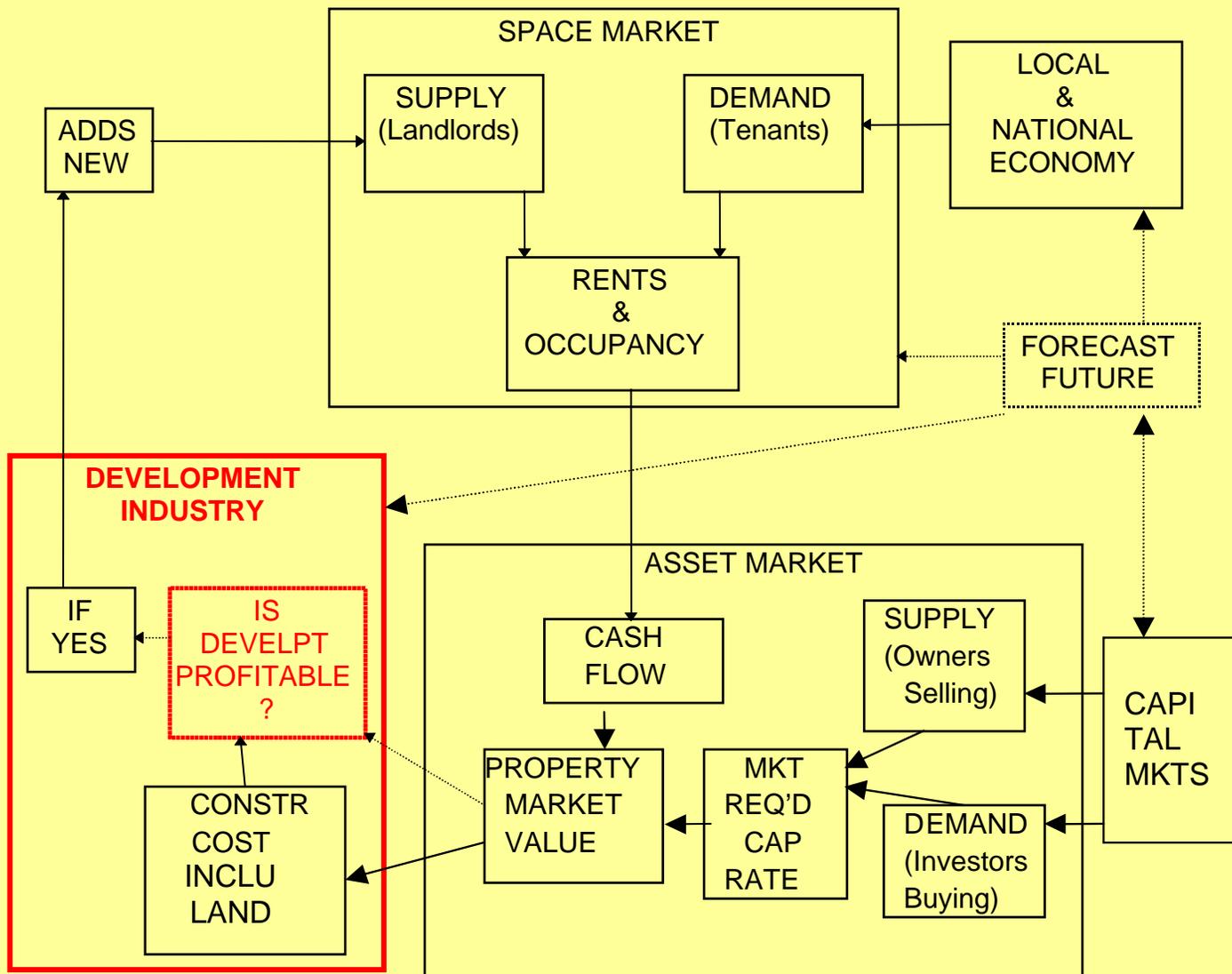


Chapter 28:
**Economic Analysis of Investment in Real
Estate Development Projects,**
Part 1

Exhibit 2-2: The “Real Estate System”: Interaction of the Space Market, Asset Market, & Development Industry



—————> = Causal flows.

.....> = Information gathering & use.

Development is important:

- *From a finance & investment perspective, but also*
- *From an urban development (physical, social, environmental) perspective...*

Development is a multi-disciplinary, iterative process . . .

