THE FUTURE-READY CFO MASTERCLASS

MODULE 5 OF 20 | PILLAR II: STRATEGY, CAPITAL AND ENTERPRISE VALUE

Strategic Capital Allocation

MODULE SUMMARY

This module teaches how a chief financial officer decides where the next dollar goes, and why. It explains return on invested capital, the weighted average cost of capital, economic profit, net present value, internal rate of return and payback, and shows when each one misleads. Verified examples cover a worked cost of capital, a ranked portfolio under a budget limit, real options, and the choice between buybacks and reinvestment. It addresses post investment reviews, sunk cost, kill criteria and allocation bias, and supplies a board approvable capital allocation policy outline, a project scorecard, and practical discussion questions for all directors.

MODULE AT A GLANCE

Core question	How does a CFO decide where the next dollar goes, so that every use of capital is tested against the same return standard, ranked fairly under a budget limit, and reviewed honestly after the money is spent?
Why it matters to the CFO	Capital allocation is the decision that most directly creates or destroys enterprise value, and it is the decision most exposed to optimism, politics and sunk cost. A policy the board approves in advance protects the company from its own enthusiasm.
Key sources	McKinsey (Koller, 2026), Deloitte CFO Signals (January 2026), Grant Thornton Q2 2026 CFO Survey, Gartner (July 2025), SEC and KPMG on buyback disclosure, with the author's own knowledge of finance theory stated plainly.
Executive artifact	A capital allocation policy outline and a weighted project scorecard, each shown as a completed example for the reader to adapt.

Important notice. This material is provided for educational and informational purposes only and does not constitute accounting, tax, legal, investment, or other professional advice. Readers should consult qualified professionals in accounting, tax, legal, and other relevant services before acting on any information presented. Fictional companies and figures are used for teaching and are labeled as such. The maturity ratings are an educational framework and have not been validated against a broad population of finance executives.

1. Executive overview and learning objectives

The core question. How does a chief financial officer decide where the next dollar goes? A company with a hundred good ideas and a fixed supply of cash must choose, and the choice is made, whether or not anyone admits it, every time a budget is approved, an acquisition is pursued, a dividend is declared or a share is repurchased. The question is simple to state and hard to answer well, because each use of capital has an advocate, each advocate has a persuasive story, and the cost of the capital being spent is paid quietly by the owners of the company and not by the person making the request.

Why this matters over the next five years. Capital is becoming harder to allocate well for three reasons. The first is uncertainty. Grant Thornton reported in June 2026, from its Q2 2026 CFO Survey of nearly 240 finance leaders, that only 37 percent were optimistic about the U.S. economy over the following six months, the lowest level in the 20 quarter history of that survey, even as 67 percent expected to increase spending on information technology and digital transformation. The second is competition for funds among very different uses. Gartner reported on July 17, 2025, from a poll of 197 finance leaders taken on June 19, 2025, that 37 percent had already paused some capital spending, while spending on artificial intelligence remained a priority. The third is the pull of acquisitions. Deloitte's CFO Signals survey for the fourth quarter of 2025, published January 13, 2026, found that 63 percent of the 200 North American CFOs polled had a greater interest in acquisitions or mergers than a year earlier, up from 55 percent the year before. Each of these surveys describes the opinions of respondents and not audited outcomes, and the reader should treat them as indications of the pressures that a CFO faces and not as measures of results.

What the module covers. Section 2 sets out the measures a CFO uses to judge a use of capital, namely return on invested capital, the weighted average cost of capital, economic profit and the project methods of net present value, internal rate of return and payback, and explains when each one misleads. Section 3 works six numerical examples, each computed in Python, a programming language widely used for financial modeling: a cost of capital, a ranked portfolio under a budget limit, a staged investment valued as a real option, the choice between a buyback and reinvestment, a post investment review and a sunk cost decision. Section 4 places the CFO of a fictional company before a decision that every capital allocator eventually faces, Section 5 prepares the boardroom, Section 6 supplies the executive artifact, and Section 7 reports the research that was read. Module 4 applies these tests to technology spending, Module 7 treats the raising of capital and the communication with investors, Module 8 treats acquisitions and divestitures in depth, and Module 17 supplies the scenario methods that stress the assumptions used here.

> **Critical module note**
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> Module 5 is one of the five critical modules in the program, together with AI literacy (Module 1), governance (Module 9), risk (Module 10) and enterprise leadership (Module 13). A score below 30 out of 50 on a critical module would block the highest designation, even when the total across all twenty modules is high. The reason is that capital allocation is the decision through which the other strengths of a CFO either become value for the owners or are lost, and excellence elsewhere should not conceal a weakness here.

Learning objectives. After completing this module the reader should be able to do the following. Each objective is tested by the self assessment in Section 8.

1. Define return on invested capital with a consistent definition of invested capital, compare it with the cost of capital, and explain what the spread means for value.
2. Build a weighted average cost of capital with target weights, compute the cost of equity with the capital asset pricing model, and state the limits of the method.

3. Compute economic profit for a company and its divisions, and explain how it differs from accounting profit.
4. Apply net present value, internal rate of return, payback and the profitability index, and recognize the conditions in which each one misleads.
5. Rank projects under a budget limit, set hurdle rates by risk class, and value flexibility with real options.
6. Apply the capital allocation hierarchy, decide between a buyback and reinvestment, run post investment reviews with kill criteria, and write a capital allocation policy that a board can approve.

2. Conceptual foundations and frameworks

The idea beneath every measure. A company creates value for its owners only when it earns more on the capital it uses than that capital costs. This is the whole of the subject, and everything in this module is a way of measuring it or a discipline for acting on it. A company that earns a profit but earns less than the cost of the capital it employs has taken value from its owners while reporting growth. Tim Koller of McKinsey, reflecting in 2026 on four decades in corporate finance, described the basic framework in the same plain terms: return on capital and growth drive cash flow, cash flow drives value, and leaders should ask whether returns exceed the cost of capital, whether they are improving and how they compare with peers. He added that basic rules do not change in periods of excitement, and that when people forget them, bad things tend to happen. Exhibit 1 lists the measures used in this module, the question each answers and the way each most often misleads.

Exhibit 1 Measures of Return on Capital: The Question Each Answers and How Each Misleads

Measure	Question it answers	Where it misleads
Return on invested capital (ROIC)	How much operating profit after tax does each dollar of invested capital earn?	Depends on the definition of capital. Old, depreciated assets flatter it. Goodwill from past deals can hide or depress it
Weighted average cost of capital (WACC)	What return do all the providers of capital, lenders and owners together, require?	Rests on estimates that cannot be observed. A single company rate applied to every project is wrong for risky and for safe projects
Economic profit	How many dollars of profit remain after charging for all capital used, including the owners' capital?	Sensitive to the capital charge. May discourage investment in assets that will earn returns only later
Net present value (NPV)	How much value, in today's dollars, does the project add after earning the required return?	Only as good as the cash flow forecast and the discount rate. Ignores flexibility unless options are valued
Internal rate of return (IRR)	What yearly return does the project earn on the capital at risk?	Favors small, quick projects. Can give several answers or none when cash flows change sign. Assumes reinvestment at the IRR itself
Payback	How soon is the money recovered?	Ignores cash flows after the payback date and the time value of money
Profitability index (PI)	How much present value is created for each dollar invested?	Useful for rationing capital, but can mislead when projects are of very different size or are mutually exclusive

Source: author's synthesis of standard corporate finance, stated from the author's own knowledge. Koller's remarks are from the McKinsey Re:think article described in Section 7.

Return on invested capital. ROIC is net operating profit after tax, often written NOPAT, divided by invested capital. **NOPAT** is operating profit multiplied by one minus the tax rate, which shows what the operations earn

before the cost of financing is deducted. **Invested capital** is the money that the company has put into its operations, and it may be measured from two directions that must agree. The operating view adds net working capital, fixed assets and acquired intangible assets such as goodwill. The financing view adds debt, lease obligations and equity and subtracts cash that the business does not need. Fictional Halvorsen Industrial, Inc., which is used for all the examples in this section, has revenue of 1,200 million dollars, operating profit of 168 million and a tax rate of 25 percent, so that NOPAT is 126 million. Exhibit 2 shows that its invested capital of 1,040 million dollars is the same from either direction.

Exhibit 2 Halvorsen Industrial, Inc. (Fictional): Invested Capital from Two Directions

Operating view	Millions	Financing view	Millions
Net working capital (operating current assets less operating current liabilities)	150	Debt	360
Property, plant and equipment	620	Lease obligations	90
Goodwill and acquired intangibles	230	Equity	640
Other operating assets, net	40	Less excess cash not needed by the business	(50)
Invested capital, operating view	**1,040**	**Invested capital, financing view**	**1,040**

Fictional. Computed in Python: 150 + 620 + 230 + 40 = 1,040 and 360 + 90 + 640 less 50 = 1,040. The two views reconcile, which is the test of a sound definition.

