Ec. 162: Demand · Risk · Forecasting
~~Decision, Case~~

Risk

Cf. James + Lee

Sizing a Culvert

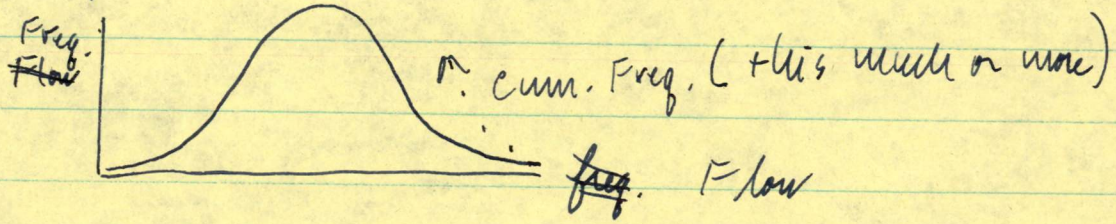
1. Washout will occur if flood > capacity.

2. Cost of washout
   - $X to repair + replace
   - $Y for loss of service

3. Probability of flood > capacity

a. Get records of stream flow + rainfall, ~~relate to~~ to translate into flows ~~at mouth~~ into culvert.

b. Freq. distr.



c. Translate freq. distr. to load duration curve.

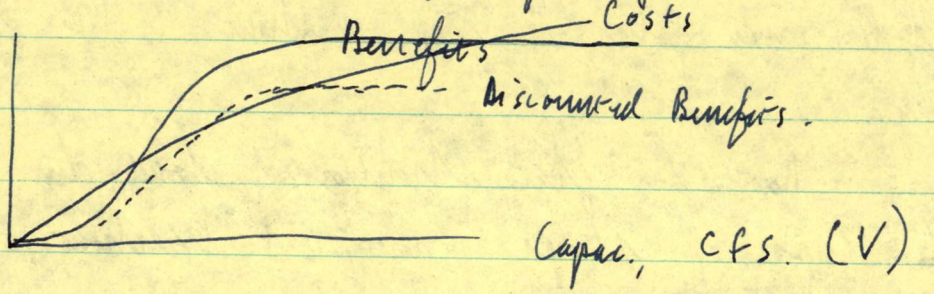


d. Any point on L.D. curve tells you what % of years have that flow or more -- i.e., a washout for that capacity.

1% is the 100 yr. flood, etc.

e. Translate load duration curve into productivity of ~~direct~~ units of capacity (cfs is the unit)

(over)



f. Discount benefits. E.g. the 50 yr. flood arrives in 25 yrs., on curve.

g. Draw cost curve.

~~Cap = k K_0 C^{.5} 6~~

Cost = $ & $V^{.5}$ or .6

h. Max B - C.

End

e. For low capacity, TP is near zero bcs. only 1% of the time is it large enough to prevent a washout.

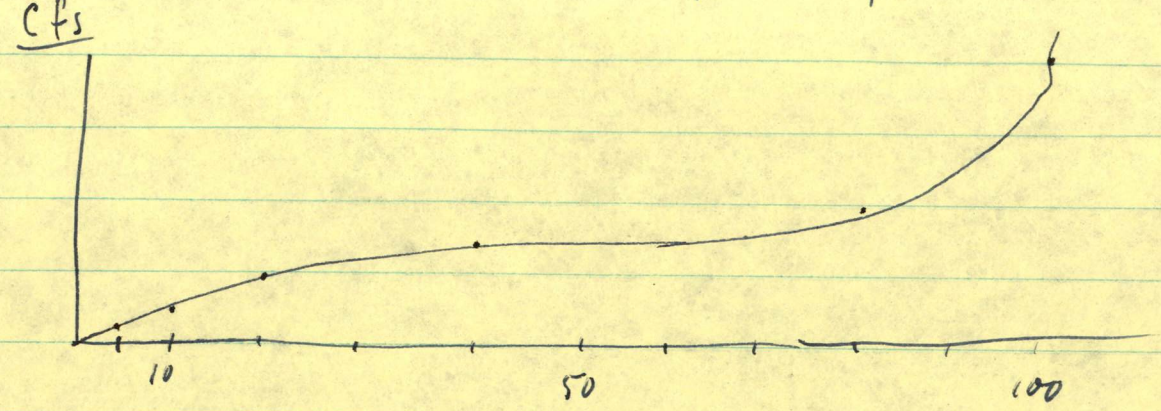
Rises slowly bcs., as you double capacity, it is still only going to stop washout 1.1% of the time, say.

But on flat shoulder of load dur. curve, a small Δ capacity stops many Δ washouts, bcs. of hi freq. of those flows. Etc.

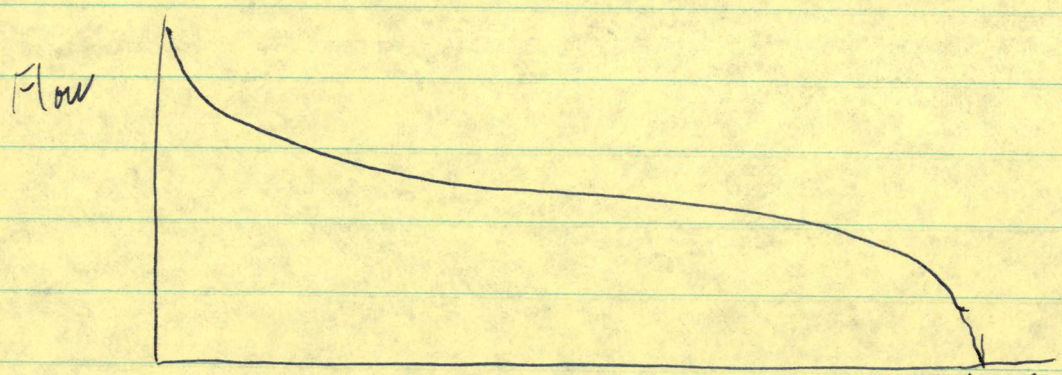
When storing wtr., small res. fills every yr. Here, curve may start right out on steep part.

Some orig. notes, for loose ends.

Orig. p. 1 + 2 were on other topics, separated.

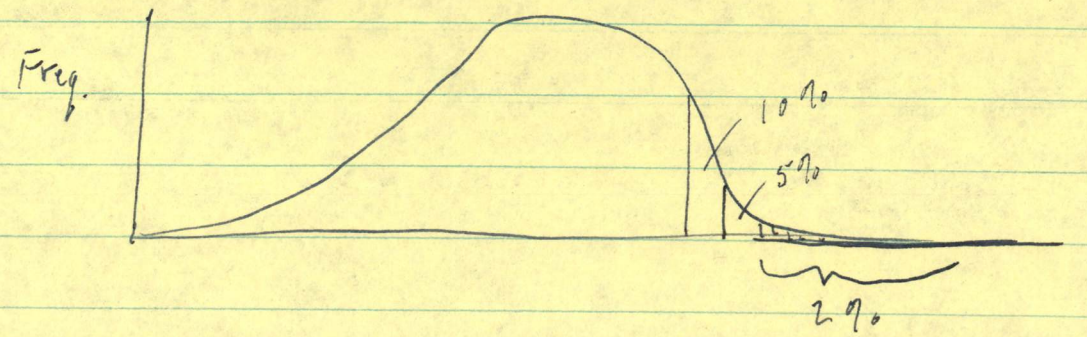


This looks like a load duration curve, backwards. Redraw.



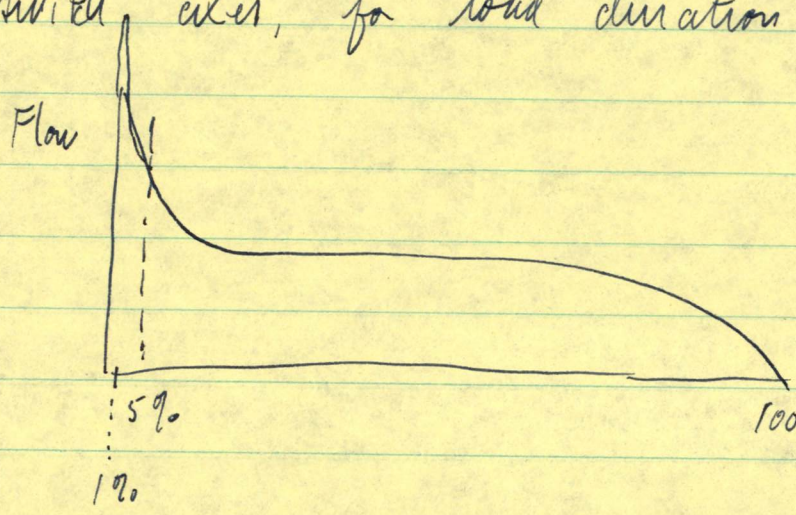
% of years w. ~~this~~ given flow or ~~more~~ ~~less~~ more.
(Cum. Freq.)

Above curves are consistent w. normal freq. distr. The steep parts are the tails. To show plausibility, start w. / normal curve, derive load dur. curve from it.





Switch axes, for load duration curve. (give math e.g.)



1% level shows the 100 yr. flood.
2% " " 50 " "
etc,

The declining freq. of use of added K is a kind of diminishing returns.

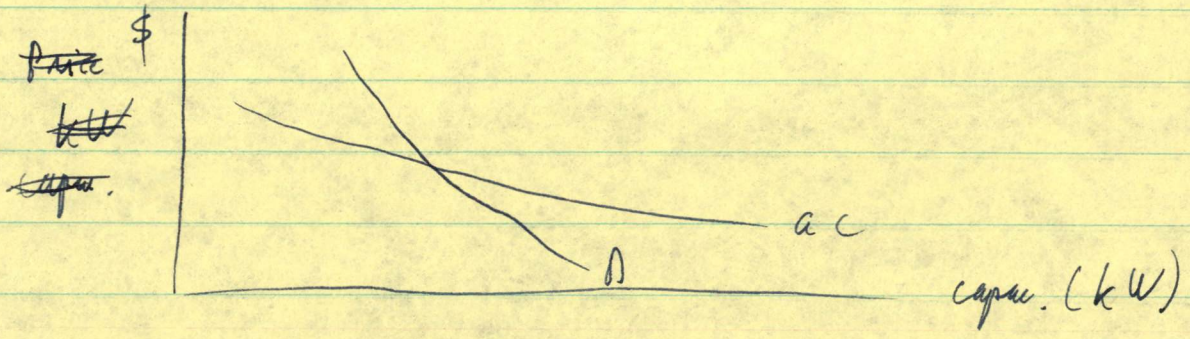
If the decline is on supply side, we often recognize this as diminishing returns — e.g. a higher dam that fills less often.

If decline is on demand side, sometimes is not recognized as diminishing returns — e.g. peak demand for power, or ferries.

Doctrine of duty to serve causes utilities to build capacity for peak demand (or, we wd., for ave. demand in direct yr., etc.)

Diff. rets. cd. show in falling demand, in given service area. Cd. one construe this as diff. rets. to franchise? To be considered.

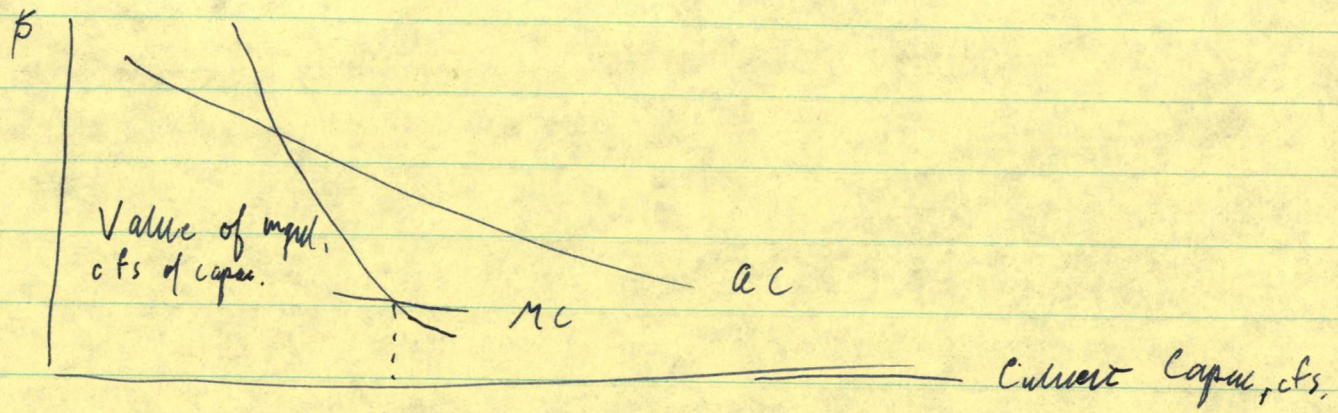
Meantime, let unit be the unit of physical output



"Demand" here is a composite; the drop refers to declining freq. of demand for added capac. in kW. (If we used kWh as unit, a diff. scheme results.)

Our traditional cost curves — can they take this into acct?

From p. 2



Capacity	Diam.	Costs			Costs of Washout			Freq. of Washout	Yrs. to 1st probable washout
		TC	ac	MC	Replmt.	Loss of Service	Σ		
10								50%	1.5
20								40	
40								30	
80								5	10
160								2	25
320								1.0	50
640								0.2	250
1280								0.0	

Recheck all this

$dC = \frac{2}{3} a q^{.6}$ (q = capacity) (a = a const.)

$A = \pi r^2$

$A^{.5} = \pi^{.5} r$

$2r\pi = C$

$r = \frac{C}{2\pi}$

$A^{.5} = \pi^{.5} \frac{C}{2\pi} = \frac{\pi^{-.5}}{2} C = .2821\, C$

$C = \frac{1}{.2821} A^{.5} = 3.545\, A^{.5}$

$a.c. = \frac{C}{A} = 3.545\, A^{-.5}$

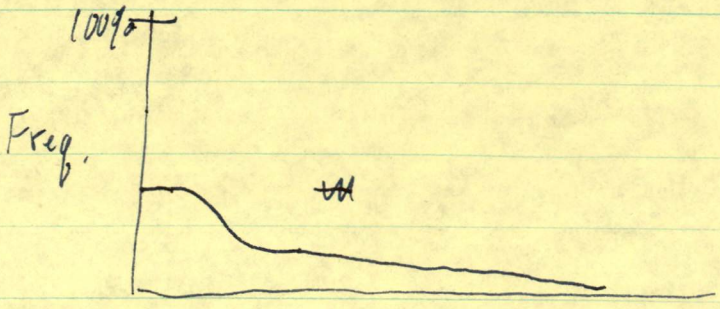
$M.C. = 3.545 \cdot .5\, A^{-.5}$

Risk.

