

Outline for use Friday, February 22, 2008, in Econ. 148

How land income (rent) has disappeared from the national accounts

- Rent of commercial real estate (income property)
 - Accelerated tax-depreciation
 - Repeated tax-depreciation
 - Covert tax-depreciation of land
 - Non-reporting of resulting fictitious capital gains
 - Exemption of capital gains upon death
 - Many other ways that capital gains escape taxation
- corporate profits transferred to offshore havens
- imputed income of owner-occupied homes and homesites, not reported
 - imputed income of vast valuable rec lands
- capital gains
- discovery of minerals and hydrocarbons, costs are expensed
- Expensing of timber acquisition (Hanzlik Formula)
- depletion allowance based on current value, although gains have not been taxed
- Expensing of rent-seeking outlays and operating losses
- Deferring recognition of capital gains until time of sale
 - Timber severance taxation
 - Minerals *in situ* (in the ground)
 - All lands
 - Non-recognition of equity withdrawals
 - Deduction of interest on equity loans, year by year
 - Deduction of property taxes, year by year
- expensing of capital outlays in exploration and extractive phases of production
 - "Intangibles"
 - Expensing of abandonment of dry leaseholds
 - Capital costs of Field B treated as expenses of Field A (role of Sen. Russell Long)

Questions on How property income disappeared from NIPA
(National Income and Product Accounts)

These questions cover points raised in class on Friday,
Feb. 22, 2008, and quite a few other related points.

On Monday I will call on people at random to answer these
questions. A good answer will mark you as a sharp student
and, who knows, raise your final grade?

A. RENT OF COMMERCIAL REAL ESTATE

1. Where do the govt. accountants who tell us the total of national income, etc., get their figures on income from commercial real estate ("income property")? (These accountants are in the U.S. Dept of Commerce; their output is called NIPA (National Income and Product Accounts).
2. Where does the IRS get its figures on income from real estate?
3. What is "tax-depreciation" as opposed to economic depreciation of a building?
4. If depreciation completely offsets (wipes out) the income from a building, why do people bother to build and buy them?
5. What is "negative cash flow"?
6. Some people have made an art of "tax-loss farming". Why would anyone buy a farm in order to lose money?
7. Are industrial buildings and their fixtures tax-depreciated in the same manner as commercial real estate?
8. May buildings be tax-depreciated more than once?
9. Why may there be a taxable capital gain when a building is sold for no more than its original cost?
10. How do real estate owners benefit by converting ordinary income into capital gains?
11. Is the land under and around the buildings tax-depreciable?
 - a. De jure

b. De facto

B. PROFITS TRANSFERRED OFFSHORE

B-1. What is an offshore tax haven?

B-2. Name three or four of them.

B-3. How does a firm whose operations are in the U.S.A. transfer profits offshore?

B-4. Are these profits taxable in the U.S.A.?

B-5. Are these profits counted as part of the GDP (Gross Domestic Product)?

B-6. How about the profits of shipping companies operating on the high seas?

B-7. May a multinational firm arbitrarily assign profits or transfer profits to whatever nation offers the lowest tax rate?

B-8. What happens when profits are "repatriated"?

C. IMPUTED INCOME, OWNER-OCCUPIED HOMES

C-1. What is imputed income?

C-2. Is it part of national income?

C-3. Do the NIPA scribes count it accurately?

C-4. Does NIPA deduct interest on home mortgages from imputed income of the homes?

C-5. Does NIPA deduct depreciation of homes from the imputed income?

C-6. The Kelo family in New London, Connecticut, occupies a low-valued house on valuable land. Is the imputed income figured on the actual house, or the value of the land for a higher use?

C-7. 10% or more of the houses in Newport Beach are unoccupied most of the time. Do they yield imputed income during that time?

C-8. Millions of acres in the U.S.A. are owned to use for hunting, or riding, or hobby farming, or shooting, or protecting views and privacy, or skiing, or social standing, or harboring pleasure boats, or golfing, or birding, or other forms of outdoor recreation. Does NIPA include this imputed income in the GDP?

C-9.

D. CAPITAL GAINS

D-1. A capital gain is the rise in value of a "capital asset". What is a capital asset?

D-2. Name three or more main kinds of capital assets.

D-3. Who decides what is a capital asset?

D-4. Why do owners gain from having their assets classified as "capital" assets?

D-5. What is a "factitious" capital gain? (see A-9)

D-6. Capital gains accrue over many years.

- a. At what point does the IRS count them?
- b. At what point does NIPA count them?
- c. At what point would "Haig-Simons" economists count them?

D-7. If an owner dies possessed of capital assets that have risen in value, said owner transfer them to heirs at their value at the time of death. All preceding gains are then forgiven forever, tax-wise.

E. REPEATED TAX-DEPRECIATION OF CAPITAL

E-1. May capital be tax-depreciated more than once? (cf. A-8.)

F. COVERT TAX-DEPRECIATION OF LAND

F-1. How may building owners tax-depreciate land, de facto?

F-2. Why is that tantamount to perpetual tax-exemption?

G. EFFECT ON OFFICIAL ESTIMATES OF NATIONAL INCOME

G-1. If NIPA undercounts appreciation, and overcounts depreciation, and undercounts imputed income, how does that affect the reported share of GDP going to property owners?

In macro-economics we are especially interested in how fast capital comes back to be reinvested. It is that flow of reinvestment in payments to factors that generates most of the national income.

We deal here with debts being retired on the instalment plan, i.e. with level payments over n years. The level payment, a , is determined using the IPF, Eqn. (3,B).

A. Interest vs. Recovery in year one.

In year one the interest is obviously Pi . To find interest as a share of the total payment, divide Pi by IPF.

$$Pi/IPF = \quad (5,A)$$

Repayment (R) as a share of the total is obviously the complement of Pi .

$$R/IPF = I-n \quad (5,B)$$

For example, on a 30 year note at 12%, $I^{-n} = 1.12^{-30} = .033$. That means only 3.3% of the first year's payment goes to reduce the balance owing. The rest is all interest.

B. Interest vs. Recovery in later years.

(5,A and B) hold also for later years, but with these adjustments. P is not the original P , but the unpaid Balance, B_n ; and in place of the original n of 30 years you use the remaining life, x , or $30-n$, where n is the number of years elapsed.

C. Balance remaining unpaid after half the total life.

The remaining balance at $n/2$ is the present value of the level payment, a , over $n/2$ years. (Surprised? Remember that the original P is the present value of the level payment over n years, too; and if you think about it, this must always be true.)

$$B_{n/2} = a \text{ -----}$$

The unpaid balance as a share of P is:

$$\frac{B}{P} = \text{-----} \quad (6)$$

Table 1 shows the complement of (6), that is the share that has been repaid after half the life, for various original values of n (n is the whole life of the debt or investment).