The definition must be chosen and then held constant. The measure changes with each choice, as Exhibit 3 shows. Dividing by year end capital gives 12.1 percent, dividing by the average of opening and closing capital gives 12.5 percent, and excluding goodwill gives 15.6 percent. None of the three is wrong, and each answers a different question. The version that excludes goodwill describes how well the operations perform, and the version that includes it describes how well the company has used the money that shareholders entrusted to it, including the prices paid for past acquisitions. A CFO who cares about discipline in acquisitions (Module 8) should insist that the version with goodwill is reported alongside the version without, so that the cost of past deals remains visible.

Exhibit 3 Halvorsen Industrial, Inc. (Fictional): Return on Invested Capital under Three Definitions

Definition of invested capital	Capital (millions)	NOPAT (millions)	ROIC, percent	Best used for
Year end capital, including goodwill	1,040	126	12.1	Stewardship of all capital entrusted, including deals
Average capital, including goodwill	1,010.0	126	12.5	Trend analysis when capital grew during the year
Year end capital, excluding goodwill	810	126	15.6	Operating performance and comparison of divisions

Fictional. Computed in Python: 126 / 1,040 = 12.12 percent; 126 / 1,010 = 12.48 percent, with opening capital of 980; 126 / 810 = 15.56 percent.

The cost of capital. The **weighted average cost of capital**, or WACC, is the blended return that lenders and owners together require for lending to or investing in the company, with each weighted by its share of the capital structure. The **cost of debt** is the interest rate the company would pay on new borrowing today, reduced for the tax saving on interest, so that a pre tax rate of 6.0 percent and a tax rate of 25 percent give an after tax cost of 4.5 percent. The tax treatment of interest differs by country and by circumstance, and the

CFO must confirm it with tax advisers. The **cost of equity** is harder, since owners are paid no stated rate. The most common estimate is the **capital asset pricing model**, or CAPM, which states that the return investors require on a share equals the risk free rate plus the share's **beta** multiplied by the **equity risk premium**. Beta measures how strongly the share price has moved with the market as a whole, so that a beta of 1.10 means a tendency to move ten percent more than the market. The equity risk premium is the extra return that investors require for holding the market in place of a risk free bond.

The limits of the model. CAPM is a useful discipline and a poor oracle. The equity risk premium cannot be observed, and respected sources use different estimates. Beta is measured from past prices, differs with the period and the index chosen, and may not describe a company that has changed its business. The model assigns risk only to the sensitivity of a share to the market, and so says nothing about risks that investors may price in other ways, such as small size or limited trading. For these reasons the CFO should treat the result as a range and test how much the answer moves when each input changes, as the worked example in Section 3 does. Practitioners often adjust beta, add premiums for size or country, or cross check with other methods, and the choice should be documented, agreed with valuation specialists and applied consistently from year to year. A CFO who can explain why the company uses a beta of 1.10 and not 0.90 has done most of the work that matters, since the explanation reveals which comparable companies, which period and which market index were chosen, and whether the choice was made before or after the answer was known.

The worked cost of capital. Exhibit 4 builds the WACC of Halvorsen from its parts. A risk free rate of 4.2 percent, a beta of 1.10 and an equity risk premium of 5.0 percent give a cost of equity of 9.7 percent. With target weights of 65 percent equity and 35 percent debt, the WACC is 7.88 percent. The weights are **target** weights, meaning the capital structure the company intends to maintain over time, measured in market values, and not the weights shown on the balance sheet. If the book weights were used, with equity at 58.7 percent of capital, the computed WACC would be 7.55 percent, which is too low by 0.33 percentage points, because the book value of equity understates what owners have at stake and the formula would then favor too many projects.

Exhibit 4 Halvorsen Industrial, Inc. (Fictional): Worked Weighted Average Cost of Capital

Component	Input or computation	Result
Risk free rate	Yield on long term government bonds (assumed)	4.2 percent
Beta	Assumed from comparable companies	1.10
Equity risk premium	Assumed	5.0 percent
Cost of equity	4.2 + 1.10 x 5.0	9.7 percent
Pre tax cost of debt	Current borrowing rate (assumed)	6.0 percent
After tax cost of debt	6.0 x (1 - 0.25)	4.5 percent
Target weights	Equity 65 percent, debt 35 percent	65 / 35
WACC	**0.65 x 9.70 + 0.35 x 4.50**	**7.88 percent**

Fictional inputs, computed in Python: 0.65 x 9.70 = 6.305 and 0.35 x 4.50 = 1.575, total 7.880 percent. The inputs are assumptions for teaching and are not market data.

Exhibit 5 Halvorsen Industrial, Inc. (Fictional): Sensitivity of the WACC to Beta, Risk Premium and Capital Structure

Beta	Equity risk premium 4.5 percent	5.0 percent	5.5 percent
0.90	6.94 percent	7.23 percent	7.52 percent
1.10	7.52 percent	7.88 percent	8.24 percent
1.30	8.11 percent	8.53 percent	8.95 percent
Equity weight 55 percent / 65 percent / 75 percent	7.36 percent	7.88 percent	8.40 percent

Fictional. Computed in Python holding the other inputs of Exhibit 4 constant. The last row varies only the equity weight, from the first to the third column, at beta 1.10 and a premium of 5.0 percent.

Reading the sensitivity. The WACC ranges from 6.94 percent to 8.95 percent across reasonable inputs, a spread of 2.02 percentage points. A project that clears the hurdle by half a point is therefore not clearly a good project, and a project that clears it by five points is clearly good under any of these inputs. The lesson for the CFO is to reserve judgment for the projects close to the line, and to demand more evidence of them, since the line itself is uncertain.

Economic profit. Economic profit is NOPAT less a charge for all the capital used, equal to the invested capital multiplied by the WACC. It is the dollar version of the spread between ROIC and WACC. The best known commercial version is marketed under the name EVA, a trademark associated with Stern Stewart and Company to the author's knowledge, and the idea itself is general and may be used under any name. For Halvorsen the spread is 12.1 less 7.88, or 4.24 percentage points, and on capital of 1,040 million dollars the economic profit is 44.0 million. Accounting profit would show only a gain, and economic profit shows how much of that gain remains after the owners have been paid their required return. Exhibit 6 divides the result among the three divisions and reveals what the company total hides.

Exhibit 6 Halvorsen Industrial, Inc. (Fictional): Economic Profit by Division

Division	NOPAT (millions)	Invested capital (millions)	ROIC, percent	Capital charge at WACC (millions)	Economic profit (millions)
Flow Controls	70	400	17.5	31.5	38.5
Industrial Fittings	38	360	10.6	28.4	9.6
Legacy Castings	18	280	6.4	22.1	(4.1)
Halvorsen total	**126**	**1,040**	**12.1**	**82.0**	**44.0**

Fictional. Computed in Python at a WACC of 7.88 percent for every division: 70 - 31.5 = 38.5; 38 - 28.4 = 9.6; 18 - 22.1 = (4.1); total 44.1. Dividing the capital charge by division would differ if the divisions carried different risk, a point taken up under hurdle rates.

What the divisions reveal. Flow Controls earns 17.5 percent and produces nearly all the economic profit. Industrial Fittings earns a little more than its capital costs. Legacy Castings earns 6.4 percent on 280 million dollars of capital and consumes 4.1 million dollars of value every year while contributing a positive accounting profit of 18 million. The CFO should ask three questions of such a division: can the return be raised above the cost of capital, can the capital employed be reduced, or would the capital earn more elsewhere in the company or in the hands of another owner? The third question leads toward divestiture (Module 8), and it can be asked only because the economic profit was computed.

Why growth is not always good. A company often believes that growth is valuable in itself. A standard value formula shows when it is. In a simple steady state, the value of a business equals NOPAT multiplied by one minus the ratio of growth to ROIC, divided by the difference between WACC and growth. If the return on new investment equals the WACC, growth adds nothing, and the value is the same as that of a business that did not grow. If the return is below the WACC, growth destroys value. Exhibit 7 shows the value of one dollar of NOPAT at a growth rate of 4 percent under different returns on new capital. The formula is a teaching simplification and not a valuation method for a real company.

Exhibit 7 Value of Growth at Different Returns on New Capital (WACC 7.88 percent, Growth 4 percent)

Return on new capital	Value of one dollar of NOPAT, in dollars	Compared with no growth	Reading
6.0 percent	8.59	-32.3 percent	Growth destroys value
7.9 percent (equal to WACC)	12.69	-0.0 percent	Growth adds nothing
12.0 percent	17.18	+35.4 percent	Growth adds value
20.0 percent	20.62	+62.5 percent	Growth adds value

Computed in Python from V = NOPAT x (1 - g / ROIC) / (WACC - g) with g = 4 percent. The no growth value of one dollar of NOPAT is 1 / 0.0788 = 12.69. Illustrative, with fictional inputs.