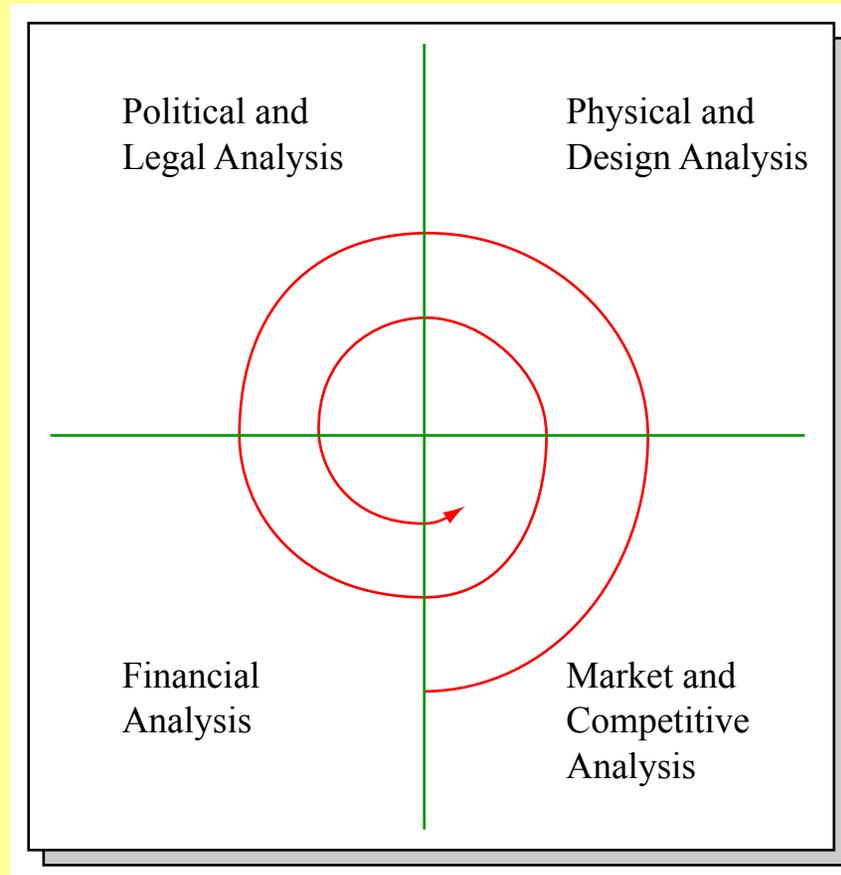


Image by MIT OCW.

The (famous) *Graaskampian Spiral*.

Graaskamp also coined the concept that most development projects can be characterized as either:

- *A use looking for a site, or*
- *A site looking for a use.*

Use Looking for a Site:

- *Developer has a particular specialization, or*
- *Developer is working for a specific user.*

Site Looking for a Use:

- *Developer tries to determine & build the “HBU”, or*
- *Public entity seeks developer to build a use determined through a political process (presumably also “HBU”).*

