment to decline by 15% net of the 5% payout, increases the annualized deficit from $327 million to $461 million. On the other hand a one standard deviation higher return of 20%, which increases the real value of the endowment by 15%, shrinks the annualized deficit to $193 million. This result highlights the exposure of the FAS to financial market risks, particularly in the short run when the university's operating decisions are relatively fixed. The university's ability to make spending adjustments grows over a longer time horizon, but risk also grows with the square root of the time horizon. Over a five-year

[8] This lesson was hammered home at Harvard by events during the global financial crisis in 2008-09, when interest rate swaps, put in place as part of a financing strategy for campus expansion, incurred large losses that amplified the risk exposure of the endowment. In response the Harvard Corporation formed a finance committee to provide integrated oversight of the financial activities of HMC and the university.

horizon, a one standard deviation lower return increases the deficit to $626 million while a one standard deviation higher return lowers the deficit to $28 million.

This analysis illustrates the fact that, over the long run, the university's adjustments in spending must have the same volatility, and more generally the same systematic risk exposures, as the returns on the endowment. At the analytical level, this is what justifies our assumption that net operating cash flows can be discounted at the endowment's rate of return. The operations of an endowment-dependent university look very different in this regard from the operations of a pension fund, which must meet fixed liabilities using a financial portfolio together with backstop guarantees from pension plan sponsors (corporations or state and local governments). Novy-Marx and Rauh (2011) have cogently criticized the accounting rules that allow public pensions to discount their liabilities using the expected returns on their assets, arguing that guaranteed liabilities should be discounted at the riskless interest rate. This criticism does not apply to our analysis because a university's spending plans are variable rather than fixed.

The implication of this for a university's management is that flexibility in spending is vital if the university is dependent on the payouts from a risky endowment. This flexibility need not be instantaneous—our framework allows for gradual adjustment to satisfy the intertemporal budget constraint—but it has to exist at some horizon. Put another way, a university must align its endowment risk-taking with its ability to adjust its spending plans to financial market conditions.

We can use our framework to explore the tradeoff between expected return and risk at the level of the university's economic budget. Assuming a fixed Sharpe ratio for the endowment, a higher expected return will lower the deficit in the baseline scenario (as shown in Figure 5 and the previous analysis) but increase the risk, in the sense that a one standard deviation lower return on the endowment will lead to a larger increase in the structural deficit. Figure 9 presents the relationship between expected returns and risk under the assumption that the endowment can achieve a relatively attractive Sharpe ratio of 0.46. In the baseline scenario of a 7% nominal rate of return, the annualized structural deficit is $327 million and a one standard deviation lower return leads to a $134 million increase in the deficit. If the endowment takes on more risk and increases its expected return to 8%, the university's mean annualized structural deficit decreases by $184 million, but the effect of a one standard deviation lower

return on the deficit increases by $48 million. Endowment risk-taking brings rewards, if the Sharpe ratio can be maintained at a high level, but once again we see that risk-taking must be accompanied by operating flexibility.

With these insights in mind, the economic budgeting framework developed above wound up playing a key role in the sub-committee's deliberations, and ultimately in its recommendations to the Harvard Corporation, who had to approve any change in the endowment's risk target. Beyond the specific decision at hand, using the budgeting framework as a device to provoke a conversation across these two different functions—university strategic planning and endowment management—proved to be a valuable way to help leadership come to an integrated understanding of the university's overall economic model.

VI. Conclusion

We believe an economic approach to university budgeting has important advantages. First, by relating the university's endowment and debt to the present value of its net operating expenditures, it shows that an apparently large endowment may already be fully utilized supporting those expenditures and may not be available to underwrite expensive new ventures. A university that appears to be "rich," in the vernacular sense that it can afford luxuries, may in fact be merely "endowment-dependent."

Second, the economic approach focuses the attention of university leaders on long-run strategic solutions to financial problems, rather than short-term fixes that use financial engineering to balance single-year accounting budgets by borrowing from the future.

Third, the approach highlights the fact that financial market conditions have a huge impact on endowment-dependent universities. If the level of real interest rates declines, for example, the return on the endowment will decline unless the university's endowment manager takes more risk. Accepting a low return worsens the university's structural budget deficit and requires painful measures to raise operating revenues or lower expenses. Taking more risk improves the current budget position but requires increased flexibility in the event that disappointing returns are realized in risky financial markets. These are tough choices, but university leaders need to face them squarely and an economic budgeting framework helps them do this.