My model of flood frequency (also found in James + Lee) and culvert sizing contains idea that the 50-yr. flood will occur, most probably, 25 yrs. in future. The flood is the "production" of the culvert — i.e. protecting from the flood is the production.

Likewise with positive risks. Say you farm in western Ki plains, and lose crop 2 years out of 3. (or get 2 years of low yields out of 3). This may "be regarded merely as a longer-than-average production period." - Barbe + Horton, cited in Huffman, p. 128.

Deeper reserves are needed. But the need is greater than 3x the one-year reserve because it is not a predictable 3 years.



The K needed in risky farming is not the same as up front K required to build a dam, e.g. Some of it takes other forms:

- a willingness to accept lower income in bad years
- a willingness to gamble on wipeout

Thus, ~~the~~ risk-preferring may substitute for K.

Calculating rent & value for such land is tricky. Key one is the model of periodic yields.

Risk

a. It's easy to pledge what you own. Harder to pledge what you want to buy

i. If it's a residence, there are ways to borrow.

ii. If an alligator, lenders avoid — How could you pay?

iii. If a public co., w. other owners, you hardly can pledge their assets. Joint living care, e.g.

b. Sometimes banks get taken — Penn Square case; Mergers case in Ts., who took Seafirst bank.

Some banks lend to insiders — But Lemke.

c. To construct, normally you own land clear, then borrow to build "construction loan." Thus, risk becomes assoc. w. K, more than land. "Increments of low quality" from lenders' view, are As of K, not land.

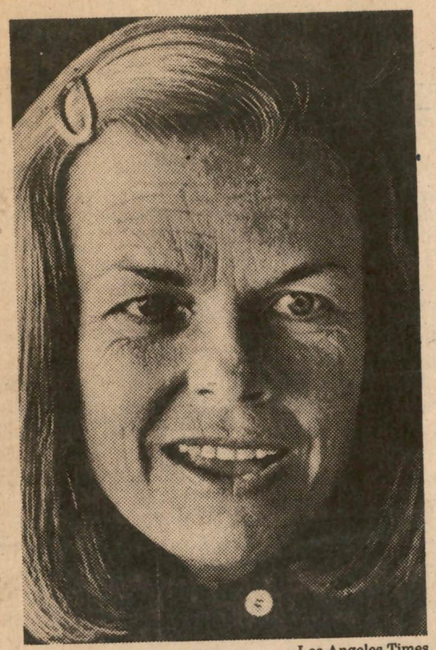
d. Then, after l.v. rises, you cd. go 2d Trust. ~~2d Trust~~ Or even if l.v. doesn't rise, but bldg. becomes seasoned.

Thus, 2d Trusts rep. l.v. more.

Los Angeles Times

BUSINESS

Thursday, September 22, 1983



Los Angeles Times

Joan Irvine Smith, minority shareholder and granddaughter of the founder of the Irvine Co., says the loan document proves she was right when she insisted six months ago that Donald L. Bren himself did not have the financial resources to buy the company.

Irvine Co. Chief Comes Under Attack by Smith, Ex-Official

By TOM FURLONG and DEBRA WHITEFIELD, *Times Staff Writers*

In separate moves Wednesday, Irvine Co. Chairman Donald L. Bren was sued for securities violations by a former company president and came under further attack by Joan Irvine Smith, his longtime antagonist and the firm's second-largest shareholder.

Claiming that he was intentionally deceived by the company he headed until nine months ago, Peter C. Kremer sued the company, Bren and director Herbert Allen Sr. for $5.5 million.

Kremer's lawsuit, filed in U.S. District Court in Los Angeles, accuses Bren of negotiating an agreement to buy Kremer's Irvine Co. stock at a price "well below the fair market value of the company" while at the same time "maneuvering to acquire the stock of other Irvine shareholders based on a substantially higher valuation."

In a brief statement released through a company spokesman, Bren said only that he "wasvery surprised and extremely disappointed inPeter Kremer's judgment." The spokesman alsopointed out that Kremer was paid $20 million insalary and compensation during the five yearshe worked for the firm.

Meanwhile, in a telephone interview, Joan Irvine Smith, a dissident minority shareholder and granddaughter of the company founder, cited a confidential loan document that she claimed shows that Bren pledged the company's assets as collateral last April, when he bought majority control of the firm for $518 million—something Bren denied at the time of purchase.

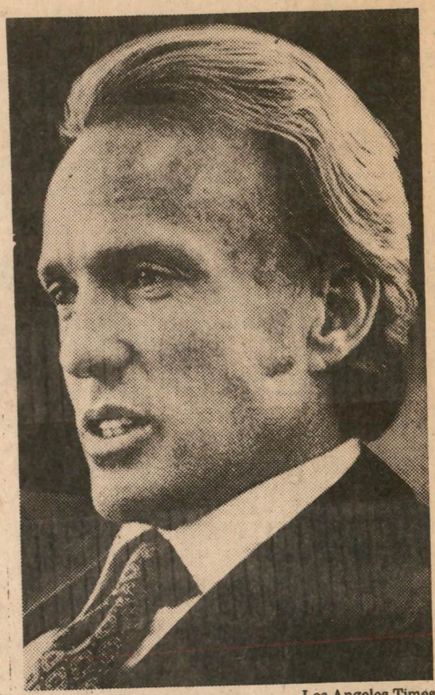
Smith said the document proves that she was right six months ago when she insisted that Bren did not have the personal resources to buy a majority interest in the company. She declined to provide a copy of the document to The Times, however.

Company officials now do not dispute Smith's facts. But they challenge her interpretation of the loan document, adding that her public discussion of the document was "highly improper."

Bren surprised the California real estate industry on April 15, when he bought a majority interest in the closely held, 68,000-acre Orange County land development firm. The purchase gave him 86% of the company's privately held stock. Smith, 50, whose grandfather founded the firm in the last century, and her mother, Athalie Clarke, retained 11% of the shares.

When the purchase was announced, Bren

Please see IRVINE, Page 2



Los Angeles Times

Chairman Donald L. Bren and other Irvine Co. officials challenge Joan Irvine Smith's interpretation of the loan document, and say her public discussion of the document was "highly improper."

Marc Rich Case

U.S. Must Go Through Swiss Legal Channels

BERN, Switzerland (AP)—The Swiss government said Wednesday that the U.S. Justice and Energy departments can only get in-

SoCal Ediso

Rating Agency Cite

By DORIS BYRON FULLER, *Times*

Reacting swiftly to a controversial decision by the Public Utilities Commission, a Chicago securities-rating firm has downgraded the investment status of Southern California Edison Co.'s bonds and pre-

oup Planning blic Offering

founder and principal stockholder of the 13-year-old company. Federated's net sales rose 55.5% in the first six months of its current fiscal year over the year-ago period.

In a preliminary prospectus filed with the Securities and Exchange Commission, Federated said it plans to offer 1.25 million shares of common stock in late October at between $12 and $15 a share. That would give public shareholders about a 21% stake in the company, with the remainder held by Schwartz, his family and three other top company officers.

Federated—earning $963,000 on revenues of $89.2 million in its fiscal 1983 ended Feb. 28, after losing $532,000 in fiscal 1982—said it would use the proceeds for additional expansion, additions to working capital and repayment of long-term debt.

The firm, which operates 15 high-volume "superstores" in Los Angeles and other California cities, up from three in 1977, said it will open an additional eight stores in California and in Arizona within the next 12 months.

ble

President of

San Diego S&L Firm to Build Nursing Homes

By ANTHONY RAMIREZ,
San Diego County Business Editor

SAN DIEGO—In an unusual diversification move, Great American Federal Savings Bank said Wednesday that it plans to spend $125 million over five years in a joint venture to develop and operate nursing homes across the Sun Belt.

The first project of Great American's venture with Income Property Group, a San Diego partnership, will be a $5-million, 125-bed facility adjacent to Scripps Memorial Hospital in Encinitas in northern San Diego County. Ground breaking is scheduled within 45 days and the project is expected to be completed in June, 1984.

Analysts said they aren't aware of any other banks or savings and loans in similar ventures.

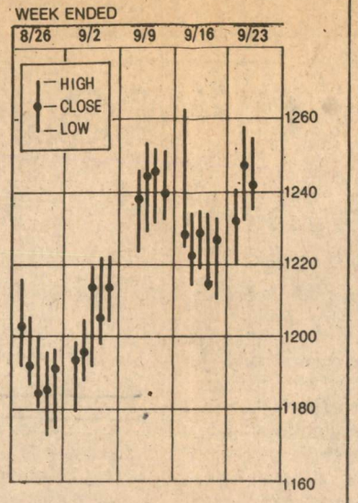
50% Stake

Under the joint venture, San Diego-based Great American, which has assets of $4.5 million, would provide financing in exchange for an equity stake in the facilities of 50% or more, according to Roger Lindland, Great American's executive vice president and chief financial officer.

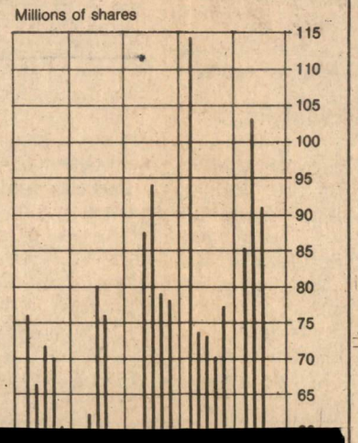
Four or five projects, worth about $40 million, have already been identified as possible future projects over the next six to 12 months, said

Dow Jones 30 Industrials

Wednesday, Sept. 21, 1983



New York Volume



IRVINE: Chief Sued

Continued from First Page

said he had been able to buy the stock by forming a new holding company, Newco I Corp., that used Bren's assets as security to finance the loan from five major U.S. banks.

Then, last week, Bren announced that he wanted to merge Newco with Irvine Co. and shift $560 million in loan and acquisition costs from the holding company to the operating company. Company officials insisted that such a merger was proposed only after several other alternatives were considered as the best way to pay off Bren's heavy debt.

Smith, however, citing a loan document dated April 15, said Bren had planned the merger and debt restructuring from the beginning. Otherwise, she said, Newco and Bren never would have gotten the loan.

"This is what makes me so mad," she said in a phone interview. "He planned all along to pledge the company's assets to borrow that money."

In fact, she said, the banks wanted such a merger agreed to in principle by July 15 and consummated by Sept. 15, a deadline that has been delayed by her continued refusal to go along with the deal.

Further, she said, the document shows that the loan was agreed to only after the Irvine Co. agreed to establish a huge cash reserve—$375 million—which would be used to help pay off the complete loan by next April.

Gary Hunt, an aide to Bren, offered a different interpretation of the loan document, which he said "is merely an indication of what the banks would prefer to have happen. It's their way of saying they think the merger (of Newco and Irvine Co.) is the best alternative."

Hunt added that the company is angry about Smith's loan document disclosure. "In our view, it's highly improper that a board member should disclose highly confidential information," Hunt said.

Hunt said the company has been extremely frustrated by Smith's continued refusal to discuss the merger with company officials. Indeed, Hunt said, Bren told Smith six months ago that such a merger was a distinct possibility, at which time Smith said she threatened to sue if the corporate assets were used as collateral.

"If she had personally sat down with Bren at the very beginning, then these misunderstandings would not have occurred," Hunt said. "If she would attend the board meetings, which she hasn't done in five years, she'd know what's going at the company."

In Kremer's lawsuit, Bren is accused of valuing the company at $750 million in determining the value of Kremer's shares last January and at $1 billion soon thereafter when Bren offered to buy out the other shareholders. That means Kremer was offered about $150,000 a share compared to $200,000 that the other shareholders were paid last April.

Kremer, president of the company from 1977 until his departure under pressure from Bren in January, contends in his suit that the company has acknowledged that the Bren transaction was planned at least as early as last Feb. 2, just seven days after Kremer signed a termination agreement negotiated by Bren. It was in that agreement that Kremer's shares were valued based on the company's being worth $750 million.

"When I first heard about the Bren purchase," Kremer said in a two-page statement accompanying a copy of the lawsuit, "I wanted to think that the timing was coincidental and that we would resolve it straightforwardly. As events have unwound, however, it appears that there was an intent to deceive me and to make certain that I did not get the same benefits of share ownership as the others.

"I am sorry to have to take this kind of action against a company that I felt so much a part of and against people whom I have always counted on to deal with me in good faith," he added. "But I am determined to follow this through despite the disproportionate resources of the other side."

RISK

There is risk bec. effort + res. are committed, sunk in particular forms, lose o.c. or salvage. This is inherent in K.

- labor is pd. currently
- land retains o.c. -- (altho arguably it loses some of it)

But does risk inhere in int. (i), or recovery of K. (k)? Normally we make int. a prior claim at a fixed rate, as on a debt.

Equity owner can take fixed int. out of c.f. if he wishes, call it income. But then deprecn. is negative income. If he sets his i.r., and c.f. is low, ~~asset value drops~~

a. He screens out more ints.

b. If c.f. ~~drops~~ falls below expectations, asset value falls, so he calcs. int. on lower base. And this is the generally correct way to do it, (using the individually relevant i.r.).

Then risk must be conceived + measured in those terms.* The risk of not recovering K., at the i.i.r. (a rise of i.i.r. wd. cause ~~such a~~ loss of cap. recovery, too.) The immediate measure

of lost cap. recov. is decline of PV. PV measures how much K you will recover, above int. cost.