Hurdle rates by risk class. A single company WACC applied to every project would approve too many risky projects and reject too many safe ones, since a project of average risk earns the WACC and a riskier one must earn more. A **hurdle rate** is the minimum return a project must be expected to earn to be approved. Many companies set a small number of hurdle rates by **risk class**, which is a group of projects with similar uncertainty, and add a premium to the WACC for each class. Exhibit 8 shows a proposed ladder for Halvorsen. The premiums are the author's proposal, set for teaching, and each company should calibrate its own from its history, as the post investment review in Section 3 illustrates.

Exhibit 8 Proposed Hurdle Rates by Risk Class (WACC 7.88 percent)

Risk class	Premium over WACC, points	Hurdle rate, percent	Reason
Replacement and compliance	0.0	7.9	Required to stay in business. Judged on least cost
Cost reduction in the core	1.0	8.9	Savings are measurable and the operation is known
Capacity expansion in the core	2.0	9.9	Demand risk is added to execution risk
Adjacent product or market	4.0	11.9	Less experience, more uncertainty about demand and margin
New business or technology bet	7.0	14.9	Outcomes are wide, and the right response is staging and options

Source: author's proposal for teaching. The premiums are illustrations and are not benchmarks drawn from any publication. Hurdle rates are applied to expected, not to hoped for, returns.

3. Practical applications and tools

The six methods that follow are each shown with a worked example on fictional data. All sums, rates, selections and values were computed in Python and checked by assertion, and the figures in the text and exhibits were generated from that computation. The reader is encouraged to rebuild each in a spreadsheet and to change the assumptions.

Method one: use NPV as the decision rule, and know when the other measures mislead. Net present value discounts each future cash flow to today at the required return and subtracts the investment. A positive result means the project is expected to earn more than the required return, and the number is the value added in today's dollars. **Internal rate of return** is the discount rate at which the NPV is zero. **Payback** is the time to recover the investment. The **profitability index** is the present value of future cash flows divided by the investment. Exhibit 9 evaluates four fictional projects at a required return of 8 percent.

Exhibit 9 Four Projects Evaluated by NPV, IRR, Payback and Profitability Index

Project	Cash flows, years 0 onward (dollars)	NPV at 8 percent	IRR, percent	Payback, years	PI
Project A	(100), 90, 40, 20	33.5	31.8	1.25	1.34
Project B	(400), 150, 170, 190, 200	182.5	26.1	2.42	1.46
Project D	(100), 55, 55, 0, 0, 0	(1.9)	6.6	1.82	0.98
Project E	(100), 20, 30, 40, 60, 90	81.3	28.6	3.17	1.81

Fictional, computed in Python with scipy root finding for IRR. Payback interpolates within the year. Project A and Project B are mutually exclusive alternatives for the same site. Project D and Project E are independent examples chosen to show payback misleading.

Reading the four projects. Project A has the higher IRR, 31.8 percent against 26.1 percent, the faster payback, 1.25 years against 2.42. Project B nevertheless has the higher profitability index, 1.46 against 1.34, and creates 182.5 dollars of value against 33.5 for Project A, because it puts four times as much capital to work at a return well above the hurdle. When the two cannot both be done, the larger NPV is the correct choice, provided that capital is not scarce. The incremental cash flow, the difference between taking B and taking A, has an IRR of 25.0 percent and an NPV of 149.0 dollars, which shows that the extra 300 dollars invested in B earns far more than 8 percent. Project D is the opposite case. It recovers its money in 1.82 years, quicker than Project E, yet its IRR of 6.6 percent is below the hurdle and its NPV is negative, while Project E, which takes 3.17 years to repay, adds 81.3 dollars of value. A payback rule would have chosen the project that loses value, since it ignores everything after the payback date.

Further cautions on IRR. Three weaknesses of the IRR deserve a CFO's attention. First, it assumes that every interim cash flow is reinvested at the IRR itself, which for a project earning 26.1 percent is optimistic. The **modified IRR**, which assumes reinvestment at a stated and more realistic rate, gives 18.6 percent for Project B at a reinvestment rate of 8 percent. Second, when the sign of the cash flows changes more than once, as in a mine that must be restored or a plant that needs a large overhaul late in life, there may be more than one IRR. A project with cash flows of (100), 260 and (165) dollars has IRRs of both 10 percent and 50 percent, and neither describes its economics, whereas the NPV at any stated discount rate is unambiguous. Third, IRR ignores scale, and a high return on a small sum is worth less than a good return on a large one. For these reasons the NPV should decide, and the IRR, payback and profitability index should be reported beside it as aids to understanding. Module 4 applies the same hierarchy of measures to technology investments, where payback is especially tempting.

Method two: ration capital with the profitability index, and then check the answer. When the capital available is less than the capital requested, projects with positive NPV must still be turned away. **Capital rationing** is the allocation of a limited budget among competing projects. The usual first step is to rank projects by the profitability index, taking the best per dollar until the money runs out. That method is easy and it is not always optimal, because projects are indivisible, and a project that does not fit the remaining money may leave cash unused. Exhibit 10 lists eight fictional projects totaling 165 million dollars of investment and 54.5 million of NPV, against a budget of 60 million.

Exhibit 10 Capital Rationing: Ranking by NPV per Dollar Compared with the Optimal Set (Budget 60 Million, Fictional)

Rank by NPV per dollar	Project	Investment (millions)	NPV (millions)	NPV per dollar invested	Taken by ranking	In the optimal set
1	P7 Tooling replacement	10.0	4.5	0.45	Yes	No
2	P2 Warehouse automation	20.0	8.0	0.40	Yes	Yes
3	P3 Energy efficiency retrofit	15.0	5.5	0.37	Yes	Yes
4	P1 Packaging line upgrade	25.0	9.0	0.36	No	Yes
5	P4 Regional distribution hub	30.0	10.0	0.33	No	No
6	P6 Product line extension	18.0	5.0	0.28	No	No
7	P8 New plant expansion	35.0	9.5	0.27	No	No
8	P5 Quality systems upgrade	12.0	3.0	0.25	Yes	No
	Selected total				21.0 NPV on 57	22.5 NPV on 60

Fictional. Computed in Python. The optimal set was found by testing all 256 combinations of the eight projects against the budget of 60. Ranking and taking projects until the next does not fit selects P7, P2, P3 and P5 for 57 of investment and 21.0 of NPV. The optimal set is P1, P2 and P3 for 60 and 22.5.

What the exhibit teaches. Ranking selected four projects for 57 million dollars and an NPV of 21.0 million, and left 3 million dollars unused. The best combination, found by testing every set that fits the budget, is the three projects P1, P2 and P3, which use the whole budget and add 22.5 million, 1.5 million more. The difference is modest here, and it can be large in a real portfolio with a few big projects. With eight projects the combinations can be tested by hand or with a spreadsheet, and with many more a method called integer programming, available in common software, finds the best set. The CFO should not leave the choice to a ranking alone, and should ask the analysts to confirm the selection against the full set of combinations, with dependencies such as projects that must be done together or that exclude one another.

Exhibit 11 What an Extra Dollar of Budget Is Worth: Optimal Sets at Four Budgets (Fictional)

Budget (millions)	Optimal projects	Capital used (millions)	NPV of the set (millions)	NPV added by the extra 20 (millions)
40	P1, P3	40.0	14.5	
60	P1, P2, P3	60.0	22.5	8.0
80	P1, P3, P4, P7	80.0	29.0	6.5
100	P1, P2, P3, P4, P7	100.0	37.0	8.0

Fictional. Computed in Python by testing all combinations at each budget. The last column is the gain in total NPV from each additional 20 million of budget, an estimate of the shadow price of capital.

The shadow price of capital. Exhibit 11 also shows what the last dollars of budget are worth. Raising the budget from 40 to 60 million adds 8.0 million of NPV, and the next steps add 6.5 and 8.0 million. Each figure is the value of relaxing the limit, and it tells the CFO whether it is worth borrowing, raising equity or deferring a dividend to fund more projects. If the value of the extra budget exceeds the cost of raising it, the limit itself, and not the projects, is the problem. Many companies that claim to ration capital in fact set an arbitrary limit and then turn away projects that earn well above the cost of capital, which is an expensive way to run a business. Module 7 treats the cost and availability of raising the funds.