References

Bok, Derek, 2024, "Why Americans Love to Hate Harvard", *Chronicle of Higher Education*, January 4.

Campbell, John Y., 2012, "Investing and Spending: The Twin Challenges of University Endowment Management", in *Forum Futures 2012*, Forum for the Future of Higher Education: Cambridge, MA, 32-40, 2012.

Campbell, John Y. and Roman Sigalov, 2022, "Portfolio Choice with Sustainable Spending: A Model of Reaching for Yield", *Journal of Financial Economics* 143, 188-206.

Dybvig, Philip H. and Zhenjiang Qin, 2021, "How to Squander Your Endowment: Pitfalls and Remedies", unpublished paper, SSRN 3939984.

Gilbert, Thomas and Christopher Hrdlicka, 2015, "Why Are University Endowments Large and Risky?", *Review of Financial Studies* 28, 2643-2686.

Hansmann, Henry, 1990, "Why Do Universities Have Endowments?", *Journal of Legal Studies* 19, 3-42.

Novy-Marx, Robert, and Joshua Rauh, 2011, "Public Pension Promises: How Big Are They and What Are They Worth?", *Journal of Finance* 66, 1211-1249.

Tobin, James, 1974, "What is Permanent Endowment Income?", *American Economic Review Papers and Proceedings* 64, 427--432.

Figures and Tables

Figure 1. Harvard FAS budget for fiscal year 2023.

Item	FY23 Amount ($m)
Tuition and Fees	449.2
Tuition Discount	-303.7
Net Tuition	**145.5**
Net Continuing Ed and Exec Fees	201.4
Total Student Income	**346.9**
Federal Sponsored Programs	143.1
Non-Federal Sponsored Programs	63.0
Total Sponsored Support	**206.0**
Current Use Gifts	153.0
Net Endowment Distribution	834.9
Other Revenue	83.0
Total Operating Revenue	**1623.8**
Faculty Salaries and Wages	209.5
Other Salaries and Wages	346.9
Total Salaries and Wages	**556.5**
Benefits	150.0
Scholarships excl. discounts	85.2
Supplies and Equipment	71.3
Space and Occupancy excl. interest	202.7
Interest	50.2
Depreciation	128.1
Other Expenses	317.1
Total Operating Expenses	**1561.0**
GAAP Operating Profit	**62.8**

Figure 2. Harvard FAS GAAP operating profit.

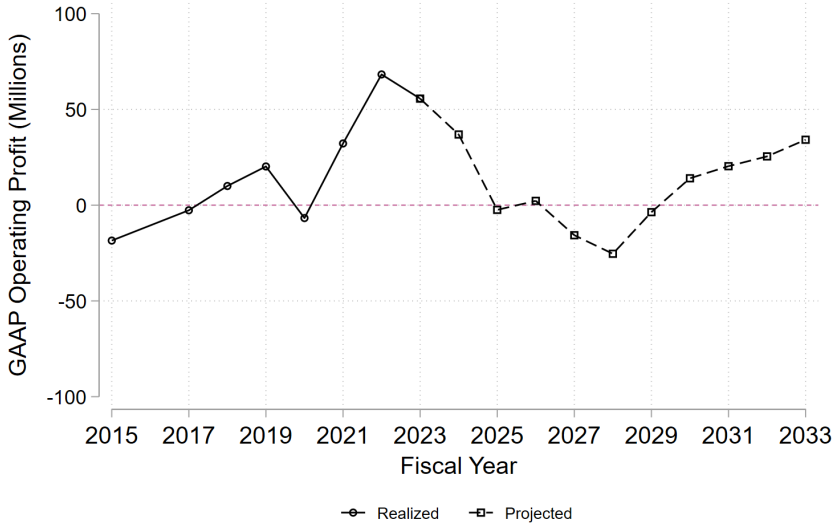

Figure 3. Modelling assumptions.

Inflation Rate	2%
Real Growth Rate Assumptions	
Compensation (FY28 & Beyond)	1%
Def'd Maint (FY28 & Beyond)	1%
Student Inc (FY28 & Beyond)	1%
Sponsored Rev (FY28 & Beyond)	0%
Other Income (FY28 & Beyond)	0%
Nominal Discount Rate - Scenario 1	7%
Nominal Discount Rate - Scenario 2	6%

Figure 4. Model overview.