✓ Thus, risk is msred. by dispersion of ests. ~~PV_0 is neet yr. (or yrs?).~~ Long invts. are thus risky bec. highly leveraged by int. sensitivity anal. shd. show how risky.

$$E.g.\quad P = R_n(1+i)^{-n} - C_0 = R_n\left[(1+i)^{-n} - \frac{C_0}{R_n}\right]$$

P is sensitive to R, n, i and leveraged by C_0 (the leverage makes $\%\Delta P > \%\Delta R$, or $\Delta P/P > \Delta R/R$)

✓ Risk is measured by the effect of various contingencies on PV_0. You are trading $\$_0$ for a dispersion of PV_0

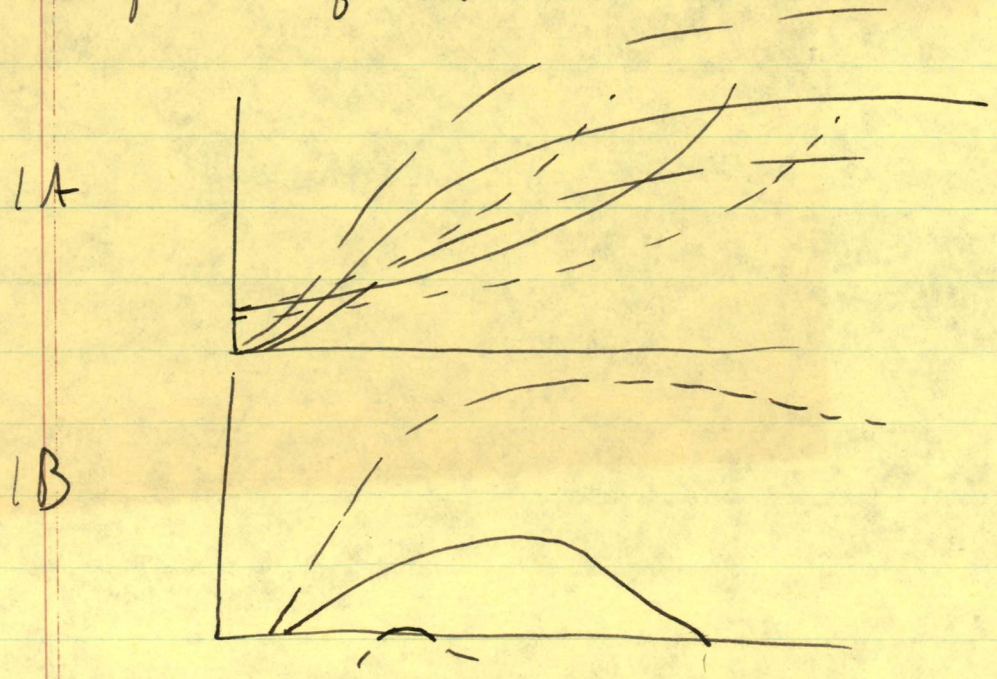


Fig. 1 B shows net values: "standard" case, hi expn. + low expn. (It needs refining.)
Best case is low i combined w. hi R_1 + v.v.
(Even better wd. be low $\underline{u}$)

I shd. refine, right from start, to get land in there, so e.g. hi $\underline{a}$ of land also reduces PV of invt. But invt. risk is reduced by inverse relation of int. + rent.

(Invt. leverage is higher for long pds.; but risk of rate changes is reduced by large no. of yrs. involved.)

Anyway, here is basic approach to risk. Work out details. Give students tables + exs.

2 alt. methods are wrong

1. Impute dispersion to PV of land, S_0. Wrong, bec. S_0 always has opp. cost. Not embodied in K, does not lose its versatility.

2. Impute dispersion to I.R. Wrong, bec. cap. has a mkt. cost.

So risk is in K recovery. Write down or up. That is the loss or gain. It occurs when values

change; ~~later~~ not later when "realized" by sale and/or "recognized" by IRS. The ΔPV is income.

A Δi reduces all PVs.

a. Immediate cap. loss. All incomes lower. This reduces cons. Thus, Δi stimulates saving, by Keynes' logic.

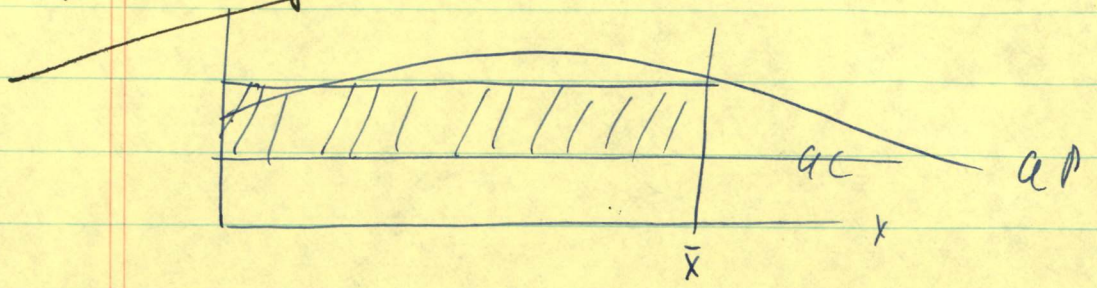
b. The loss of inc. today is compensated by higher income over rest of K life.

c. Thus cap. recovery is less. This is compensated by faster turnover forced by Δi.

There shld. be no mystery about loss of K. A portion of c.f. has been reallocated from cap. rec. to int. income.

Ec. 162 Wed., 10/14/81

"Efficiency" and Risk.



▨ Gain to fixed factors, G_{max}

$$GTC_{\bar{x}} = TC_{\bar{x}} + G_{\cancel{max\ or}\ \bar{x}} \qquad (G_{\bar{x}} = G_{max})$$

$$TP_{\bar{x}} = aP \cdot \bar{x} = TC_{\bar{x}} + G_{\cancel{\quad}\ \bar{x}}$$

$$\text{Eff.} = \frac{TP_x}{GTC_{\bar{x}}} = \frac{TC_x + G_x}{TC_x + \boxed{G_{max\ or}\ \bar{x}}}$$

box means is fixed

a fixed constant

where G is realized gain, and G_{max} is max. ~~realiz~~ possible gain. (In practice, "standard" gain is a better term, what a prudent man, a reasonably efficient mgr, wd. earn.)

In practice, when people contract to pay fixed amt (rent or interest) they pay less, bcs. of fixity.

Fixed puts:

a. My loan: contract interest vs. partic.
b. Cash rent vs. share
c. Prop. taxes.
d. Imputed int. + rent

These fixed puts are near to Gauss.
They keep you on your toes. You may goof up, then it comes out of your hide.

(d) is "notional" – requires self-discipline rather than external discipline. Some have it – they keep getting richer. Most don't – they regress to the mean.

Also, is commonly expressed as % rather than fixed amt, then Prop. 13 traded (c) for (d).

befuddling you.

Participating puts:

a. Dividends; share rents; silent partners.
b. Inc. taxes.

Physical efficiency is a simple-minded concept, e.g. max. GP of energy, regardless of cost. Use only the newest machines, & retire old ones, thus use less energy, max. GP

Every era has its fads & buzzwords. Brings out conflict of standpatters & radicals. Ecst. just lays back, waits for them to blast em. other silly then moves in w. optimizing solution.

Macro + Mgrl.

Forecasting i.

1. "Monetarists" — Beryl Sprinkel, Harris Trust, now Tsy undersecy. for Monetary affairs. (7/81) Reinforcing Volcker slowed ΔM.

2. "Monetarists" expect reduced expectations of infln. to lower i, + are puzzled why they haven't yet.

Irv. Fisher pioneered idea that infly. premia are immediately incorp. into i. Real i hardly budged; infln. jumped up + down.

But real rate fluctuates, in fact.

It must be there are other elements of S+D

3. If I have $100k, and decide not to lend it, I buy real goods instead. Does this raise i? No. I am simply disintermediating. I invest directly, displacing some mgnl. borrower. I push down mgnl. yields.

The key is that I have the 100k to lend or invest.

But now I borrow. This does Δ demand for loans. Antic. infln. makes me want to borrow. This Δ demand up so ~~rates~~ i.r.s.

So, result of antic. infln is:

a. No net effect on supply of loans.

b. ↑ demand for loans.

Demand for real assets raises their prices, hence their collateral values. This raises loans demand more.

An Organizing principle -- risk

Ownership distinction. not just mic. but risk.
Normally, ~~however~~, labor + land are paid only the contractually; K owner bears risk. He is equity K owner. Creditor capit. is pd. contractually, only bears lenders' risk. Equity risk means:

a. Are pd. later
b. Are pd. residually.

But freqly. the equity capit. is also landowner. He throws in land for the pd. of the inst. The rent (for that pd.) is also residual. But not a resid., bec:

a. Never loses salvage value
b. Has o.c. all during life, basis for an annual rent charge. Otherwise, no basis for dividing resid. between land + equity K.

Some lands' yields are riskier than others, due to wx., e.g. Also, mkt. ~~shifts~~ swings are inherent in land. I.e., the exog. risks are in land: the endog. risks are in K.

5. More generally
Let R be mean expected Rev.
Let ΔR be ~~Variance in rev.~~ σ of rev. $\frac{\sigma}{R} = C.V.$
Let f be % of costs that are fixed. $F = fR$

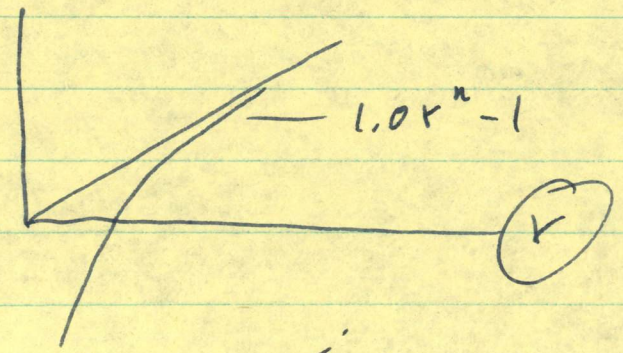
$$\text{Equity risk} = \frac{\sigma_{\Delta R}}{R - F} = \frac{\sigma_{\Delta R}}{R - fR} = \frac{\sigma_{\Delta R}}{R(1-f)} = \frac{1}{1-f}\,\frac{\sigma_{\Delta R}}{R}$$

If $f = \frac{9}{10}$ $\quad \frac{1}{1-f} = \frac{1}{1/10} = 10$

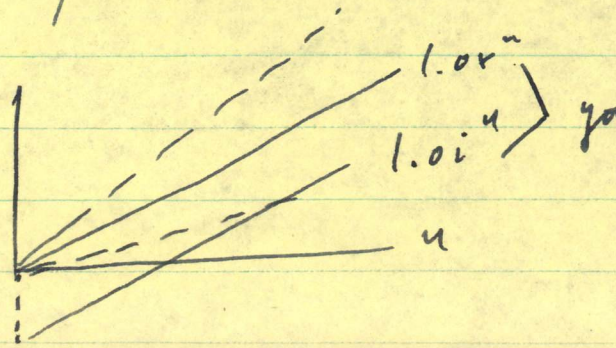
Equity risk = 10 gross risk.

6. Same as cutting off base of a graph.
Subtract a const. from a variable, Δ % variation.

7.



8



} gross claim remains constant $1 - \left(\frac{1.0i}{1.0r}\right)^n$

E. 162. Mon., Nov. , 1981

"Risk"

Based on M+M Ch. 16

I. Defns.

1. "Risk-free means fixed $ returns."

No. Inflation. Is no risk-free inv. a mirage.

2. Investors averse to risk?

Doubtful.

a. Las Vegas

b. Wildcatters. Small ones ~~do~~ are more into wildcatting than big ones. Prospectors -- more in than out?

c. Religion. Belief that God is on your side, you are elect.

d. Excitement, entertainment, stir up tired blood.

Evidence.

U.S. bonds now, or T-bills, 17% or so.

But they buy growth stocks paying 1%.

Only going concern has to meet next payroll, needs bread-+-butter returns in most daily uses of working cap. But indiv. investors have other funds to splurge, + gamble. It is not preference, but necessity that makes us avoid risk.

Also. Lenders risk. Lenders share losses, not gains,

F "I'm just an old prospector ~~...~~ ..."

so they prefer sure things.

3. Probabilities, objective & subjective.

a. Objective. Based on experience, reps.

Appraising r.e., look for comparables.

E.g. office space in Riv. ~~A~~ Seasoned space in Magnificent Center area rents for $1/sf/mo. O+M are ~~55%~~ 45%, so c.f. is 55¢/sf/mo. Less vacancy %.

Banks, which are routinized, face these things readily.

Oil wells? We thought they were risky. This shows effect of yrs. of propaganda.
"I'm jist an old prospecting miner, ..."

In fact, banks make non-recourse loans on dev. of new fields. (Same as rev. bonds.)
Based on the mgmt. A, rather than whole system.
Beware of full recourse loans, they get away from mgmt. separation.

Fire. Insurable. Actuarial. Many risks can be covered by big risk-assuming pools. MGIC, e.g.

Prices. Hedgable.

Utilities see risk backwards. Everything pays for itself from system revs. Risk is from not serving.

b. Subjective.

Rank to office space in Riverside.

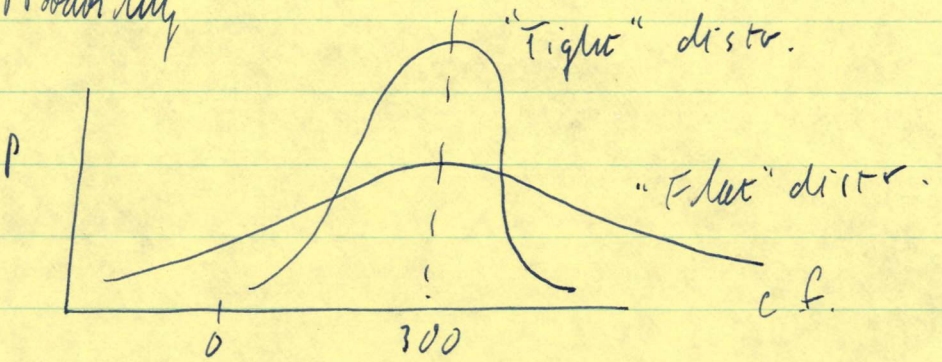
New space. How long to rent up?

Cyclical. How will new area catch on. "Demographics" help, — new name, old cut, hasn't advanced that much.