Method three: value flexibility with a real option. A **real option** is the right, but not the obligation, to take a later action on a real asset after learning more. The **option to expand** allows a larger investment if a pilot succeeds. The **option to delay** allows the company to wait for information. The **option to abandon** allows the company to sell or close the asset if results are poor, recovering a salvage value. **Staged investment** combines these, by spending a small amount to learn and committing the remainder only on good news. Consider a fictional project that costs 80 million dollars. With a probability of 40 percent it succeeds and is worth 140 million one year later, and with a probability of 60 percent it fails and is worth 40 million. Committing at once has an expected NPV of (5.93) million dollars, so a conventional analysis rejects it. Exhibit 12 compares the three ways of proceeding.

Exhibit 12 A Staged Investment Valued as a Real Option (Fictional, Millions of Dollars)

Strategy	How it works	NPV (millions)	Value of flexibility versus committing at once
Commit at once	Spend 80 now. Expected value one year later is 0.4 x 140 + 0.6 x 40 = 80, discounted at 8 percent	(5.93)	Not applicable
Commit, with an option to abandon	Spend 80 now. If the project fails, sell it for a salvage value of 50 in place of its value of 40	(0.37)	+5.56
Staged investment	Spend a pilot of 10 now. After a year, spend the remaining 70 only if the project succeeds, which pays 140	15.93	+21.85

Fictional. Computed in Python at 8 percent. Staged: -10 + 0.4 x (140 - 70) / 1.08 = 15.93. Commit at once: -80 + 80 / 1.08 = (5.93). Abandon: -80 + (0.4 x 140 + 0.6 x 50) / 1.08 = (0.37). A simple one period illustration, not a full option pricing model.

Reading the options. The same project is a loss if committed at once, (5.93) million, a roughly break even proposition with a right to abandon, (0.37) million, and a gain of 15.93 million if staged, so that the flexibility is worth 21.85 million. The staged version is better because it avoids spending 70 million dollars in the case where the project fails. The staged project still earns a positive NPV if the chance of success is as low as 15.4 percent, because the pilot of 10 million is recovered whenever the later gain, of 70 million after a year, arrives with that probability. Two cautions apply. The probabilities are judgments and not facts, and the sponsor of a project has every reason to inflate them, so the CFO should ask what evidence supports each and what the pilot will actually teach. A pilot must also be designed so that it resolves the decisive uncertainty, as a pilot in a single friendly region may not, and the company must truly be willing to stop when the news is bad, which is the subject of Method six. Module 17 describes how scenario analysis identifies the uncertainties worth buying information about.

Method four: apply the capital allocation hierarchy. Cash that a company generates has a sequence of claims on it. The first claim is to maintain the business, since an asset that is allowed to decay loses its earning

power. The next is to fund investment that earns more than its hurdle rate. The remaining uses are to acquire other businesses, to reduce debt, and to return cash to owners by dividends or buybacks. The order is a hierarchy of tests, not a rigid ladder, and each use must pass its own test before it receives money. Exhibit 13 states the tests and the usual failure of each.

Exhibit 13 The Capital Allocation Hierarchy: Tests and Common Failures

Use of capital	Test it must pass	Typical failure
Maintain the existing business	Spending preserves the earning power of assets at the least cost. Deferral costs more than it saves	Starving maintenance to protect near term profit, which borrows from future years
Reinvest in organic projects	Expected return, risk adjusted, exceeds the hurdle rate for its risk class, with evidence behind the assumptions	Approving by enthusiasm. Overstated demand. Understated cost to complete
Acquire other businesses	Price is below the value to this owner after honest synergies, and the company can integrate the target (Module 8). Return on the total price, including goodwill, exceeds the hurdle	Paying away the synergies in the premium. Counting every synergy as certain
Reduce debt	Interest saved, after tax, plus the value of lower risk, exceeds what the cash would earn elsewhere. Liquidity and covenants remain sound (Module 7)	Paying debt down when valuable projects wait, or holding too much debt through a downturn
Pay dividends	Level is sustainable through a downturn from free cash flow, and the company has no better use of the cash	Setting a level that must be cut, which damages trust more than a modest dividend would
Repurchase shares	Shares are priced below a conservatively estimated intrinsic value, and the higher priority uses are funded and leverage is within policy	Buying at any price to offset dilution or to lift earnings per share. Buying with borrowed money at the top of a cycle

Source: author's synthesis of standard practice, stated from the author's own knowledge. The order reflects the sequence of tests and is not a claim that each use must be exhausted before the next is considered.

Method five: decide between a buyback and reinvestment. A buyback is an attractive use of cash only when the shares cost less than they are worth. If the company buys at the intrinsic value, the buyback neither adds nor removes value, and if it pays more, it transfers value from the owners who remain to those who sell. The value gained or lost by the continuing owners equals the cash spent multiplied by the ratio of intrinsic value to price, less one. Suppose fictional Halvorsen has 100 million shares at a price of 48 dollars and considers spending 200 million dollars, which retires 4.17 million shares. Exhibit 14 shows the effect at four estimates of intrinsic value per share.

Exhibit 14 Buyback of 200 Million Dollars at a Price of 48 Dollars: Value to Continuing Owners (Fictional)

Intrinsic value per share (dollars)	Total value of the company (millions)	Value per share after the buyback (dollars)	Change per share (dollars)	Value gained or lost by continuing owners (millions)
40	4,000	39.65	-0.35	(33.3)
48	4,800	48.00	+0.00	0.0
55	5,500	55.30	+0.30	29.2
65	6,500	65.74	+0.74	70.8

Fictional. Computed in Python. Shares retired 200 / 48 = 4.167 million. After buyback value per share = (intrinsic value x 100 - 200) / 95.833. Gain to continuing owners = 200 x (intrinsic / 48 - 1). Intrinsic value is an estimate and is not observable.

The comparison with reinvestment. Suppose the same 200 million dollars could instead be invested in a project expected to earn a return of 11 percent a year indefinitely, a deliberately simple assumption. At the WACC of 7.88 percent the project is worth 279.2 million, so that its NPV is 79.2 million dollars. The buyback is worth 29.2 million if intrinsic value is 55 dollars and 70.8 million if it is 65 dollars, and the buyback beats this project only when intrinsic value exceeds about 67.0 dollars, a figure 40 percent above the price. The conclusion is not that reinvestment always wins. It is that a buyback is a choice among uses of capital, and it must be justified as one, with an honest estimate of intrinsic value, a margin of safety for the error in that estimate, and a comparison with the best alternative use. Two practical matters belong to advisers. In the United States a one percent federal excise tax applies to net repurchases by many corporations, to the author's knowledge from the Inflation Reduction Act of 2022, and the CFO should confirm its application with tax advisers. As to disclosure, the SEC announced on February 9, 2024 that the Fifth Circuit had vacated its 2023 share repurchase disclosure rule on December 19, 2023, so that disclosure requirements reverted to those in effect before the rule, and KPMG and CBIZ reached the same account. The requirements may change again, and counsel should confirm the current position.

Method six: review results, and stop weak projects. A **post investment review** compares what a project was expected to deliver with what it did deliver, once enough time has passed for the result to be seen. Its purpose is not to punish, but to improve the next decision and to discover the habitual error in the company's forecasts. Exhibit 15 summarizes a fictional review of six completed projects. Approved returns averaged 17.5 percent and realized returns averaged 13.2 percent, a shortfall of 4.3 points, and approved capital of 220 million dollars became 260 million, an overrun of 18.2 percent.

Exhibit 15 Post Investment Review of Six Completed Projects (Fictional)

Project (fictional)	Approved IRR, percent	Realized IRR, percent	Gap, points	Approved capital (millions)	Actual capital (millions)	Overrun, percent
Alder	18.0	11.0	-7.0	40	52	+30.0
Birch	15.0	16.0	+1.0	25	24	-4.0
Cedar	22.0	9.0	-13.0	60	81	+35.0
Dogwood	14.0	12.0	-2.0	30	33	+10.0
Elm	20.0	14.0	-6.0	45	50	+11.1
Fir	16.0	17.0	+1.0	20	20	+0.0
Average or total	**17.5**	**13.2**	**-4.3**	**220**	**260**	**+18.2**

Fictional. Computed in Python: approved IRR mean 17.5, realized mean 13.17; capital 220 approved against 260 actual. 4 of 6 projects delivered less than approved.

Using the review to calibrate. Four of the six projects fell short, and the average shortfall was 4.3 points. A CFO who sees this pattern has learned something about the company's forecasters that no single project could reveal, namely that submitted returns are optimistic by roughly this amount. The remedy is to adjust the approval process, for example by requiring that the sponsor's return be reduced by the historical shortfall before it is compared with the hurdle, or by raising the hurdle for projects from sponsors with the largest past gaps. Six projects are too few to prove a trend, and a real review should use all the projects of the last several years and should record the cause of each gap, whether demand, cost, timing or execution.