Present Value of Income and Wealth ($b)			**Present Value of Expenses ($b)**	
Operating Revenues	16.07		Operating Costs	36.23
Endowment less Debt	17.69		Capital Expenditures	8.28
Future Philanthropy	4.21			
Total	37.97			44.51
Present Value Shortfall ($b)	-6.54			
Annualized Structural Deficit ($m)	-327			

Note: All figures are present values of forecasted future cash flows in billions, except for the Annualized Structural Deficit, which annualizes the Present Value Shortfall and is in millions.

Figure 5. Detailed model.

	Net Present Value of Cash Flows ($b)						
	Scenario 1	Scenario 2	Projected Cash Flows ($m)				
	7.0%	6.0%	FY24	FY25	FY26	FY27	FY28
Cash Flows from Operations							
Revenues							
- Student Income (net of Financial Aid)	9.52	12.67	360	367	380	406	427
- Sponsored Revenue	4.09	5.10	199	204	209	214	219
- Other Income	2.47	3.08	113	120	125	129	133
Operating Revenues Total	16.07	20.84	672	692	715	749	779
Costs							
- Compensation & Benefits	(21.00)	(27.96)	(758)	(811)	(854)	(898)	(944)
- Operating Space Costs	(4.69)	(5.84)	(231)	(227)	(236)	(245)	(251)
- Other Costs	(10.55)	(13.16)	(480)	(505)	(525)	(546)	(570)
Operating Costs Total	(36.23)	(46.96)	(1469)	(1543)	(1615)	(1689)	(1765)
NET OPERATING CASH FLOWS	(20.16)	(26.13)	(797)	(852)	(901)	(939)	(986)
Cash Flows from Capital Expenditures							
Total Capital Expenditures	(8.28)	(9.99)	(451)	(492)	(648)	(743)	(788)
OPERATING & CAPITAL CASH FLOWS	(28.44)	(36.11)	(1248)	(1343)	(1549)	(1682)	(1774)
Existing Wealth							
Endowment Market Value	17.84	17.84					
Unspent Endowment Distributions	1.02	1.02					
Market Value of FAS Debt	(1.17)	(1.17)					
TOTAL EXISTING WEALTH	17.69	17.69					
Cash Flows from Future Philanthropy							
Current Use Gifts	1.87	2.34	71	73	73	90	104
Budget-Relieving Endowment Gifts	2.34	2.93	123	115	130	132	141
TOTAL PHILANTHROPY	4.21	5.27	194	188	203	222	245
TOTAL EXISTING WEALTH & PHILANTHROPY	21.90	22.96	169	175	190	207	195
Present Value Shortfall	(6.54)	(13.15)					
Annualized Structural Deficit ($m)	(327)	(526)					

Note: The present value columns are in billions, while the year-by-year projections and the annualized structural deficit are in millions. Negative numbers appear with parentheses in red.

Figure 6.
Endowment dependence of Harvard FAS, Harvard University, and peers.