Banks charge premium, construc. loans. La Mart + El Cerrito, $220,000/yr. int.

4. Expected values, $\bar{R} = \sum_{j=1}^{n} R_j P_j$; $+ \sigma$

P = Probability



Tight + Flat have same $\bar{R} = 300$, but diff. ~~msres~~ σs (or other msres. of dispersion.)

5. Msres. of dispersion.

σ is conventional.

But not for any particular reason. Mean dev. is as good, & much simpler.

What is "absolute" about σ? Not standardized for size of inv.

$C.V. = \frac{\sigma}{\bar{R}}$ a better msre — re non-recourse loans. (M+M use V or nu. I use C.V.)

But re full recourse loan, full exposure, you care about σ relative to your size.
Need some combo. of σ + $\sigma/\bar{R}$. M+M don't develop this; neither will I.

II. Techniques to adjust for Risk. 6 of them.

1. Subjective, informal. Vague.
2. NPV - payback

Widely used bec. simple.

Dual test:

a. NPV > 0

b. $n < 5$

The n cutoff makes sense re conserving IC. Puts a hi + absolute priority on it. Avoids freezing IC, becoming unable to meet payroll. E.g. if you have IC = 3(Wage-bill), then in 3 years you've got to recover the first $\frac{1}{3}$.

But simple rules of thumb can be awfully wrong sometimes. Only risk-adj. here is ass. that returns after 5 yrs. are so unsure that you assume they = 0. Often, it is the early returns that are unsure.

3. Add risk premium to disc. rate.

OK for short loans. E.g. constm. loans at 24 %.

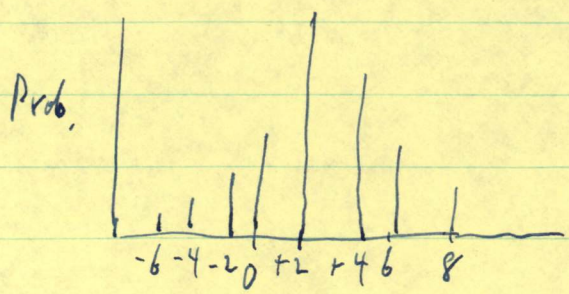
But beyond that, economists assumes risk is as exponential fn. of time. Let $k = i$ + risk premium, $k > i$

$$\frac{(1+i)^n}{(1+k)^n} = \left(\frac{1+i}{1+k}\right)^n$$ as Δ fn. of n.

$$\frac{\frac{d(1+i)^n}{di}}{(1+i)^n} = \frac{n(1+i)^{n-1}}{(1+i)^n} = n(1+i)^{-1} = \frac{n}{1+i}$$

4. Probability Distrn. approach

assign probabilities to outcomes. Use a risk-free rate.



Tree diagrams makes it more complex, p. 446. Not on exam.

They don't tell you, but you take the mean; discount for

discussion by yr. own evaluation. (Or you might compound if you prefer risk.) Call it a certainty equivalent.

5. Simulations approach.
Have computer do it.
Trial + error.
Fraught w. dangers. Better to work out eqns. Computers shd. be on tap, not on top.

6. Sensitivity analysis. Cite my S data.

Let something vary.

This is what math. is for, + differentiation.

E.g. $PV = \frac{R_n}{(1+i)^n}$ Rule: $\frac{d}{dx} a^x = a^x \ln a$

$\frac{d(1+i)^{-n}}{dn} = (1+i)^{-n} \ln(1+i) \equiv i(1+i)^{-n} = \frac{i}{(1+i)^{-n}}$

$\frac{\frac{d\,PV}{dn}}{PV} = \frac{i(1+i)^{-n}}{(1+i)^{-n}} = i$ ~~etc.~~

"Leverage" : subtract a const. from a variable. Misnamed.

Risk

1. Fu. exchange futures.
   a. You are owed pesos in 3 mos. To hedge:
      i. Sell short, 3 mo. futures
      ii. Borrow pesos today

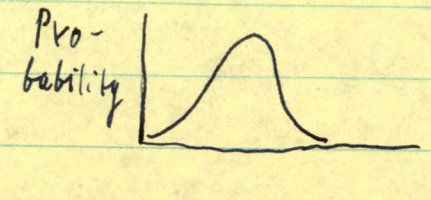
2. Kinds of leases.
   a. Non-competitive.
      No charge. Object: to get started. Indian fighters.

   b. Bonus + fixed royalty + delay rental.

   c. "Free Mining" in B.C. (you can claim tenure) also Mid. Lands, U.S.A.
      Free Prospecting ← stage before drilling, U.S.

B+P Ch. 3. Risk

Ideas of mine, too.

3 1. 

a. Prob-y is same as freq. distn.

b. ~~Has~~ Weight ea. value by its prob., + the sum is the mean. (p. 11)

c. Dispersion from mean is also imptnt.

4 { i. Some like it -- relieves them of responsibility
Some shun it.

ii. B+P uses it by S.D. This is tradition; only by chance wd. this measure be ∝ to how people respond to dispersions.

5 2. Can Δ risk by leverage. Many do so. (Reduce by sharing)

Leverage of borrowing.

" " hi i.q. crop

Tomatoes v. Barley, e.g.

But if you rent land for cash, low i.q. is highly leveraged. The leverage comes from cutting down the % of factors who share ownership of product — by paying them cash (in advance.) If you own land, then it participates. Also if owner shares.

So:

a. Δ risk by leverage

b. Reduce or share risk by partic.

3. Pooling risk

a. Many benefits

E.g. smooth out demand, raise load factors.

b. Dangers + costs

Pool good risks + bad

X - subsidize.

4. Lenders risk.

Credit rationing.

5. If distrib. is normal, we know % of outcomes falling w/in ranges. Hence, value of using σ.

$\pm\sigma$	
1	68%
2	95.5%
3	99.7%

p. 82, graph.

6. Coeff. of variation adjusts for size.

7. Cf. 5.

But many risks are shunned.

E.g. of 150 auto makers, few even survived.

World is not ruled by chance; life is not fair, not even as fair as gambling.

E.g. wealth is not normally distrib.

8. Increments of low quality. They appear low to the lender bcs. he is not finc the land, only the bldg. Land is collateral; Δ bldg. reduces equity.

9. Faster T lets you shoot the dice more often — in that sense spreads risk — if you survive.

Beware "gambler's ruin"

10. Active v. Passive risk.

Vegas is passive. No thinking, no forethought or planning.

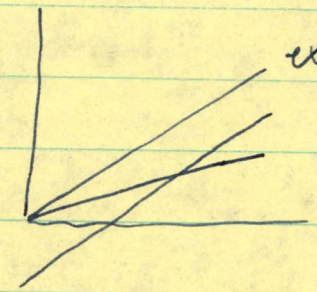
11. Hedging, futures. Burroughs new job, Union Bank.

12. Football as risk.

~~Styles of diff. Qr backs.~~

13. Value of investing in research to reduce uncertainty.

14.



expected outcome

a 50% loss spread over more years, has less effect on r

15 Cost overruns + delays
add to K.

16 Computer simulation.
In effect, this has computer throw the dice for you.
Like all machine calcs. it does the drudgery, it does not supply the observation or the analysis. The mgr. does that.

17. You reduce risk by reducing comply. costs, where there are leveraging. Thus the more K-intense, the less risk --- if it's your K.

18. Do people prefer risk? Some yes, some no. Mkts. bring them together, -- specialize.

Risk

1. $C.V. = \sigma / \bar{x}$

Leverage reduces $\bar{x}$, where $\bar{x}$ is mean expected return.

$$\frac{\sigma}{\bar{x} - L} > \frac{\sigma}{\bar{x}}$$

L = Loan

$\bar{x} - L$ = equity.

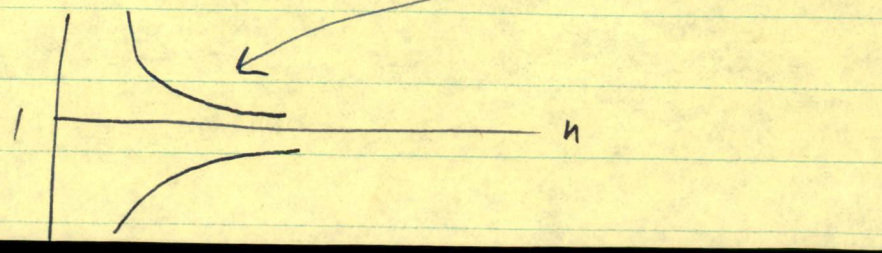
2. Buy house w. 10% down.
Live there for 1 yr., pay int. = 90% rental value
(the other 10% pays int. on yr. equity).
Sell for 20% gain; triple yr. money.

That is popular perception of leverage. A good beginning point, + for this class maybe enough.

3. $y = 1.0r^n - 1$

$$\frac{dy}{dn} = r \cdot 1.0r^n$$

$$\frac{y'}{y} = \frac{r \cdot 1.0r^n}{1.0r^n - 1} = \frac{r}{1 - 1.0r^{-n}} = rx$$



Exam Qu

4. Tomatoes, labor = 90% expected sale value; land accts for ~
Barley " = 40% " " ; " = 60%

~~Explain why~~ A landowner hiring labor finds barley less risky.

~~A family~~

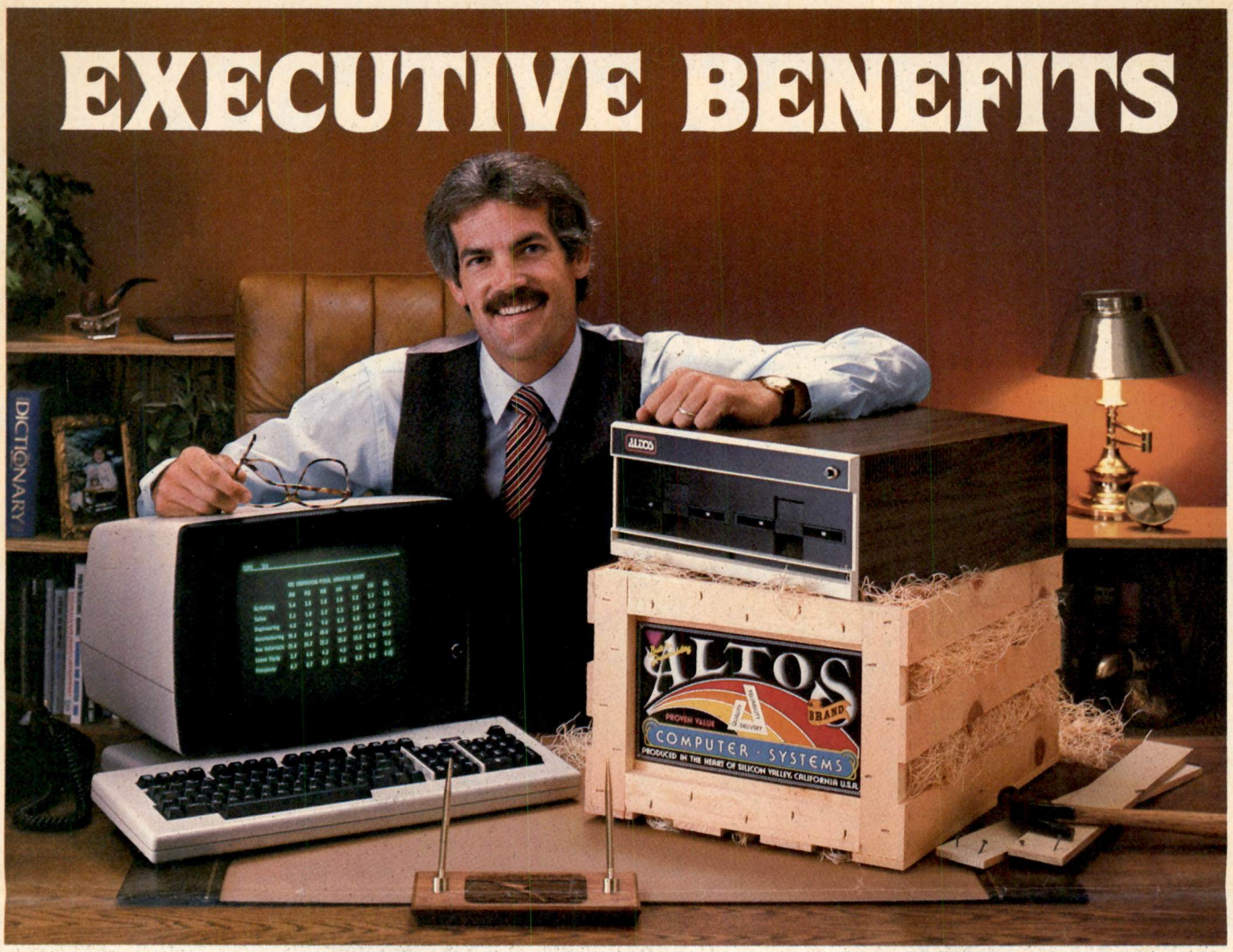
But if you rent land, + ~~supply~~ grow crop your only family labor, tomatoes are less risky.

Explain why.

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RETAILING/BILL SAPORITO

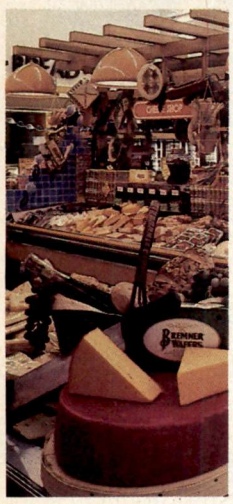
■ The business Barney Kroger began 100 years ago hawking tea and coffee from a bright red wagon has finally made it to the top. When its shareholders agreed to acquire Dillon Cos. of Hutchinson, Kansas, last week, Kroger Co. seized Safeway's crown as the largest supermarket chain in the U.S. In all likelihood the deal merely accelerated the inevitable. With football-field-size outlets like the one in Atlanta below, Kroger has become a paragon of aggressive supermarketing. It tosses out money-losing stores like rotten apples, protects winners like tender tomatoes, and attacks new markets with all the subtlety of a falling watermelon. *continued*



Kroger's performance has paid off in profits. Safeway, with 529 stores in four foreign countries, still ranks No. 1 in sales worldwide, but it trailed Kroger-*cum*-Dillon's domestic supermarket revenues of nearly $14 billion by some $700 million last year. Even without Dillon, Kroger's 1982 earnings, estimated at $160 million, will probably top Safeway's, and its stock price has left its rival's in the dust (up 43% vs. Safeway's 11% in five years).