Sunk cost and the decision to stop. A **sunk cost** is money already spent that cannot be recovered whatever is decided now. The rule of rational choice is to look only at future cash flows, and in practice that rule is very hard to follow. **Escalation of commitment** is the human tendency to continue a failing course because of past investment, often because stopping means admitting a mistake. Suppose that a fictional project has absorbed 60 million dollars, and needs 40 million more to finish, after which its cash flows are worth 35 million in present value, while stopping now would recover a salvage value of 8 million. Exhibit 16 shows the two views of the decision.

Exhibit 16 A Sunk Cost Decision: Looking Backward and Looking Forward (Fictional)

View	What is counted	Result (millions)	Conclusion
Backward looking (wrong)	Value of future flows 35 less all cash spent and to be spent, 60 + 40	(65)	Seems to argue for finishing to recover something, and in fact misleads
Forward looking: continue	Value of future flows 35 less the 40 still to be spent	(5)	Continuing adds a negative value
Forward looking: stop	Salvage value recovered	8	Stopping is worth 13 more than continuing

Fictional. Computed in Python: continue 35 - 40 = (5); stop = 8; difference 13. The 60 already spent is the same under both choices and has no bearing on the choice.

Kill criteria. The surest defense against escalation is to agree, before the money is spent, the conditions under which the project will be stopped. Such **kill criteria** must be objective, measurable and owned by someone other than the sponsor. Exhibit 17 proposes a set that a committee can adapt, and the thresholds shown are illustrations that each company must set for itself.

Exhibit 17 Proposed Kill Criteria for a Capital Project

Trigger	Example threshold (proposed)	Who decides	Action
Forward NPV turns negative	Risk adjusted NPV of remaining spend and benefits below zero at the class hurdle rate	Investment committee, on the CFO's analysis	Stop, or restructure only with new evidence
Cost to complete rises	Forecast cost to complete exceeds approval by more than 20 percent	CFO with an independent reviewer	Return to the committee for a fresh decision
Milestone missed	A named technical or commercial milestone is not met within two quarters of the plan	Committee chair	Stop, or release the next tranche only after review
Assumption fails	A driver of the case, such as price, volume or adoption, falls outside the range tested in the scenarios (Module 17)	Finance owner of the case	Rerun the case. Stop if it fails the hurdle
Better use appears	A competing project has materially higher NPV per dollar and the capital is limited	Investment committee	Redeploy the remaining budget

Source: author's framework, proposed for teaching. Thresholds are illustrations and are not drawn from a published standard.

Allocation bias and incentives. Capital allocation is shaped by human behavior at least as much as by technique. Koller reported in the McKinsey article that people do not easily change their biases, citing Daniel Kahneman, and concluded that strict processes and rules are the only reliable way to overcome them, and

that resource allocation often fails to shift from legacy businesses to faster growing opportunities. The article on capital allocation published by The Global Treasurer, which carries no byline or date on the page read, similarly names empire building and over optimism as biases to be countered by objective reviews led by the chief executive and chief financial officer. Exhibit 18 lists the biases that matter most, the way each appears in practice and a countermeasure.

Exhibit 18 Allocation Biases, Their Symptoms and Countermeasures

Bias or incentive	How it appears	Countermeasure
Optimism	Forecasts of demand and savings are higher than results, as in the post investment review	Calibrate against history. Use an independent forecast. Apply the historical gap to sponsor returns
Sunk cost and escalation	Projects continue because of money already spent	Kill criteria agreed in advance. Forward looking review at each gate
Empire building	Managers seek larger budgets, headcount and acquisitions because size confers status and pay	Reward return on capital and economic profit, not size. Judge acquisitions by return on the total price
Spreading capital thinly	Every division receives something near its share last year	Allocate by return and strategic position. Compare divisions on economic profit
Anchoring and last year budget	The budget starts from the prior year and moves by small amounts	Zero based review of the largest items. Compare to a portfolio view
Short horizon incentives	Bonuses based on earnings per share or annual profit favor buybacks and underinvestment	Include multi year return and economic profit in incentive design, with deferral (Module 9)
Sponsor as judge	The proposer also prepares the numbers and reviews the result	Finance prepares or reviews the case independently. A separate owner of the post investment review

Source: author's synthesis. The reference to Koller is from the McKinsey Re:think article, and the reference to empire building and optimism is from the Global Treasurer article, both described in Section 7. The countermeasures are the author's proposals.

4. Executive case study and decisions

Fictional case: the strategic acquisition that is nearly big enough. Brightwater Components, Inc. (fictional) makes precision bearings and fasteners and has revenue of 2.4 billion dollars. It expects to generate free cash flow of 240 million dollars this year. The board has committed to a dividend of 40 million, so that 200 million dollars is available for new uses after the dividend and the minimum cash balance. The company has a WACC of 8.5 percent and a policy ceiling on net debt, which the CFO does not intend to relax. Four requests are before the investment committee, and the chief executive has stated a strong preference for the fourth.

The requests. The first is to expand the bearing line for 90 million dollars, with an NPV of 22 million at the hurdle rate. The second is to automate the finishing plant for 45 million, with an NPV of 14 million. The third is to replace the order platform for 40 million, with an NPV of 6 million (Module 4 describes the test applied to technology). The fourth is to buy a specialty fastener maker for 150 million dollars, which the chief executive describes as transformational, with a premium to its standalone value that is justified by synergies. The seller has asked for an answer within three weeks. Exhibit 19 sets out the requests.

Exhibit 19 Brightwater Components, Inc. (Fictional): Four Requests for 200 Million Dollars

Request	Investment (millions)	NPV (millions)	NPV per dollar invested	Comment
A. Expand the bearing line	90	22.0	0.24	Core expansion, demand tested with customers
B. Automate the finishing plant	45	14.0	0.31	Cost savings measured on a pilot line
D. Replace the order platform	40	6.0	0.15	Mostly benefit from fewer errors, hard to verify
C. Acquire the specialty fastener maker	150	7.9	0.05	Value depends on synergies. See the scenarios below
Total requested	**325**	**49.9**		**Capital available: 200**

Fictional. Computed in Python. The NPV of request C is the probability weighted result shown in the next exhibit. Total requested 325 against 200 available. NPV totals 49.9.

Reading the requests. Taken together the four requests ask for 325 million dollars against 200 available, so at least one must be refused or deferred even though every NPV is positive. The ranking by NPV per dollar places the finishing plant first and the acquisition last, and the order is a first view and not a verdict, as Method two showed. The CFO should also notice the differences in the quality of the evidence. The first two requests rest on measurements, namely customer demand and a pilot line. The third rests largely on benefits that are hard to verify, and the fourth rests on a forecast of synergies that the company has not yet achieved in practice. A number is only as good as the evidence beneath it, and the committee should weigh the figures accordingly.

The acquisition. The fastener maker would cost 150 million dollars. The CFO values its standalone business, without any synergy, at 36 million dollars less than the price, so that the buyer starts 36 million behind. Synergies in cost and cross selling, after the cost of achieving them, have a present value of 66 million if fully achieved. The analysts consider three outcomes, set out in Exhibit 20. The weighted NPV is 7.89 million dollars, and the break even is that the company must achieve 54.5 percent of the planned synergies merely to recover its price. Module 8 describes why integrations commonly deliver less than planned, and the CFO must decide how much weight the plan case deserves.

Exhibit 20 Acquisition of the Fastener Maker: Synergy Scenarios and Break Even (Fictional)

Outcome	Share of synergies achieved	Probability	NPV (millions)	Probability weighted NPV (millions)
Plan: all synergies	100 percent	35 percent	30.0	10.50
Partial: 60 percent	60 percent	40 percent	3.6	1.44
Weak: 30 percent	30 percent	25 percent	(16.2)	(4.05)
Expected result		**100 percent**		**7.89**

Fictional. Computed in Python: NPV = -36 + 66 x share of synergies. 30.0 x 0.35 = 10.5; 3.6 x 0.40 = 1.44; (16.2) x 0.25 = (4.05); total 7.89. Break even share 36 / 66 = 54.5 percent.

The options and the numbers. With 200 million dollars available, the combinations that fit are limited. Exhibit 21 compares them. The best combination of requests, found by testing every set that fits the budget, is A, B and D, for 175 million and an expected NPV of 42.0 million. The acquisition and the finishing plant together

would cost 195 million and add 21.9 million, little more than half as much value, and with far greater risk. The residual of 25 million dollars is not a problem to be solved by spending it.