Table 1: Share repaid after half the full life, for various full lives (n), and various interest rates, i.

	n: 2	4	10	20	30	60	80
<u>i</u>							
.04	.49	.48	.45	.40	.36	.24	.17
.08	.48	.46	.40	.32	.24	.09	.04
.12	.47	.44	.36	.24	.15	.03	.01
.16	.46	.43	.32	.18	.10	.01	.003

D. Time required to pay half the debt.

For this we must learn to solve PVF for n. This requires logs, but again, don't panic, just invest a few dollars in a modern hand calculator. (People used to find it worth while to invest \$900 or so in a 25 lb. mechanical calculator, so don't miss out on one of today's great buys.)

Beginning with (3,A), here is how you solve for n.

$$Pi/a = 1 - I^{-n}$$

$$I^{-n} = 1 - Pi/a$$

Take the ln of both sides:

$$-n \ln I = \ln[1 - Pi/a]$$

$$n = \text{-----} \quad (3,C)$$

(The Equation is numbered (3,C) because it is still the same Eqn. as (3,A) and (3,B). It just looks a lot different when you solve it for n.)

Half the debt is retired (aka amortized, repaid, recovered, worked off, worked down, etc.) when P is reduced to half. So just replace P by P/2 in (3,C), and solve the formula for n.

But this n is not the original n , so we will call it " x ". Note that x is not half of n , it is the number of years of life remaining when half the debt is retired.

Warning! " x " is still not the final answer if you are looking for the half-life, which is the number of years elapsed, since x is the life remaining. The half-life is $n-x$. But first, let's find x .

$$x = \text{-----} \quad (7)$$

Let h = the half-life, then:

$$h = n - x \quad (8)$$

(7) must be easy to remember, because my students always do somehow. But what I do is just remember the PVF, and derive everything else from that.

[Optional form of (7), to speed calculations.

From (3,A), $Pi/a = 1 - I$, so:

$$x = \text{-----} = \text{-----} = \text{-----} \quad]$$

Finally, to get the half-life as a share of the whole life, divide by n :

$$\text{Half-life/whole-life} = (n-x)/n = 1 - x/n \quad (9)$$

Table 2: Half-life/whole-life, for various n and i .

n :	2	4	10	20	30	60	80
$\underline{i}$							
.04	.51	.52	.55	.60	.64	.74	.79
.08	.52	.54	.59	.68	.74	.85	.89
.12	.53	.56	.63	.74	.81	.90	.92
.16	.54	.57	.67	.78	.85	.92	.94

E. Summary on amortization.

Here is a summary of what we have done with Eqns. (3,B; 5,B; 6; 8; and 9), w.r.t. a 30-year loan at 12%.

From (3,B) the level annual payment (pmt) is at 12.41% of the Principal, P . Thus it is just a sliver above the i of 12%.

But if that sliver were reduced to zero, the loan would never be repaid.

From (5,B), the share of the first year's pmt that is not interest is only 3.3%. The symbol for this portion is R, which you may read as Retirement, Recovery, Repayment, Recoupment, etc., for they all mean the same thing. The rest is all interest, a pure flow of expense to the debtor, and to the lender, gross income from which he may or may not save a small share to invest. The bulk of future investment has to come from R, most of which is normally recycled because the reason that the people who have most of the capital still have it is because they habitually avoid impairing the substance of their capital: they keep it for the next round. Prodigal folks will, of course, sometimes "eat up the seed corn", but having done so they no longer participate actively in the flow of capital, except as hired hands.

From (6), the share repaid in 15 years is 15% of P. The other 85% remains unpaid, a stone around the neck of the debtor, and to the lender, frozen capital which he cannot yet recycle.

From (8), the half-life is 24.2 years, or 81% of the whole life.

The half-life as used above is a shade longer than the true mean period of investment, which in the above case is 22.2 years, or 74% of the whole life. The true mean period, p, comes from (10), below, which is presented for completeness, but not otherwise discussed here. (10) is derived, discussed and illustrated in my notes of 12 Nov 84, "Calculating Mean Periods of Investment, pp. 9-11.

$$m = \text{-----} - 1/\ln I \quad (10)$$

5. Rate of Return (ROR), or "marginal efficiency of capital".

We already have ROR in the PIPO case (1,C). It is harder to solve for i in Eqns.(3) because you cannot collect terms. Here is what you get when you try:

$$i = a \text{ -----} \quad (3,D)$$

"i" is on both sides. But don't despair, Isaac Newton faced

this problem long ago and came up with a method of homing in on i by systematic trial and error. Newton's Method is built into certain hand calculators (e.g. the HP12C) which are used routinely in business to solve (3,D) and more complex variants as well. You can do it yourself with any programmable calculator, too: program in the right side, and proceed by trial and error. With a little practise you can get it to four significant figures in just a few passes.

" i " is always less than a/P , and may be negative. It is always an increasing function of n , although decreasingly so as n gets larger. It appears to vary directly with a/P but actually is even more sensitive than that because of the echo effect between i on the left and I on the right side. See Table 3.

Table 3: ROR for various n and a/P

a/P	$n: 2.5$	5	10	15	20	30	50
.1	-.52	-.20	.0	.055	.077	.093	.099
.4	.0	.288	.385	.397	.400	.400	.400

6. Sensitivity

Sensitivity analysis is the art of expressing how one variable responds to another. The calculus derivative is a first pass at sensitivity, but it is useful to divide the derivative by the function, getting the fractional rate of change. Multiplying that by 100 you get the % rate of change, a common and familiar concept.

The derivative divided by the function is also the derivative of the natural log of the function, called the "log derivative". You have the choice of taking the log first, and then the derivative, if that saves work.

A. The PIPO case

Take the basic compounding factor, with $P=1$ for simplicity:

$$F = I_n \quad (1,A)$$

$$\ln F = n \ln I = n i$$

$$d\ln F/dn = i \quad (11)$$

For example, if n increases by one, $F/F_n = i$. Of course we already knew that, but it's reassuring when everything checks. In fact when anything doesn't check you have surely goofed.

But here is something we didn't know:

$$d\ln F/di = n \quad (12)$$

Applying this is trickier, because i doesn't change by much, hardly ever by as much as one, which is 100%. It is more likely to change by .01, and although that doesn't look like much, empires have fallen from lesser causes -- consider the present scramble to refinance mortgages because rates have fallen a few points.