"A few years ago they were not even good," a Dallas grocery executive says of Kroger's management. "Now they have far better stores, their people like the direction they're going in, and they're more formidable competition than they've ever been."





Some 200 varieties *of fresh produce, imported from as far as New Zealand, enhance sales appeal. Fat margins make the cheese bar (left) a cash cow.*

How Kroger attained its present exalted state is a tale in savvy merchandising and hardheaded strategic analysis. It begins in the early Seventies, when James P. Herring, then chairman, took a deep look at the business. Like hundreds of other food retailers that embraced self-service in the Thirties, Kroger had fed its expansion on low margins, high volume, and booming population growth. By the late 1960s, however, the company was locked in fierce competition for meager market shares in cities that were stagnating or overbuilt by rival chains. "In some markets we had a 10% share," recalls Lyle Everingham, the current chairman. "In assessing what we had, we developed a priority list of markets to establish our franchise, and we just went down the list."

Kroger was already strong in a core of America's heartland that fell inside a box with corners at Indianapolis, Memphis, Chattanooga, and Columbus. Where the company was weak, the new apostles of market share picked up their onions and blew town. They shuttered 1,237 supermarkets in all, abandoning Chicago, Washington, Milwaukee, Kansas City, Birmingham, Minneapolis, and Cleveland. Kroger now operates 1,199 food stores in 19 states and a 560-unit drugstore chain. It ranks No. 1 or 2 in 11 of its 13 major food-marketing territories, with a market share of about 50% in Ohio.

The rationale for this strategy was straightforward. Whether it has 10% or 25% of a given market, a chain has to advertise and supply its stores from a warehouse. The higher the share of market, the lower the advertising cost per customer and the faster the warehouse will turn over its inventory. In addition, Kroger has 33 manufacturing plants and a huge fleet of trucks that can deliver goods to retail with tremendous efficiency. The larger its share, the more likely those plants and trucks will be used to capacity.

A sixth of the food scanned through Kroger's computerized checkout systems is company made, high for the industry. Kroger manufactures only fast-moving commodity items such as dairy goods, peanut butter, sugar, and canned goods. "In dairies and bakeries," says Everingham, "we believe we are state-of-the-art." That may not seem much to brag about in an operation the scope of Kroger's, but price wars have been won on the cost of milk and bread.

TROUBLE HAS BESET other chains that own manufacturing plants. In the mid-Sixties A&P built the world's largest processing plant in Horseheads, New York; after running at half capacity or less for years, it was closed in 1982 (but hasn't yet been sold). Kroger wouldn't have waited that long to shoot the wounded. Each line it processes is evaluated continually—and unsentimentally—on a make-or-buy basis. Kroger pulled the plug on a candy-making plant near Cincinnati just before Christmas. "We can make candy as *good* as anyone," says Everingham. "We just can't make it as efficiently."

Being the low-cost supplier gives Kroger the chance to dictate prices. When competitive conditions allow, it charges plenty. Kroger controls half the market in its hometown of Cincinnati, which has, according to the Bureau of Labor Statistics, the fastest-rising retail food prices of any city in the nation. Competitors think hard before they'll undercut the market leader. They know Kroger could match them penny for penny—and that they would come out of the battle black and blue.

Once the customers are in the store, the secret of supermarketing is to milk them for all they're worth. That requires creativity where the shoppers meet the spaghetti, imaginative merchandising of a kind Kroger hadn't excelled at for years. After Barney Kroger stepped down in 1928, the company was run by lawyers, financial men, and others who had never been in the supermarket front lines. Everingham was the first up-through-the-ranks retailer to take command since the founder himself. His mother ran a produce department for Kroger in

PHOTOGRAPHS BY JAN STALLER





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BUICK

Wouldn't you really rather have a Buick?

Adrian, Michigan. He met his wife when they both worked at a Kroger store, and his brother manages the company's Houston division. As he rose to the top, he and other merchandisers pressed innovations to differentiate Kroger stores from competitors.

Kroger pulled up its socks in basic areas critical to attracting customers. For instance, it switched from putting produce in uninviting plastic-wrapped packages to using bulk displays like the one on page 76, which look better and let shoppers pick one apple instead of a six-pack. It also began expanding stores, adding new classes of merchandise and specialty departments to meet almost every imaginable consumer desire in food and household products. Kroger called the expanded outlets superstores; supermarkets no longer seemed adequately superlative. In the past decade the company added 12 million square feet to existing structures, about equal to 260 new superstores. The average size of a Kroger outlet is now 11% bigger than Safeway and 38% bigger than A&P.

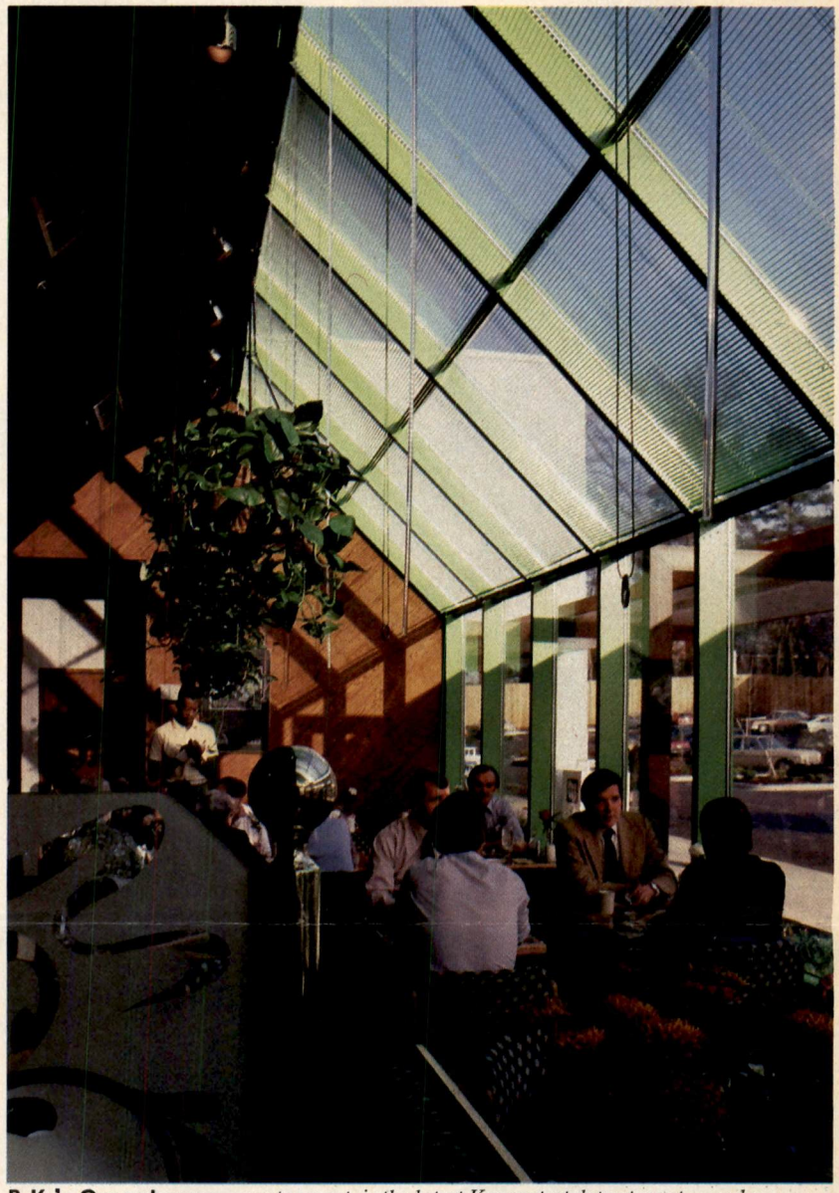
Kroger claims to be the world's biggest florist.



Entrenched as it is, Kroger can make life harrowing for any newcomer invading its territory.

KROGER surveys 250,000 consumers a year to find out what they want. For the gourmet generation, it has cheese shops and delis. For the "me" generation, health food and cosmetics. For the one-stop shopper, goods from auto parts to ziti and services from banking to pharmaceutical. Kroger is now testing restaurants attached to the stores (right), beauty salons, fresh pasta sections, and sausage nooks. It broke new ground last year by joining an insurance company to set up in-store financial service centers. It wants to sell mutual funds with the mayonnaise.

The motivation for this is margins. While the gross markup on a can of soup may be 19%, flowers can easily fetch 50% or more. The drawback is the need for sales help, which adds labor costs usually exceeding $10 an hour in an industry that's productivity crazed. To keep costs down layouts must be arranged so clerks can shift from meat to fish, health foods to flowers—and expend as little of their labor on the customers as possible. "Much, much of what our customers do is self-service even in our delicatessens and bakeries," says Everingham. "While we sell a lot of meat out of the deli counter, we sell beaucoup of the product we put out in front of the case."



B.K.'s Greenhouse, *a restaurant, is the latest Kroger test department—and a counterattack on fast-food chains that have hurt supermarket sales.*

Entrenched as it is, Kroger can make life harrowing for any newcomer invading its territory. That's especially true in towns and small cities, often the industry's most profitable markets, where a few superstores can handle all the business. Kroger keeps expanding its stores as necessary, so a newcomer will have trouble winning enough customers to fill an efficient-sized outlet profitably.

None of this means Kroger is invincible. Just last year it shut its Market Basket division in Southern California, having struggled for 20 years without winning more than a 5% share. "The 65 stores we had there were adequate to compete in the marketplace," Everingham says, "but inadequate for us to implement the kind of strategy that our company knows how to execute." Elsewhere 75 other stores were shed as "underproductive."

Kroger came close to closing shop in Pittsburgh last year when it found itself at a special disadvantage. An ailing regional chain in the recession-stunned city won wage rollbacks from local unions representing clerks and meatcutters. When Kroger demanded comparable concessions, the unions balked—until the company threatened to halt construction of five stores and close seven others.

The unions may have remembered what happened when Kroger made similar demands in western Michigan three years ago. The workers refused and Kroger sold all 21 stores there. In



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Chattanooga, two newly built stores stood empty until local unions met Kroger's conditions. And when Teamsters in Ohio authorized a strike last August, Kroger accepted 1,000 job applications for replacements before the union, working without a contract, settled in November. The tough labor policy is the product of William G. Kagler, a converted political columnist for the *Cincinnati Enquirer* who as Kroger's president is Everingham's heir apparent. "We are aggressive," he says, "about everything."



Unflamboyant
Chairman Lyle Everingham (right), 56, has a mild personality that belies his company's aggressiveness. New President William G. Kagler, 50, is more pugnacious: he ran Robert Taft Jr.'s unsuccessful 1964 Senate campaign before becoming a Kroger lobbyist and then labor chief.

In several markets Kroger's chief nemesis is warehouse-store operators. Typically carrying 5,000 to 10,000 different items stacked in packing boxes, warehouse units have lower costs than Kroger: cheaper rents, skimpier wages, and none of the services or amenities of a superstore. In St. Louis warehousers got control of 25% of the market and helped mangle Kroger's operation there. When warehousers blitzed Little Rock, Safeway converted two supermarkets to low-cost Food Barn outlets, helping to plunge the market into a price war.

Kroger hasn't let many warehouse operators eat its lunch, though. After shutting its supermarkets in Cleveland, it started four warehouse stores there; it runs them primarily to learn the economics of the business and how best to handle these competitors. When a warehouse threatens a Kroger outlet nowadays, the company advertises, "Warehouse Prices in a Complete Store," and matches the competition price for price. But it is careful to respond in only one or two stores nearest the warehouse, thus avoiding a market-wide price war. The practice is known as zone pricing, but warehousers call it just plain predatory.

They charge that Kroger in particular among the big chains tries to strangle them by selling at a loss in selected stores. In Nashville one of Kroger's 29 outlets has endured a two-year price war with a Waremart no-frills store. Kroger's response has been extremely selective: it runs separate ad circulars for the affected store alone. Claims William D. Long, Waremart's president: "Kroger is just denying me an opportunity to sell low-cost groceries." Price sheets in hand, Long has appealed to the Federal Trade Commission for relief, claiming that Kroger is singling him out for destruction. The FTC investigated but took no action. Long says Kroger's tactic is working: he won't open another store in Nashville.

EVERINGHAM has no intention of putting away the long knives. "I don't think anyone can point accusingly and say, 'Kroger started this price war,' " he argues. "But we're gonna defend our market share and our penetration with all the ability we've got."

That means Kroger does unto others before others can do unto it. The company plops down 100 superstores a year from Roanoke to Fort Worth, expanding its share of mature markets and elbowing into new ones. Everingham deems the South and West most promising. Kroger has gained ground in Houston and Dallas, and doubled its Atlanta market share to 24% in a six-year burst of store building and price pounding.

Perhaps its quickest, biggest push ever came in San Antonio, which Kroger entered from scratch in 1979. Like a thunderstorm off the Gulf of Mexico, it rolled in with 14 stores and a warehouse in two years. It was betting an estimated $100 million that it could take a big bite of the market—and gain the attendant scale economies—in a single chomp.

To help build traffic, Kroger launched its typical "best prices in town" campaign and waited for customers to pour in. The response, officials admit, was underwhelming. Lo and behold, H.E. Butt Grocery Co., the then and present market leader, knew how to play defense Kroger-style. Butt delayed construction of a new headquarters in order to match Kroger new store for new store, price for price, precipitating a price war the like of which the city had never seen. Two smaller chains went to the bottom.

Despite the escalating costs and slow progress, Kroger is a good bet to eventually get its 20% to 25% cut of the market. Meanwhile, it is demonstrating yet another talent—ability to bleed profusely and survive. "We have the good fortune," Everingham says, "not to have many San Antonios."

The surest route around other San Antonios led to the acquisition of Dillon, the 11th-largest U.S. chain, which has a lock on established markets much like Kroger's own. The Dillon Store division has big chunks of Kansas, Missouri, and Arkansas towns: it's the law in Dodge City, for example, with at least a 60% share. Out in Colorado, Dillon has two divisions. City Markets, with a grip on the western half of the state, operates on high margins in captive tourist areas and in many one- or two-store towns farther west. King Soopers, based in Denver, commands nearly half the business in the 150-by-50-mile territory along the front range of the Rockies.