Exhibit 21 Brightwater Components, Inc. (Fictional): Feasible Combinations Within 200 Million Dollars

Combination	Capital used (millions)	Expected NPV (millions)	Main risk	Leaves (millions)
A, B and D (recommended)	175	42.0	Execution of three projects at once	25
B and C (the chief executive's preference)	195	21.9	Synergy shortfall and integration load	5
A and B	135	36.0	Concentration in two projects	65
A and D	130	28.0	Smaller savings	70

Fictional. Computed in Python by testing all 16 combinations of four requests. The sets that include C and either A or A with other projects exceed the budget of 200 and are omitted. Expected NPV of C is 7.89.

The decision point. The chief executive asks the CFO whether the company should pursue the acquisition, for which the seller wants an answer in three weeks. The strategic argument is real, since the target would extend the product range. The CFO has to say how much the strategy is worth, and what it would cost to be wrong.

The recommended path. The CFO should advise the committee in five steps. First, fund A, B and D, which together add the most expected value and fit the budget, and attach to each a named owner, a benefit target and kill criteria. Second, tell the chief executive plainly that the acquisition, at this price, earns a positive return only if more than 55 percent of the synergies are achieved, and that the expected NPV of 7.9 million is small against the 150 million at risk and the demands that integration would place on management. Third, keep the strategic option alive at a lower cost of commitment, by proposing a lower price, a structure in which part of the price is paid only if synergies are achieved, a minority stake, or a commercial partnership, and by setting a walk away price in advance. Fourth, keep the residual of 25 million dollars as liquidity, or apply it to the debt that is nearest to maturity, until the stock price is below a conservative estimate of intrinsic value and the buyback test of Section 3 is met. Fifth, schedule a post investment review of each approved project at twelve and thirty six months, report the results to the board, and recalibrate the forecasts of the sponsors.

What a weaker answer misses. A weaker answer ranks the requests by internal rate of return and stops there, or accepts the strategic label as a reason to waive the test. It treats the plan case for synergies as the expected case, and it never asks what share of synergies is needed for break even. It spends the full 200 million dollars because the money is there, mistaking an available balance for an obligation. It approves projects without kill criteria and without an owner for the benefits, and it does not plan a review, so that the company learns nothing from the decisions it makes. The stronger answer is not hostile to strategy. It insists that a strategy earn its place among the uses of capital like any other, and it shows the chief executive a way to pursue the aim without staking the company on the most optimistic outcome.

Questions for reflection. At what price would the acquisition earn the hurdle at the weighted expectation of synergies, and would the seller accept it? If the committee overrode the CFO and approved the acquisition, which projects would be dropped and what would the company have to believe? How would you convince a chief executive that the better answer is to leave 25 million dollars unspent? Write your answers before reading the boardroom questions in Section 5.

5. Boardroom discussion and key takeaways

Directors seldom need to compute a cost of capital. They need to know that the person who asks for the owners' money has measured the return honestly, has compared it with the alternatives, has stated what would make the company stop and will report afterward what happened. Exhibit 22 lists the questions that a board should ask, and the CFO should be ready to answer each from evidence.

Exhibit 22 Ten Questions Directors Should Ask About Capital Allocation

Question a director should ask	What a ready CFO can say
What is our return on invested capital, on what definition, and how does it compare with our cost of capital?	ROIC with and without goodwill, the WACC with its sensitivity, and the spread by division, as in Exhibit 6
Which divisions earn less than the cost of the capital they use, and what is the plan for each?	Economic profit by division, and for each division a plan to raise returns, reduce capital or exit
How was the discount rate set, and how much does the answer move if it is wrong?	The inputs, the sources, and the sensitivity of Exhibit 5, with the documented judgment
How do we rank projects when money is limited, and what is the value of the last dollar of budget?	A ranked portfolio, a check against the optimal set, and the shadow price of capital
Which projects contain options, and how have we valued the flexibility?	The staged structure, the probabilities and the evidence behind them, and the stopping rule
Why are we repurchasing shares, at what price, and what else could the cash have done?	A range of intrinsic value, the margin of safety, a comparison with reinvestment, and the leverage after the purchase
What have our last projects actually earned compared with approval?	A post investment review with the average gap, the causes and the adjustment now made to forecasts
What would make us stop a project that is failing, and who decides?	Kill criteria agreed in advance and the record of projects stopped
How are managers rewarded, and does it encourage the right use of capital?	Incentives tied to return on capital over several years, with the link to Module 9
What is the policy, and when was it last tested against a hard decision?	The capital allocation policy of Section 6, its approvals, and the decisions where it changed the outcome

Source: author's synthesis. Cross references are to modules in this program: Module 9 for governance and incentives, and Module 17 for scenarios.

Advising the CEO and the board. The CFO should make three arguments. The first is that capital has a price, and that growth and profit are not goals unless they earn more than that price. The second is that the company will have more good ideas than money, and therefore needs a process that chooses among them by evidence and not by the seniority or persuasiveness of the sponsor. The third is that the process must include the end of the story, a review of results and a willingness to stop. Deloitte's survey of North American CFOs found that more than 60 percent had a greater interest in acquisitions than a year earlier, and the CFO may therefore expect this pressure and should prepare the board for it before a specific target appears and the debate becomes personal.

Common errors in capital allocation. Eight errors recur. The first is to use a single hurdle rate for every project. The second is to compare projects by IRR or payback alone. The third is to ignore the cost of capital tied up in working capital and acquired goodwill. The fourth is to ration by rank without testing combinations. The fifth is to accept the sponsor's probabilities and savings without calibration against past results. The sixth is to treat a buyback as a default use of surplus cash and not as an investment in the company's own shares.

The seventh is to let sunk cost drive the decision to continue. The eighth is to approve projects and never review them. Each error is cheaper to prevent in the policy than to correct in the accounts.

Key takeaways. First, value is created only when return on capital exceeds the cost of capital, and ROIC, economic profit and NPV are three ways of measuring the same fact. Second, define invested capital once and hold the definition, and show returns with and without goodwill. Third, build the WACC from target weights, treat CAPM as a range, and show the sensitivity. Fourth, let NPV decide and use IRR, payback and the profitability index as aids. Fifth, under a budget limit, test combinations and compute the value of the last dollar. Sixth, value flexibility with real options, and design pilots that resolve the decisive uncertainty. Seventh, treat a buyback as an investment in the company's own shares, justified by a range of intrinsic value and compared with reinvestment. Eighth, calibrate forecasts with post investment reviews, stop projects on forward looking tests and agree kill criteria in advance. Ninth, reward managers for return on capital over several years. Tenth, write the policy down and have the board approve it, so that the discipline survives the next enthusiastic proposal.

6. The executive artifact: a capital allocation policy outline and a project scorecard

The first artifact is the outline of a capital allocation policy that the board can approve. Its purpose is to settle in advance how the company will choose, so that individual decisions can be judged against a standard that was set when no particular project was at stake. Exhibit 23 shows the outline completed for the fictional Brightwater Components. The reader should write a blank copy with the company's own figures, and should have it reviewed by legal counsel, tax advisers and the external auditor where those fields touch their disciplines, since the policy interacts with debt agreements, securities rules and tax treatment.

Exhibit 23 Capital Allocation Policy Outline, Completed for the Fictional Brightwater Components

Section	Entry for Brightwater Components (fictional)
Purpose and principle	Allocate capital to the uses that create the most long term value per dollar, subject to liquidity and leverage limits, and review every major use after the fact
Cost of capital and hurdle rates	WACC computed each year from target weights of 65 percent equity and 35 percent debt, with sensitivity. Hurdle rates by risk class at the WACC plus 0, 1, 2, 4 and 7 points (Exhibit 8)
Order of claims on cash	Maintain assets, then fund projects above the hurdle, then acquisitions that pass the acquisition test, then debt reduction toward the target, then dividends, then buybacks (Exhibit 13)
Liquidity and leverage limits	Minimum liquidity of 250 million dollars. Net debt to operating earnings ceiling of 2.5 times, with board approval needed to exceed it for more than two quarters (Module 7)
Evaluation standard	NPV decides. IRR, payback and profitability index are reported. Sponsor returns are reduced by the historical shortfall from post investment reviews. Scenarios stress key assumptions (Module 17)
Approval authority	Below 5 million: business unit head. 5 to 25 million: CFO. 25 to 100 million: investment committee. Above 100 million, and any acquisition: board
Acquisition test	Price below value to the company after synergies weighted by scenario, break even synergy share stated, integration plan and owner named, walk away price set in advance (Module 8)
Dividend and buyback rules	Dividend sustainable through a downturn from free cash flow. Buybacks only when the price is below a conservative range of intrinsic value, higher priority uses are funded, and leverage stays within limits

Section	Entry for Brightwater Components (fictional)
Stage gates and kill criteria	Tranches released at gates. Kill criteria set at approval and owned by the committee (Exhibit 17). Technology investments follow Module 4
Post investment review	Review at twelve and thirty six months by a party independent of the sponsor. Results reported to the board annually and used to recalibrate forecasts
Incentives	Management incentive plans include return on invested capital or economic profit over a multi year period, with deferral (Module 9)
Review of the policy	Reviewed by the board each year, and after any decision of more than 100 million dollars

Fictional. The limits and thresholds are illustrations chosen for teaching and are proposed program standards, not benchmarks. Each company must set its own with legal counsel, tax advisers and its auditor where relevant.