When i rises by .01, F rises by $n/100$, which is $n\%$. This is (almost) equally true if i rises from .01 to .02, or from .20 to .21. Thus if n is 25, every point rise in i makes F rise by about 25%.

This is called "The $n\%$ Rule of Thumb", and it brings out one of the vital facts of economics, that small differences of i result in large differences in future values, and the size of the differences increases with the futurity, as measured by n . (It is a rule "of thumb" because it is less than 100% accurate, owing to the approximation that $\ln I = i$; and it needs serious adjusting when n gets above 50 or so).

The $n\%$ Rule gets especially potent in discounting, when you divide by the compounding factor (or multiply by the discount factor, which amounts to the same thing). Higher interest rates depress present values in proportion to n , the futurity of the values being discounted. Let's show this directly. This time we let $F=1$.

$$P = I^{-n} \quad (1,B)$$

$$\ln P = -n \ln I = -ni$$

$$d\ln P/dn = -i \quad (13)$$

$$d\ln P/di = -n \quad (14)$$

(14) says that a 1-point rise of i reduces P by $n\%$.

Another way to compare the growth of money at different rates, i and j , is to take their ratio. Let $J=1+j$, and $K=1+k$.

$$I^n/J^n = [I/J]^n = K^n \quad (15)$$

$$k = I/J - 1 = \text{-----} \quad (16)$$

(15) shows that the ratio of the sums growing at different rates is not constant, but keeps growing at the rate k , which (16) shows to be approximately the difference between i and j .

An excellent way to visualize this is to plot the growth curves on a semi-log scale, with n on the abscissa and F on the ordinate. The origin of the scale is where $n=0$, but $F=1$. (You get the same effect by plotting the logs of the growth curves on a common scale, but here we just treat the semi-log scale). On such a scale, equal vertical distances represent equal % increases (from the bottom of each vertical line), and every curve of constant % growth, such as (1,A), is a straight line.

The slope of the line is the % growth rate, so that doubling the growth rate doubles the slope. Growth curves with different rates, beginning from the common origin, diverge like rays as n rises. The vertical distance between them increases with n . This shows that their ratios change with n -- not just their absolute differences. The highest curve becomes an ever higher multiple of the lower curves.

Discounting on the scale is the mirror image of compounding. Instead of growing the curves "decay" exponentially, forming straight lines sloping downwards to the right, starting from the origin.

These decay curves show the effect of interest rates on present values. Higher interest rates selectively downvalue future values in proportion to their futurity. The higher is n , the more sensitive values are to i .

B. The PVF case

Beginning with (3,A), let $a=1$ for generality. We know (from the alternative derivation of (3,A) on p.4) that when n rises by one, P rises by I^{-n} , which we shall call P' . Now we solve for the fractional increase, P'/P :

$$P'/P = \text{-----} = \text{-----} \quad (17)$$

(17) shows that P'/P is a sharply decreasing function of n , approaching zero as an asymptote. This underscores the futility of building in durability beyond 50 years or so, especially at high interest rates.

C. The IPF case

For generality, set $P=1$. Take the log of both sides, and differentiate.

$$\begin{aligned} \ln a &= \ln i - \ln(1 - I^{-n}) \\ a'/a &= d\ln a/dn = \text{-----} \end{aligned} \quad (18)$$

D. Elasticities

Elasticity is another useful measure of sensitivity. It is the ratio of the log derivatives of the dependent and independent variables. We already have the first, and the second is a piece of cake, it is simply the reciprocal of the independent variable, in this case n . Dividing by $1/n$ is the same as multiplying by n , and there you have elasticity, generally described as the ratio of the percentage changes of two variables.

We can translate what we already have into elasticities immediately. Let E denote elasticity.

$$\begin{aligned} E \text{ of } F \text{ wrt } n &= n i \\ E \text{ of } F \text{ wrt } i &= i n \text{ (same thing)} \\ E \text{ of } P \text{ wrt } n &= -n i \quad (\text{PIPO case } P \text{ is referred to here}) \\ E \text{ of } P \text{ wrt } i &= -i n \quad " \end{aligned}$$

Let PV denote the present value of a flow, as in (3,A), to distinguish it from P , used for the PIPO case.

$$E \text{ of } PV \text{ wrt } n = \text{-----} \quad (19)$$

$$E \text{ of } IPF \text{ wrt } n = \text{-----} \quad (20)$$

The ratio seen in (19) and (20) pops up often in finance. You can know how it behaves by realizing that it is the ratio of simple interest to compound interest. That means the top grows nearly as fast as the bottom for a few years, but then

the bottom races far ahead and the ratio falls swiftly.

The trouble with these elasticities (and the log derivatives, too) is that they are true only at one point. If the changes are large, e.g. if you double n from 15 to 30, these point elasticities understate the response. They are accurate for small changes, however; and always useful to put you in the right ballpark.

7. Land and Capital together.

Notation:

K is capital (from the German Kapital). It has a finite life, either through consumption of the corpus, or through gradual depreciation and obsolescence.

G is land (from Ground. L usually stands for labor, so is not used for land. You often see S , for Site, Soil, or the Spanish Suelo; T , from the French Terre, Spanish Tierra, and Latin Terra; B , from the German Boden; E , for Earth; etc.). Land has infinite life, except for exhaustible resources, which are not treated here (but you can try my book, Extractive Resources and Taxation, 1967).

Both K and G are measured in value terms. Subscripts refer to dates. Lacking a subscript, time zero is meant.

What we have previously called P , for Present Value, is now divided into two parts, K and G .

A. PIPO cases, with G constant.

G is assumed constant over time in order to develop the basic math in simplest form. Having done so, you can have fun playing with various scenarios about rising and falling G .

PIPO cases generally deal with growing capital like a tree, or livestock, which yields its value at one point of future time. " F " is used to denote that Future Value, just as in (1,A). But remember that P is now gone, replaced by its two components, G and K .

1. Compounding

$$F + G = [K + G]I$$

(21,A)

You put in G at the beginning of the cycle, and take it out at the end. It is a kind of "dead weight", but it changes the necessary relationships among F, K, I, and n.

2. Discounting

$$K + G = [F + G]I^{-n} \quad (21,B)$$

Solving for K, if G is given:

$$K = FI^{-n} - G[1-I^{-n}] \quad (21,B)$$

3. Rate of Return

$$i = [-----]^{1/n} - 1 \quad (21,C)$$

(21,C) shows how the presence of the deadweight cost of G acts to reduce i, the ROR. The higher the value of G, the closer the ratio in [] approaches one.