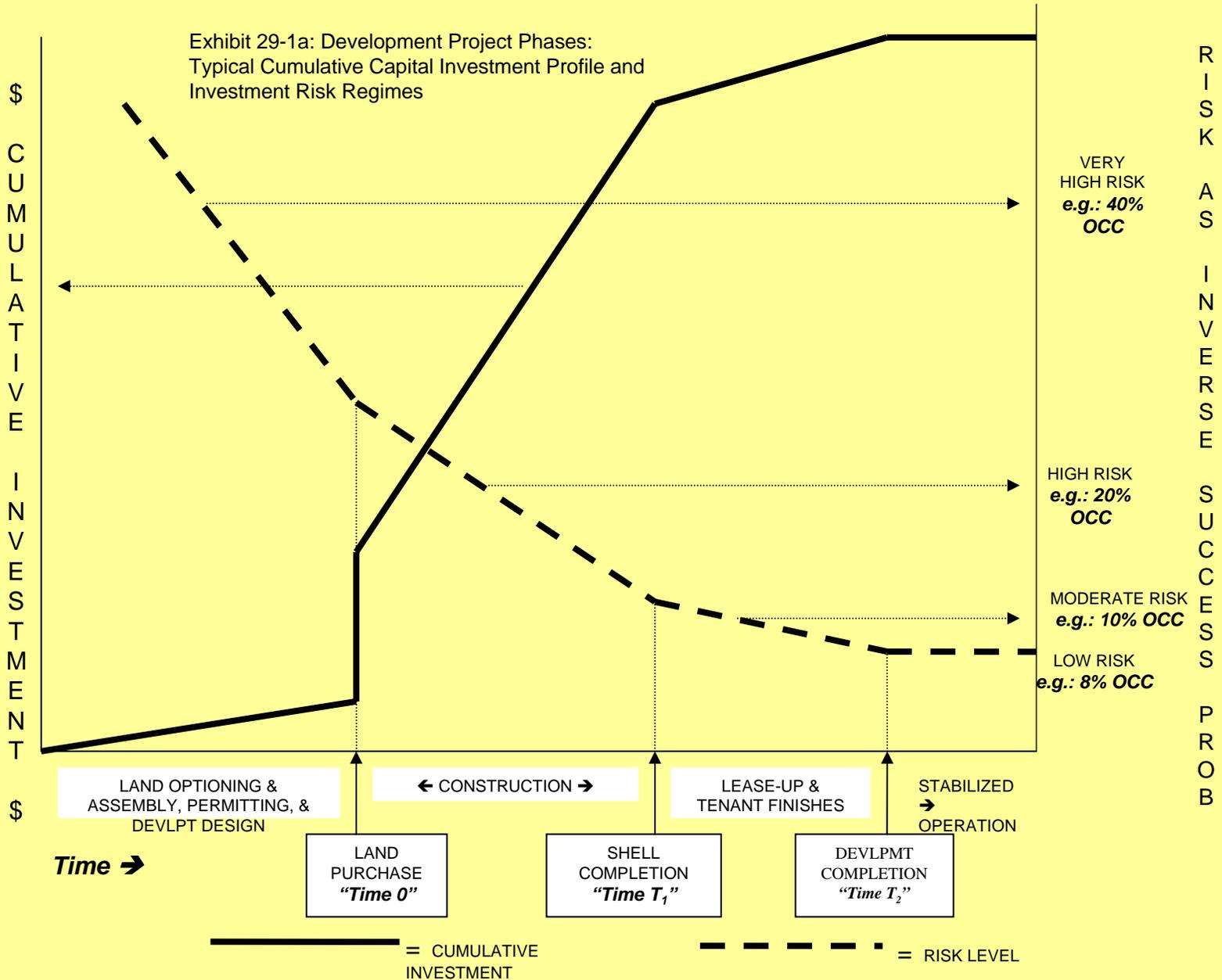
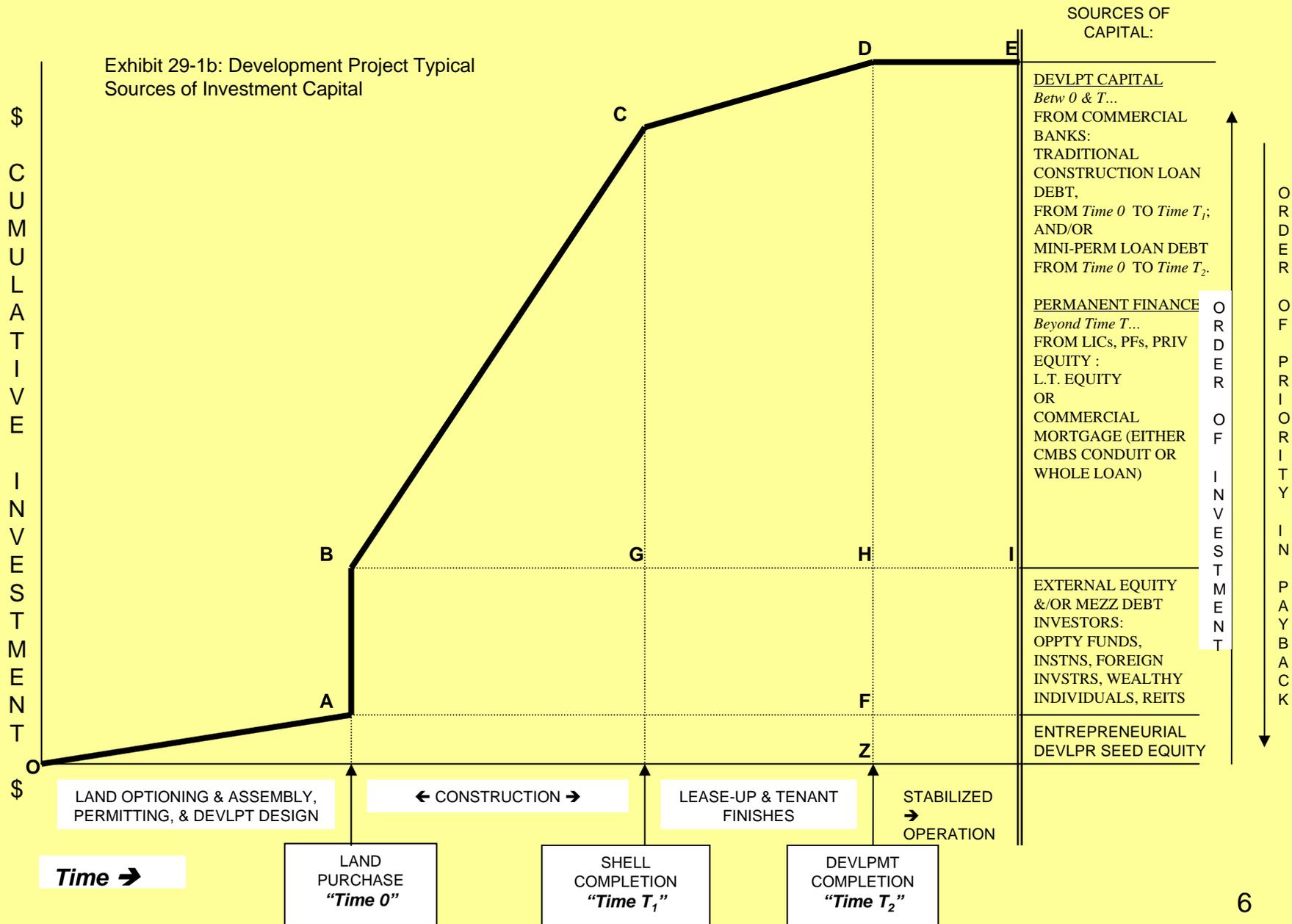
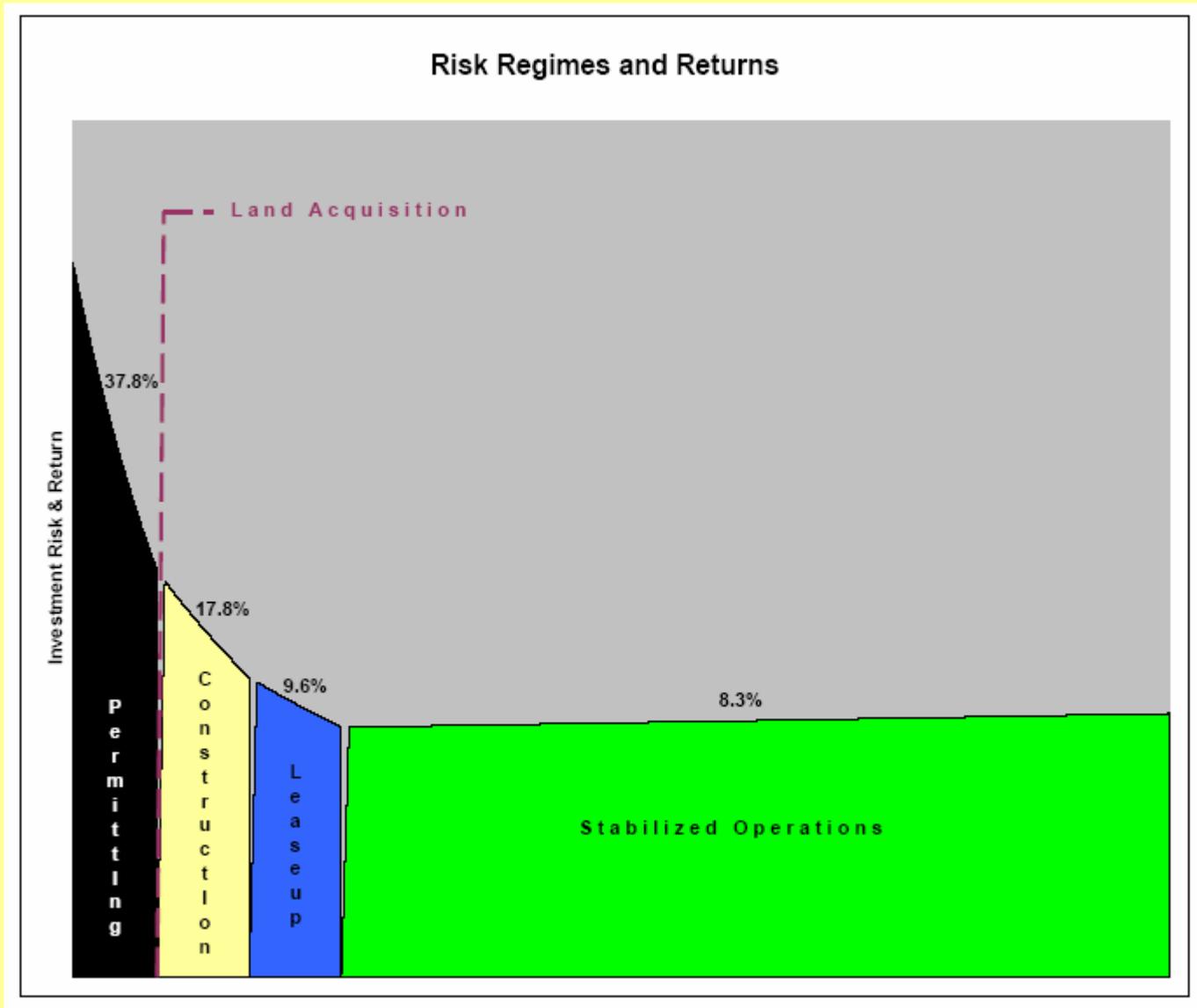