At some $600 million in Kroger stock, Dillon was the priciest supermarket acquisition in history. But Everingham figures it was a bargain. Dillon's market-share statistics signal high profits; it earned 24% on shareholders' equity last year. Having launched a highly successful generics program, King Soopers now sells 20% of its goods from the plain-Jane aisle, which could keep Kroger plants plenty busy. To crack Denver from scratch, as it did San Antonio, Kroger would have had to lay out $500 million, facing price wars and no guarantee of market share.

■ A saw in the grocery trade holds that volume hides all mistakes. Safeway, A&P, and others have spread themselves thin, vying for scraps of business, no matter how unprofitable, in quest of volume. But by quitting markets where it was competing for survival and limiting itself to those where it could compete for growth, Kroger emerged with the most volume of all. A management capable of casting aside its industry's saws looks like a good bet for the future. F

Riverside Area

Press-Enterprise

Proposed Inn study to cost $200,000 . . . B-3
Power restored to almost all B-3
Business, stocks B-8

SECTION B

c Monday, December 6, 1982

City takes gamble with its street-repair program

By JAMES RICHARDSON
Press-Enterprise Staff Writer

The city of Riverside is gambling that streets in fair shape won't fall apart until the worst thoroughfares are rebuilt.

By ignoring routine road maintenance for the next two or three years, the city is putting all its street dollars into rebuilding the worst of its boulevards.

Last year, a Texas consulting firm hired by the city concluded that Riverside needed $18 million of work on its streets. Seven major streets and sections of 120 other streets are getting a $2.2 million overhaul this fall.

Eleven more major streets are scheduled to be rebuilt in the spring as part of an additional $2.8 million program. With those projects, the city will have done extensive work on about 50 of the 685 miles of city roads in Riverside.

Robert Wales, the city public works director, explained Riverside's gamble: "We had to choose — do we lose an entire street, or hold off on regular maintenance for a year or two and devote the resources to reclaiming entire streets?"

The city chose the latter course.

No preventive maintenance is under way on the streets that are in fair condition. The maintenance, were it done, would include regularly spraying streets with a rejuvenating seal to keep the asphalt in durable shape.

The gamble makes some a little edgy.

Steven R. Simpson, a city planning commissioner and a civil engineer, likened it to overhauling a car's engine but neglecting to lubricrate the rest of the car. Simpson has long advocated increasing preventive street maintenance.

"It's an issue that is not filled with emotion," he said. "It's not anything like abortion or gun control. But it's an important subject, especially considering the amount of money we have invested in the streets that we take for granted."

Riverside is better off than many communities, particularly those of the potholed East, Simpson said. In Riverside, potholes are usually filled a day after they are reported. The city patched about 10,000 potholes last year.

But Simpson contended the city should each year set aside 1 percent of the cost of replacing the streets — $3.3 million — for maintenance. He estimated that the city could complete simple maintenance on each street every three years by devoting about $400,000 a year to the task.

Wales said Simpson's estimate of $400,000 is too low, but he generally agreed with Simpson's idea. First, though, Wales said the city must repair or rebuild its worst streets.

Take, for example, Chicago Avenue where it crosses an arroyo intersecting with Central Avenue in Canyon Crest. The sections were built between 13 and 15 years ago. With proper maintenance, they should have had a life of 20 to 30 years. But without the preventive care, Chicago began falling apart in half the time.

This fall, Chicago went under the surgeon's knife. Whole sections of the roadway have been torn out while other sections have had the cracks sealed with rubberized asphalt. The road will be repaved with a layer of rubberized asphalt, and then a second layer of "popcorn mix" asphalt, so-called because it has a finer grade of gravel for better traction.

Asphalt has long been the preferred surface for streets because it is tough, durable, waterproof and flexible. Asphalt bends with the punishment from cars and trucks.

"But over a period of time it dries out and becomes brittle," Wales said. "Once it cracks, you get water in the underbase," and then the street crumbles. It can be renovated with oil-based sprays called "slurry seal" and "fog seal."

Asphalt used to be cheap. But because it is made with oil, the cost has risen sharply. In 1970 asphalt cost $5.60 a ton. Now it costs $23.91 a ton.

The gamble of delaying work on many streets is also an expensive one. Major street rebuilding costs $72,727 for each mile of two-lane road compared to $26,086 to simply install a new layer of asphalt on each mile of two-lane road, according to city Public Works Department figures.

There is nothing more political than potholes. In years of tight budgets, street maintenance in Riverside is an easy place to cut. In election years, streets become a priority item in the wards where City Council members face tough re-election campaigns.

In 1979, Councilmen Ernest Pintor and Arden Anderson were both in hard races.They tried to give each other a hand. Both were members of a three-man council committee presiding over street appropriations.

After city road officials presented their routine list of streets in the most need of help, the committee changed the list, giving Pintor's ward an extra $38,691 for 10 street repaving projects. Both councilmen lost anyway.

The general trend of the past three years has been to boost the

(See STREET, Page B-2)



Staff photo by Marilyn Odello

A construction crew resurfaces a portion of Grand Avenue near Jurupa Avenue in Riverside.

Tried, tested two-layer asphalt method used

About 3½ years ago Riverside officials experimented on a badly cracked two-mile stretch of Magnolia Avenue. The city put down a layer of gravel imbedded in rubberized asphalt.

It was a mess. Gravel everywhere.

Mayor Ab Brown said at the time, "I wish they would do their experiments on the road to the dump so my phone wouldn't ring so much."

So the city put another layer of asphalt over the messy rubberized layer.

And that was a success story. No new cracks have rippled through in more than three years. The city is now repairing some of the worst streets with that method, according to Robert Wales, public works director.

Riverside experimented with other materials and techniques for 10 years before settling on the rubber asphalt. Riverside's guinea pig was Arlington Avenue.

One of the novel approaches was a fibrous carpet, similar to fiberglass, laid on the old roadway and then overlaid with asphalt. The carpet stopped the old cracks from working through the new pavement, but there was a problem at intersections, Wales said.

The pavement rippled where vehicles came to a stop. The underlying carpet was sliding, just as a living room carpet curls at the edges when someone slides on it.

The city also tried a relatively inexpensive layer of asphalt over the old street without any intermediate material. The predictable outcome: The old cracks came shining through in short order.

Some of those failures are still there. An example can be found on Jurupa Avenue, near Palm Avenue. Three years ago, the city graded a layer of asphalt over the damaged street, but city crews did not trim nearby tree roots or lay an intermediate layer of rubber or fiber.

Since then, water seeped into the street's foundation and the relatively new asphalt is already coming up in chunks. The street will have to be rebuilt because a simple layer of asphalt will no longer do.

Steven R. Simpson, a planning commissioner and a civil engineer, pointed out, "Once a street deteriorates to where it looks like an alligator's back or a dry lake bed, it's gone. There's no way to save it."

— James Richardson

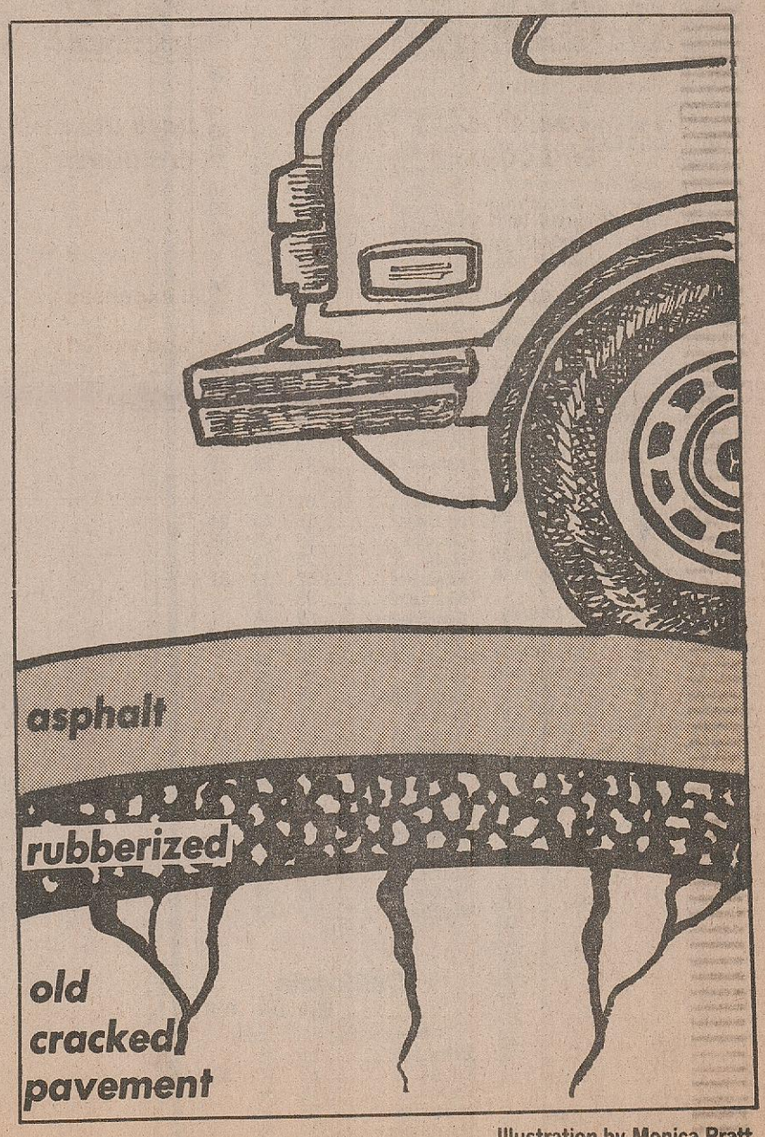


Illustration by Monica Pratt

Two layers will be put over several city streets.

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SCANNED

AS

FOUND

Projects line up for gas tax money

By MARTIN SALDITCH
Press-Enterprise Washington Bureau

WASHINGTON — Riverside County highway improvement projects estimated to cost $26.9 million are in line for money from the proposed federal gasoline tax increase.

Congress is considering the 5-cent-a-gallon increase requested by President Reagan during the current lameduck session, which will end Dec. 17.

The money could pay for a backlog of about $13.8 million worth of roadwork over the next five years in western Riverside County, and $13.1 million in the area east of Palm Desert.

Although the formula for distribution of the tax increase to the 50 states has not yet been determined, thought has already been given in Sacramento about how to spend the money.

"Rehabilitation of existing primary highways will have first preference," said William Bronte, a spokesman for the state Department of Transportation. "Remaining new interstate highway segments are already funded."

They include the section of Interstate 15 from Highway 91 (the Riverside Freeway) in Corona to Highway 60 (the Pomona Freeway) in Mira Loma, which is scheduled to be built from 1984 to 1986, and a one-mile section of I-15 near the San Diego County line, to be built next year.

Caltrans priorities for now-unfunded state projects in western Riverside County are:

√ Highway 60, repaving three sections between Riverside and Beaumont, $3.3 million.

√ Highway 74, repaving three sections running from the Orange County line through Lake Elsinore, Perris and Hemet to Palm Desert, $3.4 million.

√ Interstate 15, from the San Diego County line north to Temecula, two rehabilitation projects estimated to cost $2.3 million.

√ Highway 79, from the San Diego County line to Winchester, Hemet and Beaumont, $1.3 million for improving three segments.

√ Highway 71, $188,000 for repaving one section of the Pomona-to-Corona road.

The projects in the desert are:

√ Highway 86, from Indio to the Salton Sea, $7 million for widening and other work.

√ Highway 111, repaving estimated at $2.6 million in four sections between Palm Springs and Indio, and $5 million to widen from 28 to 32 feet a section between Palm Desert and the Imperial County line.

√ Interstate 10, $1.1 million to upgrade, flatten slopes and improve bridges in three sections east of Palm Desert, and $686,000 for repaving three sections east of Palm Desert.

The Caltrans district offices in San Bernardindo and San Diego, which split jurisdiction over state highways in Riverside County, wouldn't disclose the exact sites because recommendations aren't final.

Streets, roads and bridges maintained by city and county governments could also benefit from added federal funds that the state may provide.

The added U.S. money must be matched by the state with 17 percent on primary highway projects and 8.3 percent on interstate highway projects.

Caltrans officials say this may be difficult, even with a 2-cent-a-gallon state gasoline tax increase taking effect in January. The existing state gas tax is 7 cents a gallon and the federal gas tax is now 4 cents a gallon.

Michael Evanhoe, Caltrans' executive director, said if the existing federal matching formula for highway projects is continued, California may need another 1 or 2 cents added to its gas tax to fund its share of the added projects.

Adriana Gianturco, retiring Caltrans director, is urging the state's congressional delegation to amend Reagan's current gas-hike legislation in a way that would eliminate the need for another state gas tax increase.

Another complication may be efforts to freeze California highway funds by the Environmental Protection Agency because air quality standards for certain pollutants have not been met.

Bronte, the Caltrans spokesman, said that under the Reagan administration bill, California would get an additional $225 million in federal aid the first year over the existing level of about $665 million in such grants.

Streets scheduled for repairs

The major streets undergoing an overhaul in Riverside now are:

√ Streeter Avenue, between Jurupa and Central avenues.
√ Jurupa between Van Buren Boulevard and Streeter.
√ Van Buren, between the southern city limit and Lincoln Avenue.
√ Chicago Avenue, between Pennsylvania Avenue and Alessandro Boulevard.
√ Tyler Street, between Arlington and Hole avenues.
√ Arlington, between Alessandro and Victoria Avenue.
√ Olivewood Avenue, between Panorama Road and Prospect Avenue.

In the spring, the city plans major work on:

√ Chicago, from University Avenue to 3rd Street.
√ Jurupa, from Magnolia Avenue to Olivewood.
√ La Sierra Avenue, from Victoria to Indiana Avenue.
√ Lincoln, from Grace to Washington streets.
√ Main Street, from 3rd to the Pomona Freeway.
√ Olivewood, from Jurupa to Panorama.
√ University, from Comer Avenue to the Pomona Freeway.
√ Washington, from Lenox Avenue to Victoria.
√ Van Buren, from Arlington to the Santa Ana River.
√ Victoria, from University to 14th Street.
√ Arlington, from Tyler to Magnolia.