If you want to get a quick fix on how rising G affects the ROR, (21,C) is the place to start. If G_n (which is the G on top) is expected to rise above G on the bottom, that offsets part of the deadweight effect and pushes up ROR toward what it would be if G were zero. If G_n/G gets up as high as F/K, then the rise of G completely offsets the deadweight effect, and ROR is the same as if G were zero.

Now watch carefully. If G_n/G gets greater than F/K, that would seem to raise the ROR. But it will never happen. Why? Because then investors would just buy more G, rather than put any K on what they have, and sit back and maximize their ROR without using the land at all. They would become pure land speculators, since the ROR on just holding land is higher than on using land.

That in turn will push up G until the ROR on holding land falls. This gets tricky, however, because: a) A rise of G may generate expectations of equal or greater rises of G_n ; b) A higher value for G will lower the ROR on using land, as in (21,C), which tends to turn investors back towards pure land speculation again. We cannot begin to unravel all the possible scenarios here, but we will look at some history of speculative bubbles which gives us an idea of the range of documented human behavior in the past.

4. Period of time.

$$\begin{aligned}
 n \ln I &= \ln[F+G] - \ln[K+G] \\
 &= \frac{\ln[F+G] - \ln[K+G]}{\ln I} \quad (21,D)
 \end{aligned}$$

The effect of G is to bring the two logarithms on the right side closer together, thus reducing the n required to achieve a given ROR from given values of F/P.

5. Value of G.

$$G = \text{-----} \quad (21,E)$$

(21,E) is named the Faustmann Formula, after a German forester who discovered it in 1849. I will refer to it as Faustmann (that will be easier to remember than (21,E)).

Faustmann is premised on there being many cycles of investment and recovery after the first one. In fact, that is how Faustmann first derived (21,E), which we have reached by a different route.

The PV form of Faustmann.

It is generally useful to put Faustmann in the PV form. G is already a PV, and this change won't affect G. But we multiply both top and bottom of Faustmann by the discount factor, I. This makes Faustmann more directly comparable with other valuation equations, as we will see.

$$G = \text{-----} \quad (21,F)$$

The top of (21,F) is the PV of the first cycle of land use. The bottom is a divisor that converts the PV of cycle one into a land value derived from all future cycles. Rather than divide it is more convenient to take the reciprocal and multiply, calling it the "Land Value Multiplier", or LVM.

Here are some LVM values, to give you a feel for it, when $i=.05$.

Table 4: Land Value Multipliers when $i=.05$.

n:	1	2	4	8	16	32	64
LVM:	21.0	10.8	5.6	3.1	1.8	1.3	1.05

For example, when $n=16$, cycles following the first one add 80% to the value of cycle one.

Value and Rent

Multiplying G by i we get annual rent (cf. (2), p.4). We need a notation for rent:

b = annual rent (from German Bodenrente. German nouns begin with upper case, but lower case is used here to hew to my convention that flows are denoted by lower case letters, and upper case letters are reserved for point values.)

Note that in the top of (21,F) all values are present values. Multiplying by i , the rest of it becomes the IPF, so we have:

$$b = [-K + FI] \times IPF \quad (22)$$

What (22) does is to take the irregular stream of investments and revenues that we actually get, and convert them to a level annual amount, b , which is the annual value of land, or rent.

Optimal life, and replacement timing.

A most important by-product of Faustmann is determining the optimal value of n , which is the length of the cycle of investment and recovery. Optimal n is the value of n that maximizes G .

The condition for maximizing G is that the log derivative of the numerator equal that of the denominator. That means, recall, that their % rates of change are equal, so that the ratio doesn't change. Let's see where that leads us. Let $F' = dF/dn$. Then:

$$\frac{F' - KiIn}{F - KI^n} = \frac{iI^n}{I^n - 1} = \frac{i}{1 - I^{-n}}$$

$$F'[1 - I^{-n}] + Ki = Fi$$

$$\frac{F'}{F} = \frac{i}{1 - I^{-n}} = IPF \quad (23)$$

Macro is a search for bottlenecks restricting output and especially employment. Here are some prime candidates.

1. Natural Resources
2. Money
3. Spending
4. Capital
5. Turnover of capital (output-capital ratio) (*Note analogy of*
6. Monopoly and administered prices (*exposition of hoi's. &*
7. Unions (*vert. mult.)*
8. Taxes
9. Government regulations and the law
10. Social overhead capital
11. Knowledge and its dissemination
12. Leadership

Any of these or the lack of one might restrict output and employment, depending on the time and place. Rival theories and policies differ in the emphasis they place on different bottlenecks. Our job is to put the finger on the bottlenecks that give us the most trouble today, and decide how best to open them up.

Come prepared to discuss these next Tuesday.

Florida, Richard, 2009, "How the Crash Will Reshape America". *The Atlantic Monthly*, March, pp. 44-56

Notes by Mason Gaffney, for use in classes

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Cites Youssef Cassis, *Capitals of Capital*, a history. Financial leadership has migrated, yes, but only very slowly. London did not replace Amsterdam until the early 19th Century (I surmise after Waterloo). NYC replaced London in 20th Century. (Cf. my *New Life in Old Cities*, showing that NYC population surpassed London in 1924, during its "second wind" building and population boom caused by its exempting new middle class dwellings from the property tax, 1921-32.)

The migration of financial power typically lags migration of industrial power. E.g. the U.S. overtook England by 1890, but financially only 30 years later or so (helped by W.W. I).

Thriving financial centers need and attract foreigners. Tokyo today is handicapped by its closed culture. So are Singapore and Dubai.

Nationally, the financial sector accts for about 8.3% of GDP at its recent peak; headed down now to about 7%, says Cassis. Florida thinks it will drop more, maybe to 5%, where it was 25 years ago.

Fnc'l jobs acct for 22% of wages in NYC, but only 8% of the jobs (so they pay a lot better!).

Fnc'l jobs are 8% of those in NYC; national average is 5.5%. In several smaller cities the % is higher than in NYC.

NYC is losing many financial jobs, but it will survive bcs it has many other strengths. It has a broad range of creative industries: media, design, arts, entertainment. High-tech companies like Bloomberg. Cites Elizabeth Currid, *The Warhol Economy*, for detail on the diversity of NYC. Fashion design, music, film, art – and psychiatry! Cites Jane Jacobs on how the jostling of creative people in different professions spurs innovation.