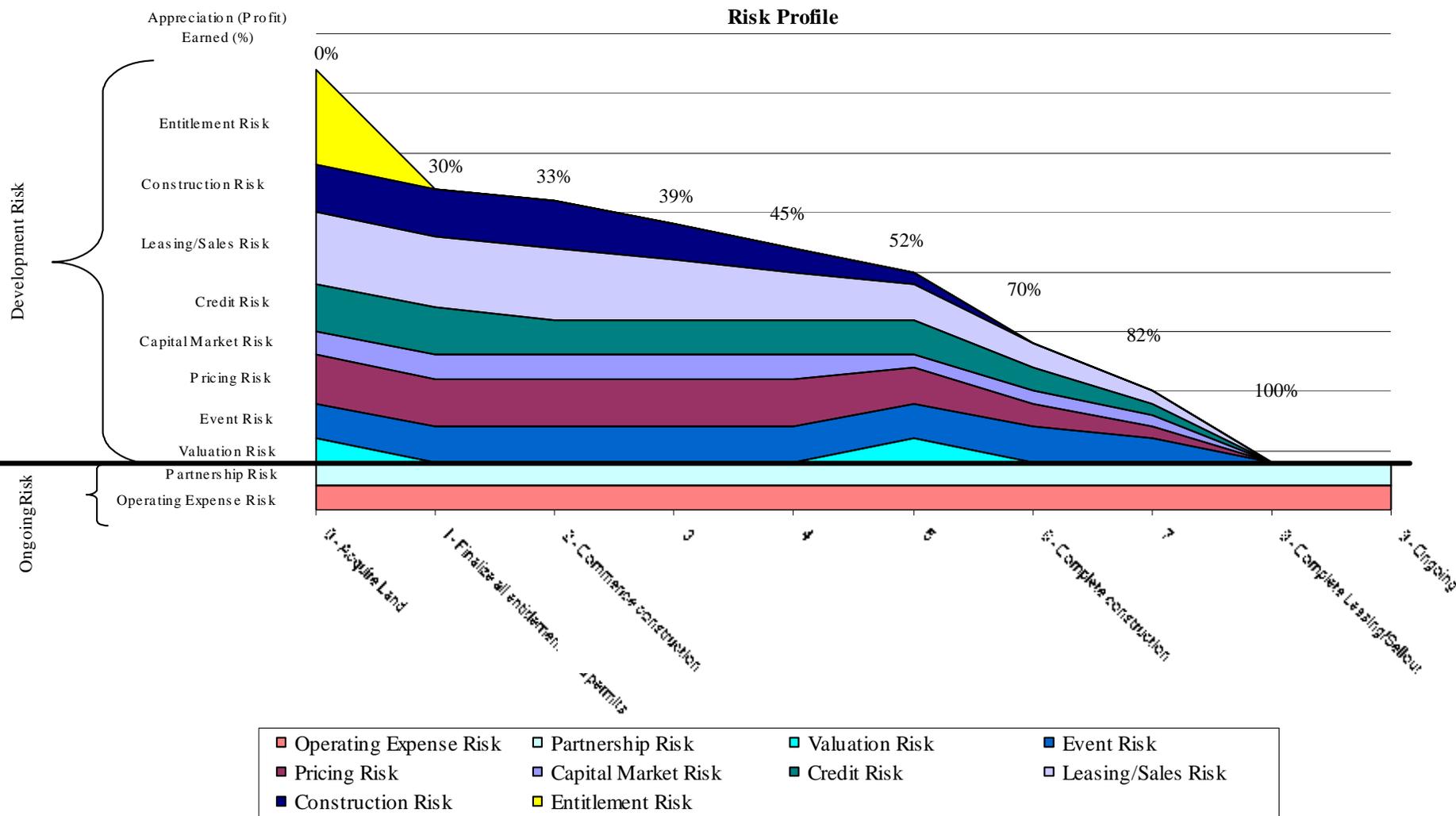
Exhibit 29-1b: Development Project Typical Sources of Investment Capital