Enrollment opens for UCR Extension classes

Enrollment for the University of California, Riverside, Extension winter session has opened.

Classes begin Jan. 3 with about 130 offerings, including courses in photography, writing, the arts, nature, business, education and health.

A catalog of course descriptions is available from the extension office on campus. Catalogs can be ordered and enrollment can be taken over the telephone at 787-4105 or (800) 442-4990, the toll-free number. Visa and MasterCard are accepted as payment for enrollment.

Two courses are for college-bound high school students: "Preparing for Success in College" and "Preparing for the SAT." There will also be a seminar for shy people and a three-day program on "Computers in Agriculture."

Street . . .

(Continued from Page B-1)

street budget, though there have been peaks and valleys. In the 1978-79 budget year the city spent $573,357 for the streets. This year the street budget is almost five times that.

Last spring, when the council was going through the budget, the streets were initially held to the same level as the year before. Wales then warned that the streets would eventually deteriorate if the city did not do something more.

Since then, the streets got an unexpected windfall, ending up at the $2.8 million level for the budget year that began in July. The city also set aside an additional $1.3 million for patch work, the routine filling of potholes, patching utility lines.

"That didn't put us in Fat City but it was a substantial improvement," Wales said. If the city can stay roughly near $2½ million a year, Wales predicted the city streets should be up to snuff within five years.

One reason for Wales' optimism is that with a slowdown in Riverside residential growth, the city is no longer building new streets. The resources devoted to those projects are now turned to repairing the streets Riverside neglected, Wales said.

But city officials said they are worried about the effects of the recession on city revenues, including those devoted to streets. The bulk of the city's street money comes from gasoline and sales taxes. If motorists buy less gas, the state will have less money for local streets.

Of particular concern is the $600,000 for streets coming from the gasoline sales tax. Under state law, the money from the tax must first be devoted to the city's transit needs, the buses.

Whatever is left can go toward fixing the streets. So, if revenue falls, the streets will suffer first.

Weather

RIVERSIDE — Fair except for a chance of patchy low clouds or fog late night and early morning. Northerly winds by evening. High today in upper 60s to low 70s, tomorrow in 60s. Extended outlook, Wednesday-Friday, fair with strong winds through Thursday. Highs in 60s, lows in 30s. Yesterday's high 73, overnight low 39.

LOS ANGELES — Cloudy tonight. Low 51. Partly cloudy during morning hours Tuesday, becoming fair in the afternoon with gusty northerly winds 20 to 30 mph in areas below canyons. High 66.

BEACHES — Cloudy tonight. Lows 46 to 53. Partly cloudy during morning hours Tuesday, becoming fair in afternoon with gusty northerly winds 20 to 30 mph in areas below canyons. Highs 64 to 68.

MOUNTAINS — Fair tonight but some fog and low cloudiness along coastal slopes late tonight. Lows 28 to 38. Partly cloudy Tuesday with northerly winds 25 to 35 mph. Resort level highs 44 to 52.

DESERTS — Fair tonight. Lows 34 to 44 in northern deserts and 42 to 48 southern deserts. Variable clouds Tuesday. North to northwest winds 20 to 30 mph. Highs in northern deserts 55 to 65 and southern deserts 65 to 72.

Riverside Rainfall

Date	Inches
Sept. 8	.28
Sept. 16	.08
Sept. 17	.04
Sept. 26	.52
Sept. 27	.26
Oct. 26	.05
Nov. 9	.37
Nov. 10	.57
Nov. 19	.25
Nov. 29	.24
Nov. 30	1.21

Season to date: 3.87
Last season to date: 2.86

Riverside Temperatures

National

	High	Low	Prc
Albany	56	54	.24
Albuquerque	53	24	
Anchorage	24	19	.01
Atlanta	66	42	1.04
Bismarck	35	21	
Boise	48	42	.36
Boston	57	51	
Brownsville	78	54	
Buffalo	67	52	.23
Charlotte	73	49	.54
Cheyenne	40	24	
Chicago	63	55	.10
Cincinnati	67	48	.08
Cleveland	67	50	.31
Dallas	66	42	
Denver	45	26	
Des Moines	41	27	.95
Detroit	60	44	.19
Duluth	33	22	
Fairbanks	-11	-17	
Hartford	55	39	.03
Helena	39	29	.04
Honolulu	80	73	
Houston	71	52	
Indianapolis	63	41	.30
Kansas City	41	28	.79
Las Vegas	61	37	
Louisville	65	44	.24
Memphis	56	45	.05
Miami	78	76	
Milwaukee	52	33	.31
Minneapolis	38	24	
New Orleans	69	48	
New York	63	56	.10
Oklahoma City	58	32	
Omaha	37	22	
Philadelphia	70	60	.04
Phoenix	67	45	
Pittsburgh	68	46	.15
Portland, Me.	48	46	.06
Portland, Ore.	45	40	.36
Rapid City	59	31	
Reno	47	27	
Richmond	77	69	.08
Salt Lake	41	28	
Seattle	44	36	.55
Spokane	38	30	.11
Washington	72	63	

California

	High	Low	Prc
24 hours ending 4 a.m. today			
Bakersfield	56	45	
Eureka	62	52	.39
Fresno	55	48	
Lancaster	65	33	
Los Angeles	72	53	
Paso Robles	59	43	
Red Bluff	51	50	.01
Redwood City	56	49	
Sacramento	51	47	

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Marginal plants were

beverage cartons; fiber glass mat for shingles; fiber glass and other energy-saving insulations; filters that clarify foods, drinks, medicines; lighting systems that illuminate roads, offices, basketball games.

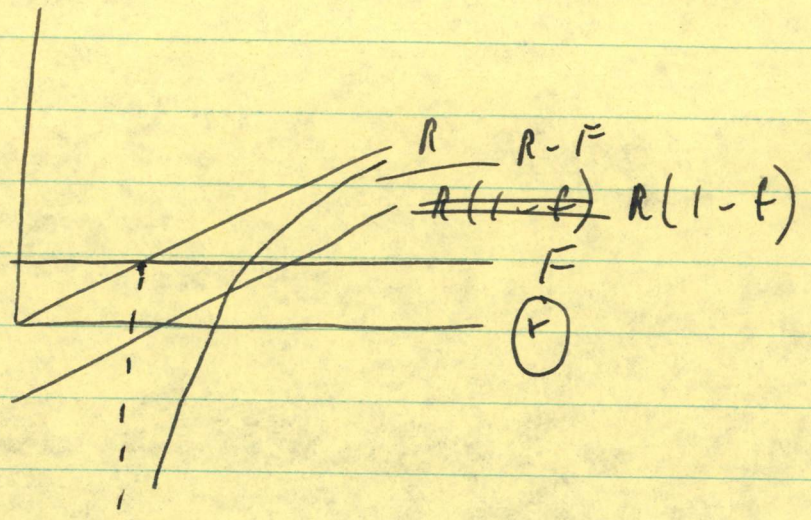
These products—and indeed all Manville products—have two things in common: They're well made; and they

Agenda

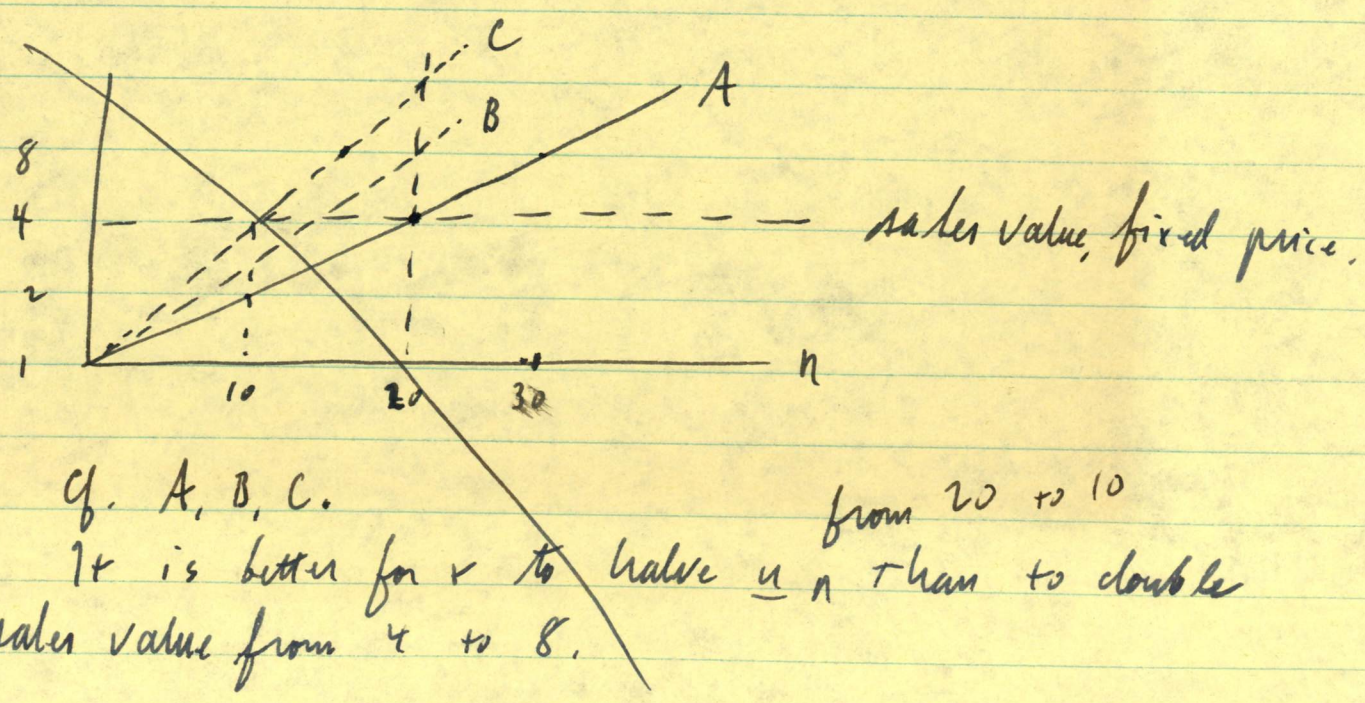


a. Cf. PV of double R vs halve n
b. Do. for L.V.

Risk rises w. leverage. Show on log scale.

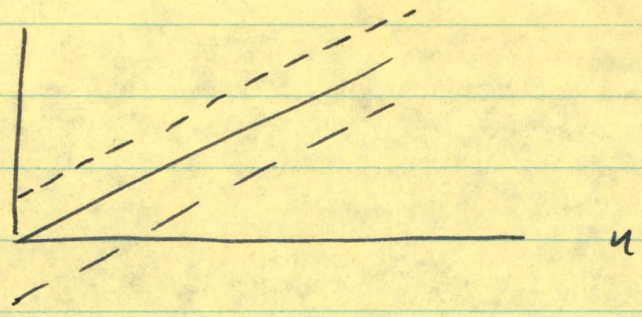


Beware consultants + Best Case assms., (esply. when they list them, set off the hook.)



Cf. A, B, C.

It is better for r to halve n from 20 to 10 than to double sales value from 4 to 8.



Risk drops w. u, bcs. you are reducing leverage, by using more of your own K. It becomes a higher % of inputs. (In 1 yr., it is just r % of inputs.)

Lender, too, feels better about longer term? No, bcs. his share of total also rises. Well, lender's share grows w.r.t. labor -- not w.r.t. equity.

Likewise, risk drops ~~as~~ as r increases. Same reason:

Leverage

1. Let $n = \infty$

Borrow at s %

E = equity, L = Loan $\} = G$ = Gross Inv.

g = gross % earned on $E + L$

$g(E+L) = a$

r = rate of int. paid

i = internal r.r.

$$rE = g(E+L) - iL$$

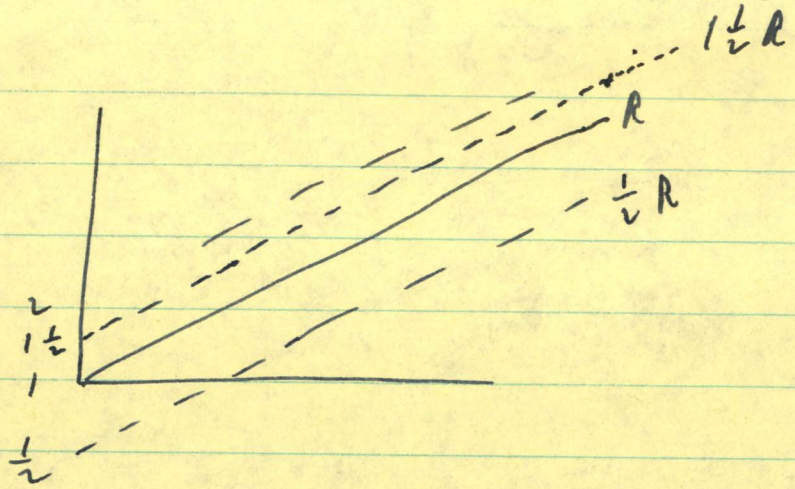
$$r = \frac{g(E+L) - iL}{E} = g + \frac{L(g-i)}{E}$$

2. PIPO case

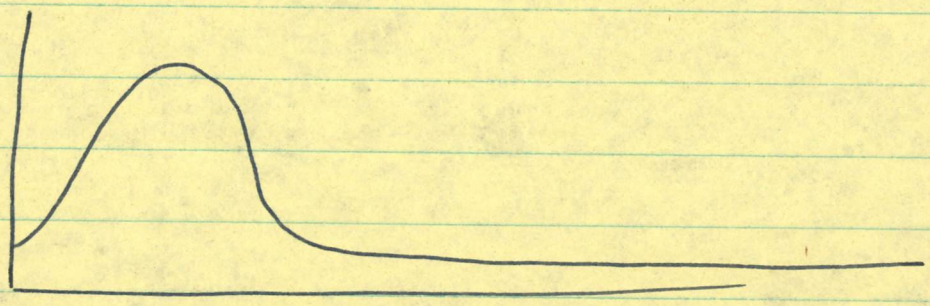
$$r = \frac{R - L\,1.0i^n}{E + L}$$

$$G(1+g)^n = R_n$$

$$(1+r)^n = \frac{G(1+g)^n - L(1.0i)^n}{G} = (1+g)^n - \frac{L}{G}\,1.0i^n$$



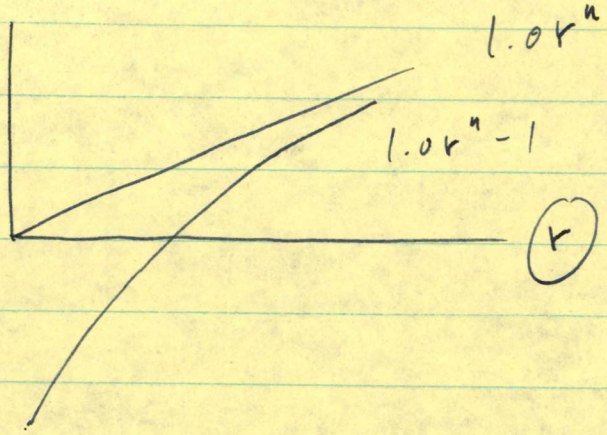
If $\frac{\sigma}{R}$ is const. the band around R is of const. % hence in parallel lines.