The project scorecard. The second artifact converts the evidence for a proposed project into a score that a committee can compare across projects and over time. Each of seven criteria is rated from 0 to 5, where 0 means no evidence and 5 means strong evidence that an independent reviewer has inspected, and the weighted points equal the weight multiplied by the rating and divided by 5. The weights are the author's proposal. The bands are proposed program standards and not empirical benchmarks: 80 points or more supports approval, 55 to 79 points supports conditional approval with stated actions, and below 55 points returns the proposal to the sponsor. Exhibit 24 completes the scorecard for the expansion of the bearing line, request A in the case study.

Exhibit 24 Project Scorecard for the Fictional Expansion of the Bearing Line

Criterion	Weight	Rating (0 to 5)	Points	Evidence
Return above the hurdle, risk adjusted	25	4	20.0	Risk adjusted NPV of 22 million at the hurdle rate. Positive in the weak demand case, and the margin over the hurdle is modest
Quality of assumptions and evidence	20	3	12.0	Demand tested with five customers. Cost to complete based on a single quote and not yet confirmed
Strategic fit and option value	15	4	12.0	Core business, and the expansion adds a stage for later growth in the region
Downside protection and risk	15	3	9.0	Fixed cost rises if volume disappoints. Break even utilization stated and tested in two scenarios (Module 17)
Execution capability and sponsor record	10	4	8.0	Sponsor delivered the last expansion on budget. Construction partner is experienced
Capital efficiency (profitability index, payback)	10	3	6.0	Profitability index of 1.24. Payback inside the life of the asset, though not short
Owner, kill criteria and review plan	5	4	4.0	Owner named. Kill criteria and review plan drafted and agreed by the committee chair
Total score	**100**		**71.0**	**Conditional approval, with actions on the cost to complete and the demand evidence**

Fictional. Computed in Python: 25 x 4 / 5 = 20.0; 20 x 3 / 5 = 12.0; 15 x 4 / 5 = 12.0; 15 x 3 / 5 = 9.0; 10 x 4 / 5 = 8.0; 10 x 3 / 5 = 6.0; 5 x 4 / 5 = 4.0; total 71.0 of 100. Weights and bands are proposed program standards and are not validated benchmarks.

Using the artifacts. The sponsor and an independent reviewer, such as the controller or internal audit, should score the card separately, and any gap of two points or more on a criterion should be discussed before the meeting. The same card should be rescored at each gate, so that the committee can see whether the weakest ratings have improved. At 71 points the expansion earns a conditional approval. The conditions are those that the weakest ratings point to: confirm the cost to complete with a second quote, test demand with more customers, and state the break even utilization to the board. Over several projects the committee will learn which criteria predicted trouble in the post investment reviews, and the weights can then be changed on evidence and not on opinion.

7. Research and Perspectives from the Leading Firms

The publications below were found by search, and each was opened before it was described. Where a page returned only part of its content, or did not state its date, the description says so and states only what was returned. The corporate finance theory in Section 2, including CAPM, the value formula and the real option arithmetic, is stated from the author's own knowledge and not from these pages. Practice and rules change, and the reader should confirm the current text before relying on any item.

Exhibit 25 Publications of the Leading Firms and Standard Setters

Source	Title and URL	What it says
McKinsey and Company	Re:think: What has changed, and what has not, over four decades in corporate finance, Tim Koller (published 2026, exact date not stated on the page read). https://www.mckinsey.com/~/media/mckinsey/email/rethink/2026/02/2026-02-11d.html	Says ROIC and growth drive value, that leaders should compare returns with the cost of capital and with peers, that resources often fail to shift from legacy businesses, and that strict processes are the only way to overcome bias
Deloitte	The year ahead: North American CFOs reveal their top 6 expectations for 2026, CFO Signals 4Q 2025 (January 13, 2026). https://www.deloitte.com/us/en/insights/topics/business-strategy-growth/4q-2025-cfo-signals-survey.html	Survey of 200 CFOs at North American companies with at least 1 billion dollars of revenue. 63 percent report more interest in mergers and acquisitions than a year earlier, up from 55 percent, and 50 percent name digital transformation of finance the top priority
Grant Thornton	Grant Thornton survey: CFOs ramp up technology investment despite record low economic confidence, Q2 2026 CFO Survey press release (June 2026, date taken from the URL). https://secure.businesswire.com/news/home/20260617684790/en/Grant-Thornton-survey-CFOs-ramp-up-technology-investment-despite-record-low-economic-confidence	Survey of nearly 240 finance leaders. 37 percent are optimistic about the U.S. economy, the lowest in 20 quarters, 67 percent expect to increase IT and digital spending, and 42 percent expect M&A; activity to increase, of whom 11 percent expect significant increases
Gartner	Gartner survey shows 37 percent of finance leaders have already paused some capital spending, yet AI investments remain a top priority for 2H25 (July 17, 2025). https://gcom.pdo.aws.gartner.com/en/newsroom/press-releases/2025-07-17-gartner-survey-shows-37-percent-of-finance-leaders-have-already-paused-some-capital-spending-yet-ai-investments-remain-a-top-priority-for-2h25	Webinar poll of 197 finance leaders on June 19, 2025. 37 percent paused some capital spending, 3 percent are pausing more than 25 percent, and cuts target low return software, travel and contractors while cybersecurity and automation are protected

Source	Title and URL	What it says
KPMG	SEC share repurchase disclosure rule vacated, Financial Reporting View (January 2024). https://kpmg.com/us/en/frv/reference-library/2024/sec-share-repurchase-disclosure-rules.html	Reports that the Fifth Circuit vacated the SEC share repurchase disclosure modernization rule on December 19, 2023 and that issuers should continue to provide repurchase disclosure under the existing rules
CBIZ	SEC Share Repurchase Disclosure Rule Hits Judicial Wall: What is Next? (March 29, 2024). https://www.cbiz.com/insights/article/sec-share-repurchase-disclosure-rule-hits-judicial-wall-whats-next	Describes the 2023 rule, the Fifth Circuit ruling of October 31, 2023 and the vacatur, and advises issuers to follow existing rules in Forms 10-Q and 10-K and to consult advisors
SEC Division of Corporation Finance	Further Announcement Regarding Share Repurchase Disclosure Modernization Rule (February 9, 2024). https://www.sec.gov/corpfin/announcement/further-announcement-re-share-repurchase-disclosure-modernization-rule-020924	States that because of the vacatur, disclosure requirements revert to those in effect before the final rule, and refers to the prior Item 703 of Regulation S-K
The Global Treasurer	Capital Allocation That Outpaces the Cost of Capital (2025 by its URL, no byline or date on the page read). https://www.theglobaltreasurer.com/2025/07/14/capital-allocation-that-outpaces-the-cost-of-capital/	Describes investment returns versus WACC, a four part framework using NPV, IRR and ROIC with sensitivity analysis, biases such as empire building and over optimism, and the value of a clear policy. Contains no statistics

Each page was opened and the descriptions follow what the tool returned. No PwC, EY, BDO, RSM US, Baker Tilly, Crowe, Forvis Mazars, Moss Adams, CohnReznick or CLA publication was read for this module and none is cited. Survey statistics are self reported and describe perceptions and not audited outcomes. The EY capital allocation page was opened but contained no findings and is not cited.

What the research agrees on. The sources differ in kind, from an essay by a leading corporate finance practitioner to surveys of finance leaders and regulatory notices, and they should not be read as one body of evidence. They agree on three points. The pressure on capital is rising, with confidence low, some spending paused and interest in acquisitions up. The method of good allocation has not changed, and it consists of comparing returns with the cost of capital and applying a consistent process in spite of bias. And the rules around the return of capital, in particular buyback disclosure, are subject to legal and regulatory change that requires the advice of counsel. The most useful single observation for the CFO is Koller's, that strict processes and rules are the only dependable way to overcome the biases that distort allocation, which is the reason for the policy and the scorecard of Section 6.

How a CFO can use the research. The surveys are best used as a mirror and not as a benchmark. When a survey reports that many finance leaders expect to spend more on technology while few are confident about the economy, the useful question is how the company's own capital plan would look if both conditions held for a year, which is the kind of question that Module 17 teaches the reader to ask with scenarios. The regulatory notices serve a different purpose, since they remind the CFO that the mechanics of returning capital sit inside a framework that courts and regulators can change, and that disclosure practice should be reviewed with counsel before each program is announced. The essay by Koller is the most durable of the sources, because it restates principles that were true before the surveys were taken and will be true after they are forgotten.