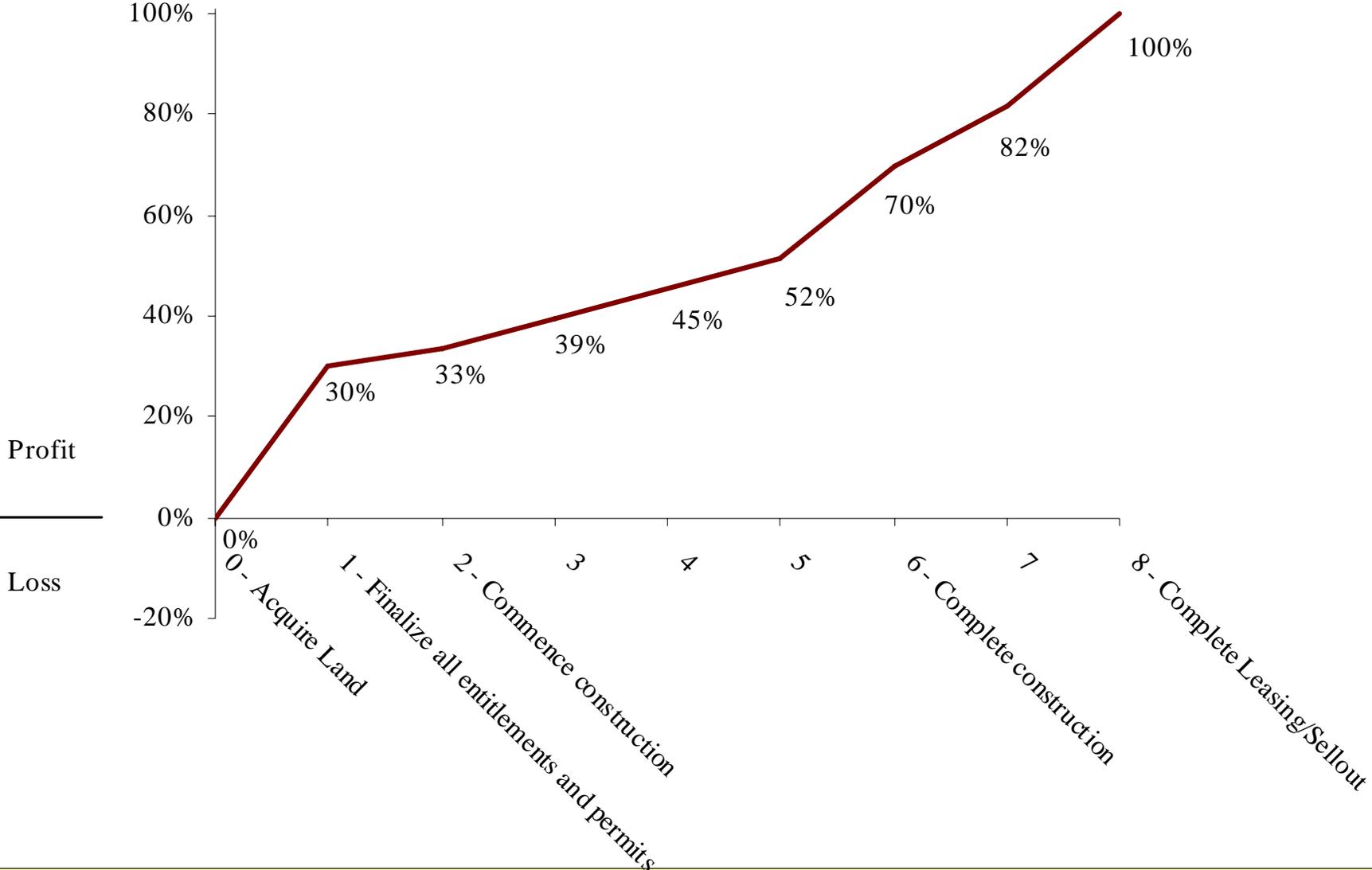
From Tod McGrath's analysis of Massachusetts 40B projects...