Worldwide, people are crowding into a few "mega-regions", where they can be more creative and innovative. The Boston-NYC-Washington corridor. (50 years ago Jean Gottman named it "Megalopolis" and oversold it.) Charlotte-Atlanta corridor; Northern Calif; Southern Calif; Houston-San Antonio-Dallas; Tampa-Orlando-Miami; Cascadia (Portland-Seattle-Vancouver); Greater Chicago; Toronto-Buffalo-Chester (I doubt that Buffalo is thriving!).

Worldwide there are also London; Tokyo; Amsterdam-Brussels-Antwerp; Shanghai-Beijing (but Shanghai now has one of the greatest overhang of empty office space in history); Bangalore-Mumbai.

The world's 40 biggest mega-regions have 18% of world population; 67% of global production; and 90% of new patented innovations (remember Montana's dismal record in patents).

Chicago is a center for industrial management (whatever that means). It has taken much of the finance and law away from smaller Midwestern cities. Miami is the fncl center for much of Latin America. The fncl crisis won't change that – says Prof. Florida.

Educational attainment is now more highly concentrated in big cities than it was 30 years ago. Seattle, San Francisco, Austin, Raleigh, and Boston now have 2-3 times the concentration of college grads of Akron or Buffalo. This geographic sorting of people by education is unprecedented.

The metabolism of living organisms varies inversely with their size; but big cities' metabolism rises with their size. (Not clear how he defines metabolism; in my class I have equated it with clearance and renewal, but it has other aspects as well.)

Cities with high metabolism can overcome business failures easier.

Detroit is a catastrophe. The average home price has fallen to \$18,500. Many people are stuck there because they cannot sell for enough to start over elsewhere. School system broke, taken over by the State. Falling enrollment; aging population; unemployment rate 21%. Only 10% of Detroit's adult population are college grads. (Cf. earlier reading, "What's the Matter with Michigan?")

Phoenix and Vegas depended too much on construction, as though it were a basic industry in itself. In the bust, their values have fallen the most" 33% and 32%. Costner's Field of Dreams became the Field of Screams: "If you build it, nobody comes".

High homeownership rates, the product of subsidies and tax favors, is a mistake: it locks people in place when they need to move. Cites economist Andrew Oswald: places with higher rates of homeownership have higher rates of unemployment.

THE CRASH OF 2008 continues to reverberate loudly nationwide—destroying jobs, bankrupting businesses, and displacing homeowners. But already, it has damaged some places much more severely than others. On the other side of the crisis, America's economic landscape will look very different than it does today. What fate will the coming years hold for New York, Charlotte, Detroit, Las Vegas? Will the suburbs be inextricably changed? Which cities and regions can come back strong? And which will never come back at all?

HOW THE CRASH WILL RESHAPE AMERICA

By Richard Florida

MY FATHER WAS a child of the Great Depression. Born in Newark, New Jersey, in 1921 to Italian immigrant parents, he experienced the economic crisis head-on. He took a job working in an eyeglass factory in the city's Ironbound section in 1934, at age 13, combining his wages with those of his father, mother, and six siblings to make a single-family income. When I was growing up, he spoke often of his memories of breadlines, tent cities, and government-issued clothing. At Christmas, he would tell my brother and me how his parents, unable to afford new toys, had wrapped the same toy steam shovel, year after year, and placed it for him under the tree. In my extended family, my uncles occupied a pecking order based on who had grown up in the roughest

economic circumstances. My Uncle Walter, who went on to earn a master's degree in chemical engineering and eventually became a senior executive at Colgate-Palmolive, came out on top—not because of his academic or career achievements, but because he grew up with the hardest lot.

My father's experiences were broadly shared throughout the country. Although times were perhaps worst in the declining rural areas of the Dust Bowl, every region suffered, and the residents of small towns and big cities alike breathed in the same uncertainty and distress. The Great Depression was a national crisis—and in many ways a nationalizing event. The entire country, it seemed, tuned in to President Roosevelt's fireside chats.

The current economic crisis is unlikely to result in the same kind of shared experience. To be sure, the economic contraction is causing pain just about everywhere. In October,

FEATURES

*“Rodriguez’s little F-15
in the distance was not
predator but prey, trapped
and awaiting a kill shot
that would never come,
because in the next instant
the MiG became a huge
fireball in the sky.”*

—MARK BOWDEN

from “The Last Ace,” beginning on page 58

less than a month after the financial markets began to melt down, Moody's Investor Services published an assessment of recent economic activity within 381 U.S. metropolitan areas. Three hundred and two were already in deep recession, and 64 more were at risk. Only 15 areas were still expanding. Notable among them were the oil- and natural-resource-rich regions of Texas and Oklahoma, buoyed by energy prices that have since fallen; and the Greater Washington, D.C., region, where government bailouts, the nationalization of financial companies, and fiscal expansion are creating work for lawyers, lobbyists, political scientists, and government contractors.

No place in the United States is likely to escape a long and deep recession. Nonetheless, as the crisis continues to spread outward from New York, through industrial centers like Detroit, and into the Sun Belt, it will undoubtedly settle much more heavily on some places than on others. Some cities and regions will eventually spring back stronger than before. Others may never come back at all. As the crisis deepens, it will permanently and profoundly alter the country's economic landscape. I believe it marks the end of a chapter in American economic history, and indeed, the end of a whole way of life.

GLOBAL CRISES AND ECONOMIC TRANSFORMATION

"One thing seems probable to me," said Peer Steinbrück, the German finance minister, in September 2008. As a result of the crisis, "the United States will lose its status as the superpower of the global financial system." You don't have to strain too hard to see the financial crisis as the death knell for a debt-ridden, overconsuming, and underproducing American empire—the fall long prophesied by Paul Kennedy and others.

Big international economic crises—the crash of 1873, the Great Depression—have a way of upending the geopolitical order, and hastening the fall of old powers and the rise of new ones. In *The Post-American World* (published some months before the Wall Street meltdown), Fareed Zakaria argued that modern history's third great power shift was already upon us—the rise of the West in the 15th century and the rise of America in the 19th century being the two previous sea changes.

But Zakaria added that this transition is defined less by American decline than by "the rise of the rest." We're to look forward to a world economy, he wrote, "defined and directed from many places and by many peoples." That's surely true. Yet the course of events since Steinbrück's remarks should give pause to those who believe the mantle of global leadership will soon be passed. The crisis has exposed deep structural problems, not just in the U.S. but worldwide. Europe's model of banking has proved no more resilient than America's, and China has shown that it remains every bit the codependent partner of the United States. The Dow, down more than a third last year, was actually among the world's better-performing stock-market indices. Foreign capital has flooded into the U.S., which apparently remains a safe haven, at least for now, in uncertain times.