8. The ten question self assessment

Rate each statement from 1 to 5 using the scale below, and mark one box in each row. The ratings must rest on actual experience or documented evidence, such as a capital decision you analyzed, a post investment review you ran or a policy you drafted, and not on confidence. A rating of 1 means Unprepared: limited understanding and no meaningful application. A rating of 2 means Developing: conceptual familiarity, relying heavily on others. A rating of 3 means Competent: able to apply the capability independently in conventional situations. A rating of 4 means Advanced: the capability is integrated into strategy and delivers measurable results. A rating of 5 means Future-ready: enterprise wide impact, anticipation of change and the development of others.

No.	Statement of demonstrated capability	1	2	3	4	5
1	I can compute ROIC with a consistent definition of invested capital, show it with and without goodwill, and compare it with the cost of capital.	☐	☐	☐	☐	☐
2	I can build a WACC with target weights, compute the cost of equity with CAPM, and explain the limits of the method and the sensitivity of the result.	☐	☐	☐	☐	☐
3	I compute economic profit by division and use it to question where capital earns less than it costs.	☐	☐	☐	☐	☐
4	I can apply NPV, IRR, payback and the profitability index, and I recognize when IRR or payback misleads.	☐	☐	☐	☐	☐
5	I can rank projects under a budget limit, check the ranking against the optimal set, and state the value of the last dollar of budget.	☐	☐	☐	☐	☐
6	I set hurdle rates by risk class and calibrate them against the results of past projects.	☐	☐	☐	☐	☐
7	I can value a staged investment, an option to abandon or an option to delay, and I design pilots that resolve the decisive uncertainty.	☐	☐	☐	☐	☐
8	I can decide between a buyback, a dividend, debt reduction, an acquisition and reinvestment, with a test for each and an estimate of intrinsic value.	☐	☐	☐	☐	☐
9	I run post investment reviews, agree kill criteria in advance, and resist sunk cost and escalation of commitment.	☐	☐	☐	☐	☐
10	I have written or revised a capital allocation policy that a board approved, and I address allocation bias and incentives.	☐	☐	☐	☐	☐

Total score: _____ out of 50. Ten statements rated from 1 to 5 give a minimum of 10 and a maximum of 50 points. Exhibit 26 gives the proposed interpretation. The scale is that of the source proposal for this program, and the statements are specific to this module.

Critical module note

Module 5 is a critical module. In this program a score below 30 out of 50 on a critical module would block the highest designation, regardless of the total across all twenty modules. The other critical modules are 1, 9, 10 and 13.

Exhibit 26 Proposed Interpretation of the Module 5 Score

Score	Reading	Suggested use
10 to 19	Unprepared	Study the module in full, and work the six examples with your own figures before the next capital decision
20 to 29	Developing	Compute ROIC and economic profit for your own company, and ask an experienced peer to review the result. This range blocks the highest designation
30 to 39	Competent	Lead a capital review and a post investment review, and present the results to the committee
40 to 45	Advanced	Draft the policy, the hurdle ladder and the scorecard, and teach others to use them
46 to 50	Future-ready	Share the method across the enterprise and invite independent review of the allocation record

These bands are proposed program standards and have not been empirically validated against a broad population of finance executives. Module 5 is designated a critical module, and a score below 30 would block the highest designation.

Development actions by pattern. A single total can hide the pattern behind it, so look at which statements received the lowest ratings. Exhibit 27 suggests three actions for each pattern.

Exhibit 27 Development Actions for Low Score Patterns

Low scores on	Pattern	Three suggested development actions
Statements 1, 2 and 3	Measurement gap: the reader cannot yet measure return against the cost of capital	1. Reconcile invested capital from the operating and financing views. 2. Rebuild Exhibit 4 with your own inputs and vary each. 3. Compute economic profit for each division
Statements 4, 5 and 6	Decision rule gap: the reader cannot yet choose among projects	1. Rework Exhibit 9 with your own projects. 2. Test all combinations of a real budget. 3. Draft a hurdle ladder and calibrate it against past results
Statements 7 and 8	Judgment gap: the reader cannot yet value flexibility or choose among uses of cash	1. Value one staged project with and without the option. 2. Estimate intrinsic value for your company as a range. 3. Compare a buyback with reinvestment as in Exhibit 14
Statements 9 and 10	Discipline gap: the reader cannot yet review, stop or set policy	1. Review three completed projects against their approvals. 2. Write kill criteria for one live project. 3. Draft a policy outline using Exhibit 23 and discuss it with the board chair

Source: author's suggestions. The mapping of statements to patterns is the author's proposal, and ratings should rest on experience or documented evidence.

What evidence supports a high rating. The ratings are meaningful only when they rest on something that another person could inspect. Exhibit 28 lists, for each statement, the kind of evidence that would justify a rating of 4 or 5. A reader who cannot produce the item should rate the statement lower, however confident the reader feels.

Exhibit 28 **Evidence That Supports a High Self Assessment Rating**

Statement	Evidence that would support a rating of 4 or 5
1. ROIC	A written definition of invested capital reconciled from both views, and a report of ROIC with and without goodwill for the last three years
2. WACC	A dated WACC memorandum with sources, target weights, sensitivity and the review of a valuation specialist
3. Economic profit	A division report of economic profit used in at least one decision to invest, fix or exit
4. Project methods	Investment papers in which NPV leads, with IRR and payback shown and the cases of misleading results explained
5. Rationing	A ranked portfolio checked against combinations, with the value of the marginal dollar stated to the committee
6. Hurdle rates	A hurdle ladder approved by the committee and a calibration against completed projects
7. Options	A business case with a staged structure, probabilities with evidence, and a pilot designed to resolve the key uncertainty
8. Uses of cash	A paper that compares a buyback or acquisition with reinvestment, with a range of intrinsic value and tax and legal review
9. Review and stopping	Post investment reviews of several projects, kill criteria in approval papers and at least one project stopped under them
10. Policy and incentives	A board approved policy, minutes showing its use, and incentive plan terms that include return on capital

Source: author's suggestions for teaching. The evidence listed is illustrative and each company may accept other documents.

A closing thought. The owners of a company hand its managers a fixed sum and ask a plain question, what will you do with it? A sound measure of return, an honest cost of capital, a process that ranks fairly, a willingness to stop and a policy that the board has approved are within the CFO's power to provide, and they are most of what separates companies that use capital well from those that merely spend it.

9. Currency check and sources

Currency check: this field changes, and rates, market data, tax rules, disclosure requirements and survey results shown here may already have changed. The publications in Exhibit 25 were opened in October 2026, and their statistics are largely self reported. The following were confirmed on pages read: the McKinsey article by Tim Koller and the points attributed to it, though its page stated no date; the Deloitte CFO Signals 4Q 2025 statistics of 200 CFOs, 63 percent and 55 percent, published January 13, 2026; the Grant Thornton Q2 2026 survey statistics, with the date taken from the URL; the Gartner statistics of July 17, 2025; the KPMG, CBIZ and SEC accounts of the vacatur of the share repurchase disclosure rule on December 19, 2023. The following come from the author's own knowledge and were not confirmed in a source read: the definitions and formulas for ROIC, NOPAT, WACC, CAPM, economic profit, NPV, IRR, modified IRR, payback and the profitability index; the value formula for growth; the real option illustration; the buyback value formula; the limits of CAPM; the association of the name EVA with Stern Stewart and Company; the one percent federal excise tax on repurchases under the Inflation Reduction Act of 2022; and the hierarchy, hurdle premiums, kill criteria and scorecard weights. The companies, rates, probabilities, projects and all dollar figures in the exhibits are fictional and were chosen for teaching, and all sums, NPVs, IRRs, selections and shares were computed in Python and checked by assertion. This module is educational and is not accounting, tax, legal, securities or investment advice. Readers must consult qualified professionals in accounting, tax, legal and other relevant services before acting, and matters such as the tax treatment of interest and repurchases, debt covenants and securities disclosure in particular require the advice of qualified counsel and tax advisers. Every rate and assumption in the exhibits is an illustration, and a reader who applies the method must replace each with the company's own figure.

Sources: McKinsey (Koller, 2026); Deloitte CFO Signals 4Q 2025; Grant Thornton Q2 2026 CFO Survey; Gartner (July 17, 2025); KPMG, CBIZ and the SEC on buyback disclosure; The Global Treasurer (2025). Titles, dates and URLs appear in Exhibit 25. The five point scale is from the source proposal for this program.