NCREIF Accounting Committee White Paper on Timing of Recognition of Development “Entrepreneurial Profit”



Cumulative Entrepreneurial Profit



Their list of “primary risk factors” . . .

1. **Entitlement Risk**

- Risk of obtaining appropriate land entitlements, construction permits, and possibly zoning variances.

2. **Construction Risk**

- Materials pricing – risk that the cost of materials may change significantly from the original construction
- Scheduling – risk that planned construction completion could be prolonged due to weather delays, labor disputes, material delivery delays, etc.

3. **Leasing/Sales Risk**

- Risk that forecasted absorption (leasing or unit sales) volume will not be realized.
- Risk that early termination clauses would be invoked or that the property becomes encumbered by a long-lease with below-market rent escalation provisions (frequency and/or amount of increase).
- Risk of a market-driven restructure of leasing or sales commission rates.

4. **Operating Expense Risk**

- Risk of a significant change in one or more fixed or variable expense categories such as insurance, real estate taxes, etc.

5. **Credit Risk**

- Risk that pre-lease tenants and/or tenants' industry segment is negatively impacted during development.

6. **Partnership Risk (if applicable)**

- Risk that accompanies any ownership less than 100% due to a myriad of factors regarding control, revenue distributions, etc.

7. **Capital Market Risk**

- Interest Rates – risk of a significant change in interest rates during the development period. This could affect cost of construction or, in the case of a condominium project, the buyer's ability to obtain suitable purchase price financing.
- Alternative investment risk – risk that investor allocations or rates of return for alternative investments will change resulting in shifts in capitalization and discount rates.

8. **Pricing Risk**

- Supply Risk – risk that unanticipated competitive supply will enter the market before lease-up or sellout is achieved resulting in short-, mid-, or long-term concessions, absorption, pricing, etc.
- Real Estate Cycle Issues – risk that rental rates may be negatively affected by changes in market dynamics.

9. **Event Risk**

- Risk of a material physical, economic, or other event occurring that significantly impacts asset operations value. Weather, discovery of previously unknown environmental contamination, exodus of major employment providers, and terrorism comprise a sampling of such events.

10. **Valuation Risk**

- Risk that a lack of applicable, current market data exists to accurately value the subject property.
- Risk that a lack of competency exists with the appraiser engaged to specifically address issues of property geography, valuation analytics, market research, etc.

29.2 Basic Information: Enumerating Project Costs & Benefits

Two types of project budgets are important to be developed:

- *Construction & Absorption Budget:*
 - *Covers construction (& lease-up, for “spec” projects);*
 - *← Relates to the “COST” side of the NPV Equation.*
- *Operating Budget:*
 - *Covers “stabilized” period of building operation after lease-up is complete;*
 - *Typically developed for a single typical projected “stabilized year”;*
 - *← Relates to the “BENEFIT” side of the NPV Equation.*

$$\text{NPV} = \text{Benefits} - \text{Costs} = \text{Value of Bldg} - \text{Cost of Devlpt.}$$

The Operating Budget (*Recall the items from Chapter 11*):

- **Forecast Potential Gross Income (PGI, based on rent analysis)**
- **Less Vacancy Allowance**
- **= Effective Gross Income (EGI)**
- **Less forecast operating expenses (& capital reserve)**
- **= Net Operating Income (NOI)**

The most important aspect is normally the rent analysis, which is based (more or less formally) on a *market analysis* of the space market which the building will serve. (See Chapter 6, or Wheaton's 11.433 course.)

The bottom line:

NOI forecast, combined with *cap rate* analysis (of the asset market):

➔ $\text{NOI} / \text{cap rate} = \text{Projected Completed Building Value} = \text{“Benefit” of the development project.}$

The Construction & Absorption Budget:

Construction: *“Hard Costs”*

- Land cost
- Site preparation costs (e.g., excavation, utilities installation)
- Shell costs of existing structure in rehab projects
- Permits
- Contractor fees
- Construction management and overhead costs
- Materials
- Labor
- Equipment rental
- Tenant finish
- Developer fees

The Construction & Absorption Budget (*cont.*):

Construction: “*Soft Costs*”

- **Loan fees**
- **Construction loan interest**
- **Legal fees**
- **Soil testing**
- **Environmental studies**
- **Land planner fees**
- **Architectural fees**
- **Engineering fees**
- **Marketing costs including advertisements**
- **Leasing or sales commissions**

Absorption Budget (*if separate*):

- **Marketing costs & advertising**
- **Leasing expenses (commissions)**
- **Tenant improvement expenditures (“*build-outs*”)**
- **Working capital during lease-up (until break-even)**

29.3 Construction Budget Mechanics

Construction *takes time* (typically several months to several years).