MORE ONLINE

For an interview with Richard Florida about the regional impact of the financial crisis, visit www.theatlantic.com/recession.

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It is possible that the United States will enter a period of accelerating relative decline in the coming years, though that's hardly a foregone conclusion—a subject I'll return to later. What's more certain is that the recession, particularly if it turns out to be as long and deep as many now fear, will accelerate the rise and fall of specific places within the U.S.—and reverse the fortunes of other cities and regions.

By what they destroy, what they leave standing, what responses they catalyze, and what space they clear for new growth, most big economic shocks ultimately leave the economic landscape transformed. Some of these transformations occur faster and more violently than others. The period after the Great Depression saw the slow but inexorable rise of the suburbs. The economic malaise of the 1970s, on the other hand, found its embodiment in the vertiginous fall of older industrial cities of the Rust Belt, followed by an explosion of growth in the Sun Belt.

The historian Scott Reynolds Nelson has noted that in some respects, today's crisis most closely resembles the "Long Depression," which stretched, by one definition, from 1873 to 1896. It began as a banking crisis brought on by insolvent mortgages and complex financial instruments, and quickly spread to the real economy, leading to mass unemployment that reached 25 percent in New York.

During that crisis, rising industries like railroads, petroleum, and steel were consolidated, old ones failed, and the way was paved for a period of remarkable innovation and industrial growth. In 1870, New England mill towns like Lowell, Lawrence, Manchester, and Springfield were among the country's most productive industrial cities, and America's population overwhelmingly lived in the countryside. By 1900, the economic geography had been transformed from a patchwork of farm plots and small mercantile towns to a landscape increasingly dominated by giant factory cities like Chicago, Cleveland, Pittsburgh, Detroit, and Buffalo.

How might various cities and regions fare as the crash of 2008 reverberates into 2009, 2010, and beyond? Which places will be spared the worst pain, and which left permanently scarred? Let's consider how the crash and its aftermath might affect the economic landscape in the long run, from coast to coast—beginning with the epicenter of the crisis and the nation's largest city, New York.

WHITHER NEW YORK?

At first glance, few American cities would seem to be more obviously threatened by the crash than New York. The city shed almost 17,000 jobs in the financial industry alone from October 2007 to October 2008, and Wall Street as we've known it has ceased to exist. "Farewell Wall Street, hello Pudong?" begins a recent article by Marcus Gee in the *Toronto Globe and Mail*, outlining the possibility that New York's central role in global finance may soon be usurped by Shanghai, Hong Kong, and other Asian and Middle Eastern financial capitals.

This concern seems overheated. In his sweeping history *Capitals of Capital*, the economic historian Youssef Cassis

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chronicles the rise and decline of global financial centers through recent centuries. Though the history is long, it contains little drama: major shifts in capitalist power centers occur at an almost geological pace.

Amsterdam stood at the center of the world's financial system in the 17th century; its place was taken by London in the early 19th century, then New York in the 20th. Across more than three centuries, no other city has topped the list of global financial centers. Financial capitals have "remarkable longevity," Cassis writes, "in spite of the phases of boom and bust in the course of their existence."

The transition from one financial center to another typically lags behind broader shifts in the economic balance of power, Cassis suggests. Although the U.S. displaced England as the world's largest economy well before 1900, it was not until after World War II that New York eclipsed London as the world's preeminent financial center (and even then, the eclipse was not complete; in recent years, London has, by some measures, edged out New York). As Asia has risen, Tokyo, Hong Kong, and Singapore have become major financial centers—yet in size and scope, they still trail New York and London by large margins.

In finance, "there is a huge network and agglomeration effect," former assistant U.S. Treasury secretary Edwin Truman told *The Christian Science Monitor* in October—an advantage that comes from having a large critical mass of financial professionals, covering many different specialties, along with lawyers, accountants, and others to support them, all in close physical proximity. It is extremely difficult to build these dense networks anew, and very hard for up-and-coming cities to take a position at the height of global finance without them. "Hong Kong, Shanghai, Singapore, and Tokyo are more important than they were 20 years ago," Truman said. "But will they reach London and New York's dominance in another 20 years? I suspect not." Hong Kong, for instance, has a highly developed IPO market, but lacks many of the other capabilities—such as bond, foreign-exchange, and commodities trading—that make New York and London global financial powerhouses.

"A crucial contributory factor in the financial centres' development over the last two centuries, and even longer," writes Cassis, "is the arrival of new talent to replenish their energy and their capacity to innovate." All in all, most places in Asia and the Middle East are still not as inviting to foreign professionals as New York or London. Tokyo is a wonderful city, but Japan remains among the least open of the advanced economies, and admits fewer immigrants than any other member of the Organization for Economic Cooperation and Development, a group of 30 market-oriented democracies. Singapore remains for the time being a top-down, socially engineered society. Dubai placed 44th in a recent ranking of global financial centers, near Edinburgh, Bangkok, Lisbon, and Prague. New York's openness to talent and its critical mass of it—in and

outside of finance and banking—will ensure that it remains a global financial center.

IN THE SHORT RUN, the most troubling question for New York is not how much of its finance industry will move to other places, but how much will simply vanish altogether. At the height of the recent bubble, Greater New York depended on the financial sector for roughly 22 percent of local wages. But most economists agree that by then the financial economy had become bloated and overdeveloped. Thomas Philippon, a finance professor at New York University, reckons that nationally, the share of GDP coming from finance will probably be reduced from its recent peak of 8.3 percent to perhaps 7 percent—I suspect it may fall farther, to perhaps as little as 5 percent, roughly its contribution a generation ago. In either case, it will be a big reduction, and a sizable portion of it will come out of Manhattan.

Lean times undoubtedly lie ahead for New York. But perhaps not as lean as you'd think—and certainly not as lean as those that many lesser financial outposts are likely to experience. Financial positions account for only about 8 percent of the New York area's jobs, not too far off the national average of 5.5 percent. By contrast, they make up 28 percent of all jobs in Bloomington-Normal, Illinois; 18 percent in Des Moines; 13 percent in Hartford; 10 percent in both Sioux Falls,

South Dakota, and Charlotte, North Carolina; Omaha, Nebraska; Macon, Georgia; and Columbus, Ohio, all have a greater percentage of population working in the financial sector than New York does.