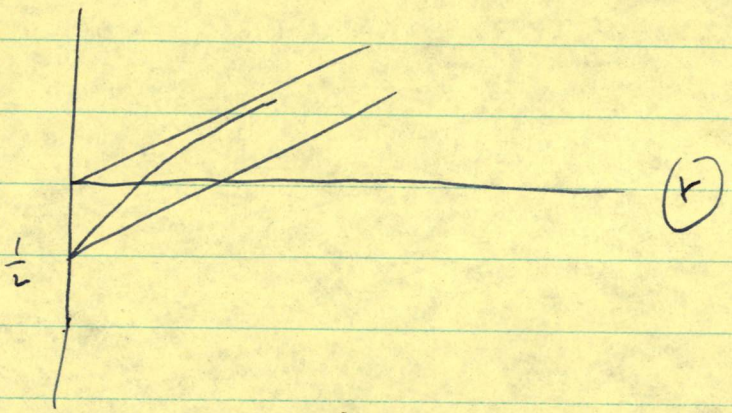


Some prefer skewed gamble. Marshall's case. Small no. of hi prizes.

To play for the hi prizes, you must wait longer. Rich oil firms hunt elephants; small ones stick to higher success ratio, lower rewards. (Some Wyo. men is this way.)

Leverage, notes





You put up $\frac{1}{2}$

Borrow ~~$100~~ 90 at 10%. s = service of debt = $90 \frac{.10}{1 - 1.1^{-n}}$

Put in 10. $a = 100 r \frac{w}{1 - 1.0w^{-n}}$

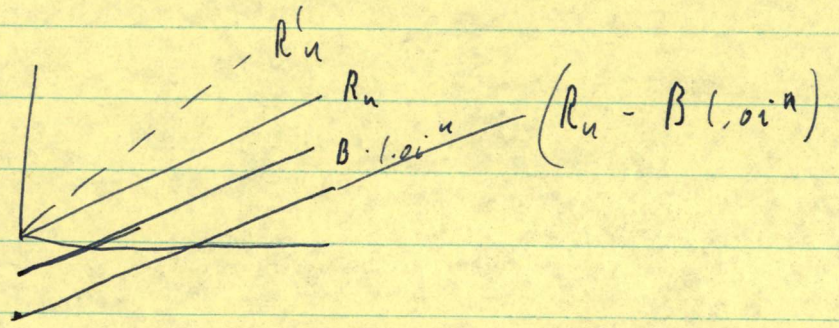
If your w > .10, you get leverage

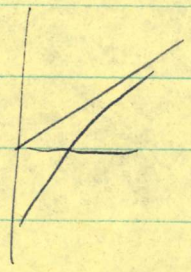
Your r ≅ ~~annual~~ w - s

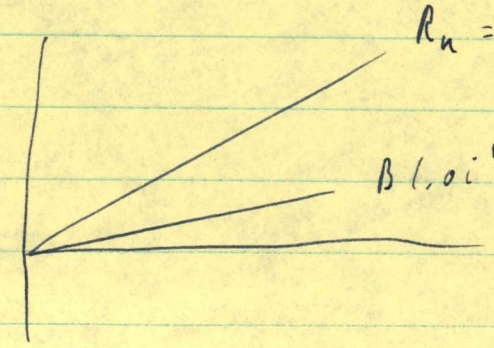
Wachstum, 2

$$\frac{\hat{R} - (\cdot 1,0\,r^n}{\bar{R}}$$

$$r = \left[\frac{R_n - B\,1,0i^n}{C_0 - B}\right]^{\frac{1}{n}} - 1$$







Leverage.

1. Simplest case. Fast sale, ~~no~~ interest.

10 workers - partners.

1 pays cash to others, owns crop, value = Σ labor cost.

Price rises 10%. His work now gets double reward.

He pays $10 to ea., = $90. Sells for $110, keeps 20.

In this sense, every ~~worker~~ entrep. (1) leveraged. Residual owner

~~2.~~ is called entrep. Cf. 6.

2. He borrows 90, ~~assumes~~ risks 10.

Similar to #1. It isn't his cash that he forwarded, but it is his liability to repay.

3. He owns land.

a. Pays out 50; expected value is ~~100~~ 110

10% on [50 K + 50 land rent]

Less leverage bcs. he put up higher %, i.e. the land use.

~~5.~~

b. Same land.

Pays out 950; expects 1100

10% on [950 K + 50 land rent]

More leverage bcs. he pd. off 95% of inputs.

4. The rents land, puts up work
   a. Pays out 50 cash rent; puts in his work, of 50.

   b. Pays 50 rent; puts in work of 950.
Now little leverage.

5. Ways to reduce leverage, dilute leverage.
   a. Put in land, hold down use of hired labor.

   b. Put in K.
      i. In II, like land
      ii. In series, by wait.

   c. Put in labor.

6. Ec. Risk implies time, defined outcome. Hence K.
   But capots. are not always risk takers. You can "rent out" cap. for fixed rent, by lendin'.
   (Can also rent out bldgs & equipment. Here, you ~~risk~~ and yr. risk w. the cap. leased; do not particip. in what it in turn produces in next stage.)

   Resid. owner is called equity capt. Shares of eq. called partics. Equity is at risk, or at stake.

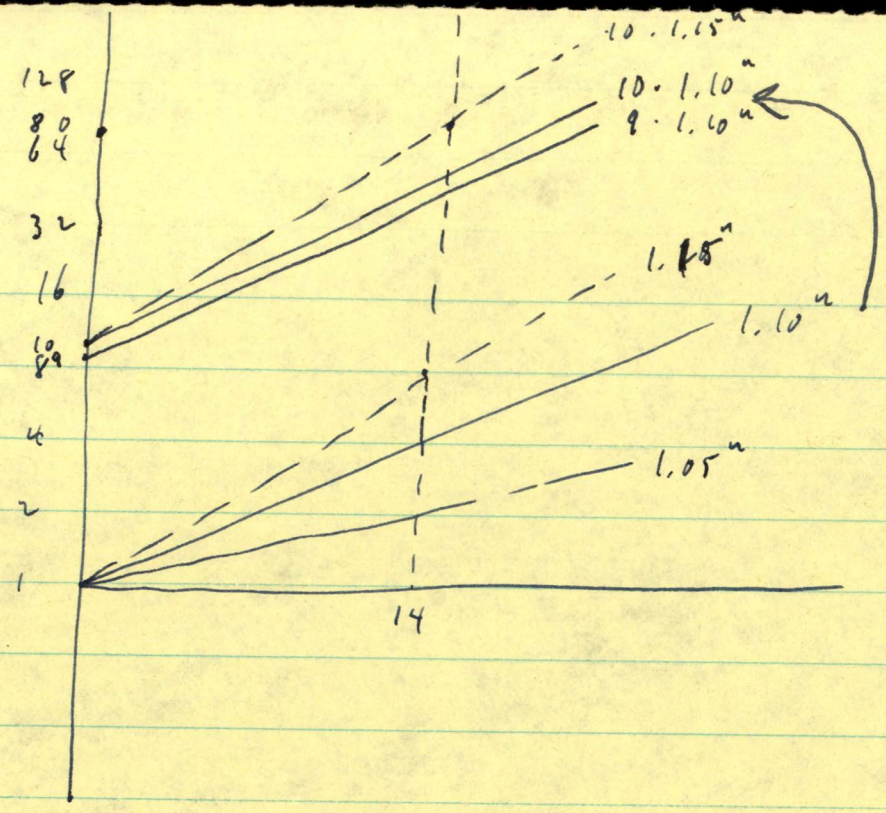
7. Are other kinds of risk
   a. Safety. Dangerous jobs pay premium.
      ($ value on life, again.)

   b. Unsteady empl.
      In U.S. labor takes this risk, routinely.

8. Normal equity risk is to hire K for int.
   Borrow at 15%, invest for 15% ± x%. That x% is risk.
   Here, there is no diluting of risk by Δn. You have to feed the bankers throughout life of loan.

9. To cope w. ± x%, or risk, requires more knowledge + personal involvement. One who does this is in charge. The essence of Mgmt. is being in charge. The obvious mgr. is one w. most stake in outcome

10.)



$$(P_E + P_B)\, 1.0g^n = R_G \qquad R_G = \text{Gross Rev}$$

g = Gross rate

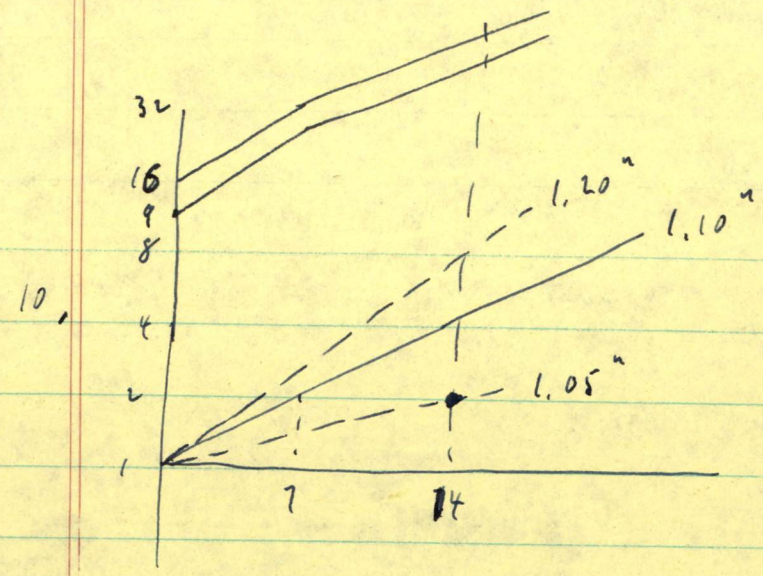
$$r = \left(\frac{R_G - P_B\, 1.10^n}{P_E + P_B}\right)^{\frac{1}{n}} - 1$$

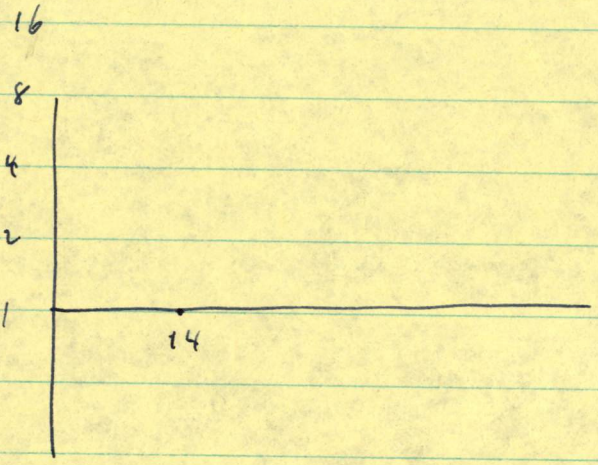
$$P_E \cdot 1.0r^n = R_G - P_B\, 1.0i^n \qquad r = \text{rate to equity}$$

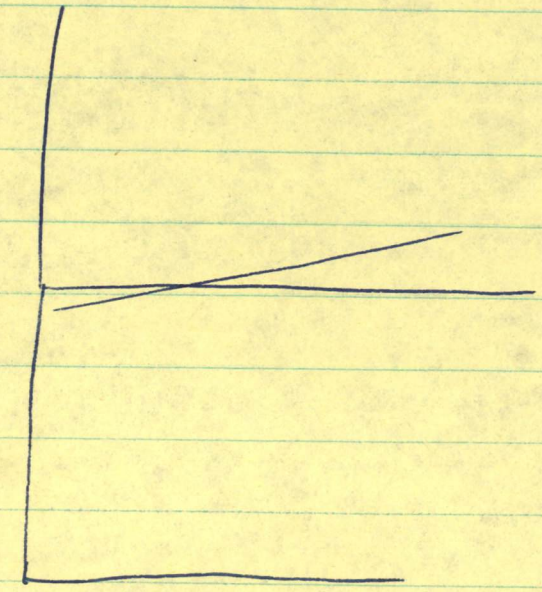
$$r = \left(\frac{R_G - P_B\, 1.0i^n}{P_E}\right)^{\frac{1}{n}} - 1 = \left[\frac{(P_E + P_B)\, 1.0g^n - P_B\, 1.0i^n}{P_E}\right]^{\frac{1}{n}} - 1$$

$$= \left[\frac{P_E\, 1.0g^n + P_B\left(1.0g^n - 1.0i^n\right)}{P_E}\right]^{\frac{1}{n}} - 1 = \left[\frac{P_E + P_B\left(1 - \left(\frac{1.0i}{1.0g}\right)^n\right)}{P_E\, 1.0g^{-n}}\right]^{\frac{1}{n}} - 1$$

$$= \left[1 + \frac{P_B}{P_E}\left(1 - \left(\frac{1.0i}{1.0g}\right)^n\right)\right]^{\frac{1}{n}} 1.0g - 1$$







Cut off base, turn a small Δ into a big one.