During this period, financial capital is being used to pay for the construction.

“*Time is money*”: The opportunity cost of this capital is part of the real cost of the construction.

This is true whether or not a construction loan is used to finance the construction process. But:

Construction loans are almost always used (even by equity investors who have plenty of cash).

Why? . . .

The “classical” construction finance structure:

Phase:



Financing:

C.O.

Construction Loan

Bridge Loan

Permanent Mortgage

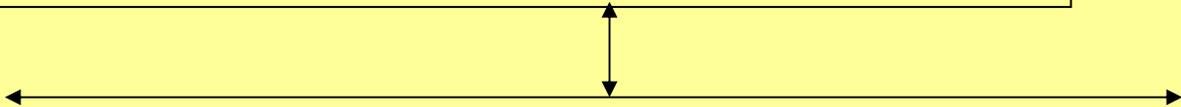
Source:

Commercial Bank

- Comm. Bank
- Insur Co.

- Via Mortg Brkr or Mortg Banker:*
- Life Insur. Co.
 - Pension Fund
 - Conduit → CMBS

Construction lender won't approve construction loan until permanent lender has conditionally approved a “take-out” loan.



The construction loan collapses a series of costs (cash outflows) incurred during the construction process into a *single value* as of a single (future) *point in time* (the projected completion date of the construction phase).

Actual construction expenditures (“*draws*” on the construction loan) are added to the accumulating *balance* due on the loan, and interest is charged and compounded (adding to the balance) on all funds drawn out from the loan commitment, from the time each draw is made.

Thus, interest *compounds forward*, and the borrower owes no payments until the loan is due at the end of construction, when all principle and interest is due.

Bottom line: Borrower (developer) faces no cash outflows for construction until the end of the process, when the entire cost is paid (including the “cost of capital”).

Example:

Commitment for \$2,780,100 of “future advances” in a construction loan to cover \$2,750,000 of actual construction costs over a three month period. 8% interest (nom.ann.), compounded monthly, beginning of month draws:

Month	New Draw	Current Interest	New Loan Balance
1	\$500,000	\$3,333.33	\$503,333.33
2	\$750,000	\$8,355.55	\$1,261,688.88
3	\$1,500,000	\$18,411.26	\$2,780,100.14
4	and so on		

Construction schedule must estimate the amount and timing of the draws.

The accumulated interest ($8333+8356+18411 = \$30,100$ in this case) is a **very real part of the total cost of construction**. AKA “*Financing Cost*”.

Typically a “commitment fee” is also required, up front (in cash).

29.4 Simple Financial Feasibility Analysis in Current Practice

The traditional and most widely employed method for the analysis of the financial feasibility of development projects will be referred to here as: “*Simple Financial Feasibility Analysis*” (SFFA).

SFFA is based on the commercial mortgage market (for *permanent* loans).

It assumes the developer will take out the largest permanent loan possible upon completion of the building.

It assumes that the development *costs* will equal the market *value* of the property on completion.

Obviously, SFFA leaves something to be desired from a normative perspective, but:

- *It is simple and easy to understand.*
- *It requires no specialized knowledge of the capital markets other than familiarity with the commercial mortgage market (does not even require familiarity with the relevant property asset market).*

SFFA comes in two modes: “*Front Door*”, & “*Back Door*” . . .

SFFA “Front Door” Procedure:

Start with costs & end with rent required for feasibility...

Site Acquisition Costs + Construction Costs
= Total Expected Development Cost
X Loan to Value Ratio
= Permanent Mortgage
X Annualized Mortgage Constant
= Cash Required for Debt Service
X Lender Required Debt Service Coverage Ratio
= Required Net Operating Income or NOI
+ Estimated Operating Expenses (Not passed through to tenants)
= Required Effective Gross Income
÷ Expected Occupancy Rate
= Required Gross Revenue
÷ Leasable Square Feet
= Rent Required Per Square Foot

Question: Is this average required rent per square foot achievable?

Typical approach for “Site looking for a Use”.

Example:

- Class B office building rehab project: 30,000 SF (of which 27,200 NRSF).
- Acquisition cost = \$660,000;
- Rehab construction budget: \$400,000 hard costs + \$180,000 soft costs.
- Estimated operating costs (to landlord) = \$113,000/yr.
- Projected stabilized occupancy = 95%.
- Permanent loan available on completion @ 11.5% (20-yr amort) with 120% DSCR.
- Estimated feasible rents on completion = \$10/SF.

What major issue is left out here?

Site and shell costs:	\$ 660,000
+ Rehab costs:	580,000
= Total costs:	\$1,240,000
X Lender required LTV	x 80%
= Permanent mortgage amount:	\$ 992,000
X Annualized mortgage constant:	x 0.127972
= Cash required for debt svc:	\$ 126,948
X Lender required DCR:	x 1.20
= Required NOI:	\$ 152,338
+ Estd. Oper. Exp. (Landlord):	113,000
= Required EGI:	\$ 265,338
÷ Projected occupancy (1-vac):	÷ 0.95
= Required PGI:	\$ 279,303
÷ Rentable area:	÷ 27200 SF
-----	-----
= Required rent/SF:	\$10.27 /SF

Lender will base mortg on Mkt Val, not constr cost.