New York is much, much more than a financial center. It has been the nation's largest city for roughly two centuries, and today sits in America's largest metropolitan area, as the hub of the country's largest mega-region. It is home to a diverse and innovative economy built around a broad range of creative industries, from media to design to arts and entertainment. It is home to high-tech companies like Bloomberg, and boasts a thriving Google outpost in its Chelsea neighborhood. Elizabeth Currid's book, *The Warhol Economy*, provides detailed evidence of New York's diversity. Currid measured the concentration of different types of jobs in New York relative to their incidence in the U.S. economy as

a whole. By this measure, New York is more of a mecca for fashion designers, musicians, film directors, artists, and—yes—psychiatrists than for financial professionals.

The great urbanist Jane Jacobs was among the first to identify cities' diverse economic and social structures as the true engines of growth. Although the specialization identified by Adam Smith creates powerful efficiency gains, Jacobs argued that the jostling of many different professions and different types of people, all in a dense environment, is an essential spur to innovation—to the creation of things that are truly new. And innovation, in the long run, is what keeps cities vital and relevant.

When a place gets boring, even the rich people leave. With the hegemony of the investment bankers over, New York now stands a better chance of avoiding that sterile fate.

In this sense, the financial crisis may ultimately help New York by reenergizing its creative economy. The extraordinary income gains of investment bankers, traders, and hedge-fund managers over the past two decades skewed the city's economy in some unhealthy ways. In 2005, I asked a top-ranking official at a major investment bank whether the city's rising real-estate prices were affecting his company's ability to attract global talent. He responded simply: "We are the cause, not the effect, of the real-estate bubble." (As it turns out, he was only half right.) Stratospheric real-estate prices have made New York less diverse over time, and arguably less stimulating. When I asked Jacobs some years ago about the effects of escalating real-estate prices on creativity, she told me, "When a place gets boring, even the rich people leave." With the hegemony of the investment bankers over, New York now stands a better chance of avoiding that sterile fate.

AMERICA'S "FAST" CITIES: CRISIS AND REINVENTION

In his 2005 book, *The World Is Flat*, Thomas Friedman argues, essentially, that the global economic playing field has been leveled, and that anyone, anywhere, can now innovate, produce, and compete on a par with, say, workers in Seattle or entrepreneurs in Silicon Valley. But this argument isn't quite right, and doesn't accurately describe the evolution of the global economy in recent years.

In fact, as I described in an earlier article for this magazine ("The World Is Spiky," October 2005), place still matters in the modern economy—and the competitive advantage of the world's most successful city-regions seems to be growing, not shrinking. To understand how the current crisis is likely to affect different places in the United States, it's important to understand the forces that have been slowly remaking our economic landscape for a generation or more.

Worldwide, people are crowding into a discrete number of mega-regions, systems of multiple cities and their surrounding suburban rings like the Boston–New York–Washington Corridor. In North America, these mega-regions include Sun Belt centers like the Char-Lanta Corridor, Northern and Southern California, the Texas Triangle of Houston–San Antonio–Dallas, and Southern Florida's Tampa–Orlando–Miami area; the Pacific Northwest's Cascadia, stretching from Portland through Seattle to Vancouver; and both Greater Chicago and Tor-Buff-Chester in the old Rust Belt. Internationally, these mega-regions include Greater London, Greater Tokyo, Europe's Am-Brus-Twerp, China's Shanghai–Beijing Corridor, and India's Bangalore–Mumbai area. Economic output is ever-more concentrated in these places as well. The world's 40 largest mega-regions, which are home to some 18 percent of the world's population, produce two-thirds of global economic output and nearly 9 in 10 new patented innovations.

Some (though not all) of these mega-regions have a clear hub, and these hubs are likely to be better buffered from the

crash than most cities, because of their size, diversity, and regional role. Chicago has emerged as a center for industrial management and has rolled up many of the functions, such as finance and law, once performed in smaller midwestern centers. Los Angeles has a broad, diverse economy with global strength in media and entertainment. Miami, which is being hit hard by the collapse of the real-estate bubble, nonetheless remains the commercial center for the large South Florida mega-region, and a major financial center for Latin America. Each of these places is the financial and commercial core of a large mega-region with tens of millions of people and hundreds of billions of dollars in output. That's not going to change as a result of the crisis.

Along with the rise of mega-regions, a second phenomenon is also reshaping the economic geography of the United States and the world. The ability of different cities and regions to attract highly educated people—or human capital—has diverged, according to research by the Harvard economists Edward Glaeser and Christopher Berry, among others. Thirty years ago, educational attainment was spread relatively uniformly throughout the country, but that's no longer the case. Cities like Seattle, San Francisco, Austin, Raleigh, and Boston now have two or three times the concentration of college graduates of Akron or Buffalo. Among people with postgraduate degrees, the disparities are wider still. The geographic sorting of people by ability and educational attainment, on this scale, is unprecedented.

The University of Chicago economist and Nobel laureate Robert Lucas declared that the spillovers in knowledge that result from talent-clustering are the main cause of economic growth. Well-educated professionals and creative workers who live together in dense ecosystems, interacting directly, generate ideas and turn them into products and services faster than talented people in other places can. There is no evidence that globalization or the Internet has changed that. Indeed, as globalization has increased the financial return on innovation by widening the consumer market, the pull of innovative places, already dense with highly talented workers, has only grown stronger, creating a snowball effect. Talent-rich ecosystems are not easy to replicate, and to realize their full economic value, talented and ambitious people increasingly need to live within them.

Big, talent-attracting places benefit from accelerated rates of "urban metabolism," according to a pioneering theory of urban evolution developed by a multidisciplinary team of researchers affiliated with the Santa Fe Institute. The rate at which living things convert food into energy—their metabolic rate—tends to slow as organisms increase in size. But when the Santa Fe team examined trends in innovation, patent activity, wages, and GDP, they found that successful cities, unlike biological organisms, actually get faster as they grow. In order to grow bigger and overcome diseconomies of scale like congestion and rising housing and business costs, cities must become more efficient, innovative, and productive. The

Sadly and unjustly, the places likely to suffer most from the crash—especially in the long run—are the ones least associated with high finance.

researchers dubbed the extraordinarily rapid metabolic rate that successful cities are able to achieve “super-linear scaling.” “By almost any measure,” they wrote, “the larger a city’s population, the greater the innovation and wealth creation per person.” Places like New York with finance and media, Los Angeles with film and music, and Silicon Valley with high tech are all examples of high-metabolism places.

Metabolism and talent-clustering are important to the fortunes of U.S. city-regions in good times, but they’re even more so when times get tough. It’s not that “fast” cities are immune to the failure of businesses, large or small. (One of the great lessons of the 1873 crisis—and of this one so far—is that when credit freezes up and a long slump follows, companies can fail unpredictably, no matter where they are.) It’s that unlike many other places, they can overcome business failures with relative ease, reabsorbing their talented workers, growing nascent businesses, founding new ones.