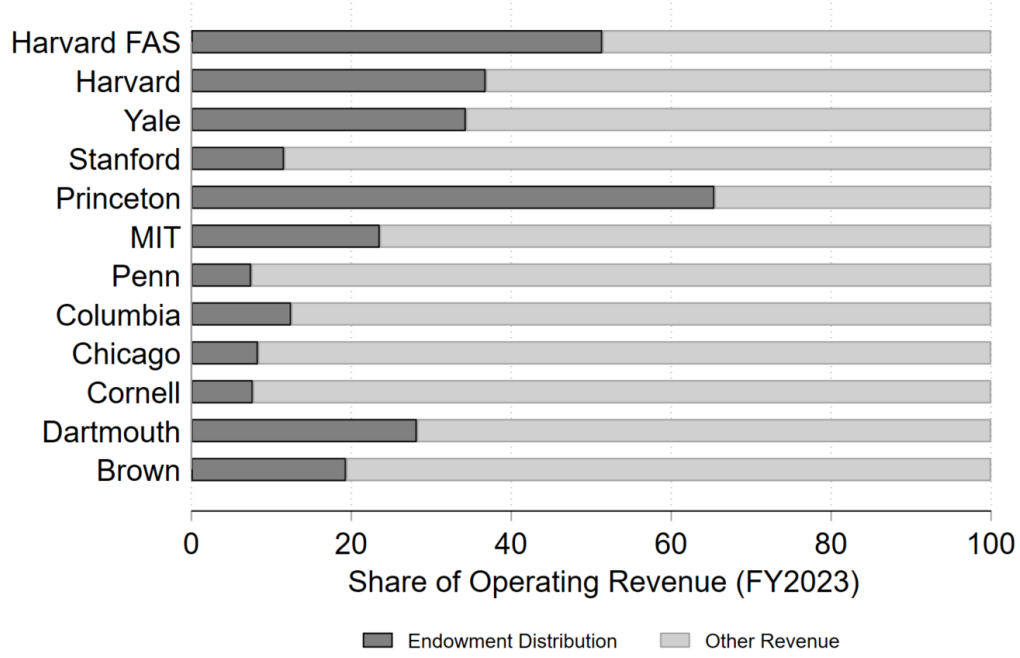

Figure 7. Endowment per student of Harvard FAS, Harvard University, and peers.

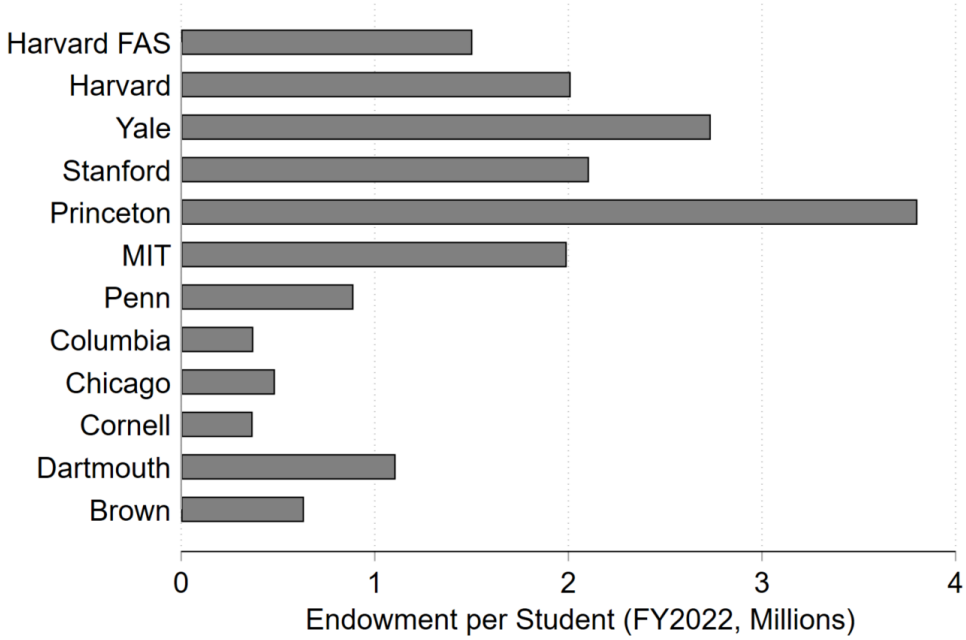

Figure 8. Effect of endowment growth on the budget deficit.

Endowment Growth	Present Value Surplus/Deficit ($b)	Annualized Structural Surplus/Deficit ($m)	Deficit Growth vs. Baseline
-35%	-12.79	-639	95%
-30%	-11.89	-595	82%
-25%	-11.00	-550	68%
-20%	-10.11	-505	55%
-15%	-9.22	-461	41%
-10%	-8.33	-416	27%
-5%	-7.43	-372	14%
0%	-6.54	-327	0%
5%	-5.65	-282	-14%
10%	-4.76	-238	-27%
15%	-3.87	-193	-41%
20%	-2.97	-149	-55%
25%	-2.08	-104	-68%
30%	-1.19	-59	-82%
35%	-0.30	-15	-95%

Note: Endowment growth is the growth of the endowment's real value under the baseline scenario.

Figure 9. Endowment risk-return tradeoff.

Nominal Expected Return	Standard Deviation of Return	Change in Mean Annualized Structural Deficit ($m)	Change in Effect of -1SD Return on Annualized Structural Deficit ($m)
5%	11%	436	-75
6%	13%	199	-41
7%	15%	0	0
8%	17%	-184	48
9%	19%	-360	103
10%	21%	-533	166

Note: The calculation assumes a Sharpe Ratio of 0.46. The standard deviation of returns is rounded to the nearest percentage point. Changes in the mean and standard deviation of the annualized structural deficit as the level of risk varies are calculated relative to the baseline scenario of 7% nominal expected returns.