Use mkt cap rate info to est. bldg val.

SFFA “Back Door” Procedure:

Start with rents & building, and end with supportable development costs...

Total Leaseable Square Feet (based on the building efficiency ratio times the gross area)

X Expected Average Rent Per Square Foot

= Projected Potential Gross Income (PGI)

- Vacancy Allowance

= Expected Effective Gross Income

- Projected Operating Expenses

= Expected Net Operating Income

÷ Debt Service Coverage Ratio

÷ Annualized Mortgage Constant

÷ Maximum Loan to Value Ratio

= Maximum Supportable Total Project Costs

(Question: Can it be built for this including all costs?)

- Expected Construction Costs (Other than Site)

= Maximum Supportable Site Acquisition Cost

Question: Can the site be acquired for this or less?

Typical approach for “Use looking for a Site”.

Example:

- Office building 35,000 SF (GLA), 29,750 SF (NRA) (85% “Efficiency Ratio”).
- \$12/SF (/yr) realistic rent (based on market analysis, pre-existing tenant wants space).
- Assume 8% vacancy (typical in market, due to extra space not pre-leased).
- Preliminary design construction cost budget (hard + soft) = \$2,140,000.
- Projected operating expenses (not passed through) = \$63,000.
- Permanent mortgage on completion available at 9% (20-yr amort), 120% DCR.
- Site has been found for \$500,000: *Is it feasible?*

Potential Gross Revenue = 29,750 x \$12 = \$ 357,000

Less Vacancy at 8% = - 28,560

= Effective Gross Income \$ 328,440

Less Operating Expenses - 63,000

= Net Operating Income \$ 265,000

÷ 1.20 = Required Debt Svc: \$ 221,200

÷ 12 = Monthly debt svc: \$ 18,433

→ Supportable mortgage amount = \$ 2,048,735

÷ 0.75 LTV = Min. Req'd. Value: \$ 2,731,647

Less Construction Cost - 2,140,000

→ Supportable site acquisition cost: \$ 591,647.

$$= \frac{18433}{.09/12} \left[1 - \left(\frac{1}{1 + .09/12} \right)^{240} \right]$$

So, the project seems feasible.

But again, something seems left out... Project may be feasible, but...

Problems with the SFFA:

- *Just because a project is financially feasible, does not necessarily mean that it is desirable.*
- *Just because a project is not feasible using debt financing, does not necessarily mean that it is undesirable:*
 - *A project may appear unfeasible with debt financing, yet it might be a desirable project from a total return to investment perspective (and might obtain equity financing).*

Don't confuse an SFFA feasibility analysis with a normatively correct assessment of the *desirability* of a development project from a financial economic investment perspective.

SFFA does not compute the *value of the completed property*.

Hence, does not compute the NPV of the development investment decision:

$$\text{NPV} = \text{Value} - \text{Cost} .$$

SFFA merely computes whether it is possible to take out a permanent loan to finance (most of) the development costs.

The *correct* way to evaluate the financial economic *desirability* of a development project investment:

(Recall Chapter 10.)

“THE NPV INVESTMENT DECISION RULE”:

- 1) MAXIMIZE THE NPV ACROSS ALL MUTUALLY-EXCLUSIVE ALTERNATIVES;
AND**
- 2) NEVER CHOOSE AN ALTERNATIVE THAT HAS: $NPV < 0$.**

For development investments:

$$NPV = \text{Benefit} - \text{Cost} = \text{Value of Bldg} - \text{Cost of Devlpt.}$$

Potential Gross Revenue = 29,750 x \$12 =	\$ 357,000
Less Vacancy at 8% =	- 28,560
= Effective Gross Income	\$ 328,440
Less Operating Expenses	- 63,000
= Net Operating Income	\$ 265,000
÷ 1.20 = Required Debt Svc:	\$ 221,200
÷ 12 = Monthly debt svc:	\$ 18,433
→ Supportable mortgage amount =	\$ 2,048,735
÷ 0.75 LTV = Min. Req'd. Value:	\$ 2,731,647
Less Construction Cost	- 2,140,000
-----	-----
→ Supportable site acquisition cost:	\$ 591,647.

To see the problem with the SFFA, consider again the example we just looked at (*left*). The project seemed feasible with a \$500,000 land cost. But suppose (as is reasonable)...

- Expected cap rate at completion = 10%
- OCC for investment in such property when stabilized (unlvd) $E[r_V] = 11\%$
- OCC for construction cost $E[r_K] = 6\%$
- Time to build = 1 year.

Then the correctly determined NPV of this project is as follows:

$$\begin{aligned}
 NPV &= PV[Bldg] - PV[Constr] - PV[Land] \\
 &= \frac{\$265000/0.10}{(1+0.11)^1} - \frac{\$2140000}{(1+0.06)^1} - \$500000 = \frac{\$2650000}{1.11} - \frac{\$2140000}{1.06} - \$500000 \\
 &= \$2387000 - \$2019000 - \$500000 \\
 &= -\$132000
 \end{aligned}$$

which is a negative NPV. (Even tho supportable site acquisition cost appears to be +\$91647 above land price.)

Thus, the NPV Rule says: Don't invest.

And the NPV Rule is based on Wealth Maximization.