Economic crises tend to reinforce and accelerate the underlying, long-term trends within an economy. Our economy is in the midst of a fundamental long-term transformation—similar to that of the late 19th century, when people streamed off farms and into new and rising industrial cities. In this case, the economy is shifting away from manufacturing and toward idea-driven creative industries—and that, too, favors America’s talent-rich, fast-metabolizing places.

THE LAST CRISIS OF THE FACTORY TOWNS

Sadly and unjustly, the places likely to suffer most from the crash—especially in the long run—are the ones least associated with high finance. While the crisis may have begun in New York, it will likely find its fullest bloom in the interior of the country—in older, manufacturing regions whose heydays are long past and in newer, shallow-rooted Sun Belt communities whose recent booms have been fueled in part by real-estate speculation, overdevelopment, and fictitious housing wealth. These typically less affluent places are likely to become less wealthy still in the coming years, and will continue to struggle long after the mega-regional hubs and creative cities have put the crisis behind them.

The Rust Belt in particular looks likely to shed vast numbers of jobs, and some of its cities and towns, from Cleveland to St. Louis to Buffalo to Detroit, will have a hard time recovering. Since 1950, the manufacturing sector has shrunk from 32 percent of nonfarm employment to just 10 percent. This decline is the result of long-term trends—increasing foreign

GALLERY A FIRM STANCE by Thomas Fuchs



competition and, especially, the relentless replacement of people with machines—that look unlikely to abate. But the job losses themselves have proceeded not steadily, but rather in sharp bursts, as recessions have killed off older plants and resulted in mass layoffs that are never fully reversed during subsequent upswings.

In November, nationwide unemployment in manufacturing and production occupations was already 9.4 percent. Compare that with the professional occupations, where it was just a little over 3 percent. According to an analysis done by Michael Mandel, the chief economist at *BusinessWeek*, jobs in the “tangible” sector—that is, production, construction, extraction, and transport—declined by nearly 1.8 million between December 2007 and November 2008, while those in the intangible sector—what I call the “creative class” of scientists, engineers, managers, and professionals—increased by more than 500,000. Both sorts of jobs are regionally concentrated. Paul Krugman has noted that the worst of the crisis, so far at least, can be seen in a “Slump Belt,” heavy with manufacturing centers, running from the industrial Midwest down into the Carolinas. Large swaths of the Northeast, with its professional and creative centers, have been better insulated.

Perhaps no major city in the U.S. today looks more beleaguered than Detroit, where in October the average home price was \$18,513, and some 45,000 properties were in some form of foreclosure. A recent listing of tax foreclosures in Wayne County, which encompasses Detroit, ran to 137 pages in the *Detroit Free Press*. The city's public school system, facing a budget deficit of \$408 million, was taken over by the state in December; dozens of schools have been closed since 2005 because of declining enrollment. Just 10 percent of Detroit's adult residents are college graduates, and in December the city's jobless rate was 21 percent.

To say the least, Detroit is not well positioned to absorb fresh blows. The city has of course been declining for a long time. But if the area's auto headquarters, parts manufacturers, and remaining auto-manufacturing jobs should vanish, it's hard to imagine anything replacing them.

When work disappears, city populations don't always decline as fast as you might expect. Detroit, astonishingly, is still the 11th-largest city in the U.S. "If you no longer can sell your property, how can you move elsewhere?" said Robin Boyle, an urban-planning professor at Wayne State University, in a December Associated Press article. But then he answered his own question: "Some people just switch out the lights and leave—property values have gone so low, walking away is no longer such a difficult option."

Perhaps Detroit has reached a tipping point, and will become a ghost town. I'd certainly expect it to shrink faster in the next few years than it has in the past few. But more than likely, many people will stay—those with no means and few obvious prospects elsewhere, those with close family ties nearby, some number of young professionals and creative types looking to take advantage of the city's low housing prices. Still, as its population density dips further, the city's struggle to provide services and prevent blight across an ever-emptier landscape will only intensify.

That's the challenge that many Rust Belt cities share: managing population decline without becoming blighted. The task is doubly difficult because as the manufacturing industry has shrunk, the local high-end services—finance, law, consulting—that it once supported have diminished as well, absorbed by bigger regional hubs and globally connected cities. In Chicago, for instance, the country's 50 biggest law firms grew by 2,130 lawyers from 1984 to 2006, according to William Henderson and Arthur Alderson of Indiana University. Throughout the rest of the Midwest, these firms added a total of just 169 attorneys. Jones Day, founded in 1893 and today one of the country's largest law firms, no longer considers its Cleveland office "headquarters"—that's in Washington, D.C.—but rather its "founding office."

Many second-tier midwestern cities have tried to reinvent themselves in different ways, with varying degrees of success. Pittsburgh, for instance, has sought to reimagine itself as a high-tech center, and has met with more success than just about anywhere else. Still, its population has declined from a high of almost 700,000 in the mid-20th century to roughly

300,000 today. There will be fewer manufacturing jobs on the other side of the crisis, and the U.S. economic landscape will be more uneven—"spikier"—as a result. Many of the old industrial centers will be further diminished, perhaps permanently so.

THAT'S NOT TO SAY that every factory town is locked into decline. You need only look at the geographic pattern of December's Senate vote on the auto bailout to realize that some places, mostly in the South, would benefit directly from the bankruptcy of GM or Chrysler and the closure of auto plants in the Rust Belt. Georgetown, Kentucky; Smyrna, Tennessee; Canton, Mississippi: these are a few of the many small cities, stretching from South Carolina and Georgia all the way to Texas, that have benefited from the establishment, over the years, of plants that manufacture foreign cars. Those benefits could grow if the Big Three were to become, say, the Big Two.

This phenomenon, a sort of lottery whereby some places win merely by outlasting others, will not be limited to towns built around automobiles, or even around manufacturing. As the recession continues and large companies in a variety of industries fail, their remaining competitors may grow stronger, along with the places where those competitors are situated. Charlotte, North Carolina, offers an interesting case study. The financial crisis left one of the city's two big banks, Wachovia, ailing; this fall, Wachovia was acquired by

San Francisco-based Wells Fargo, in a deal that will cost the city many thousands of jobs. But things could have been much worse; the deal also preserved many jobs. What's more, at roughly the same time, Bank of America, Charlotte's other large bank (and the biggest bank in the U.S.) bought Merrill Lynch for pennies on the dollar.

A business truism holds that when your competitors are retrenching, it's a great time to grow your market share. Deborah Strumsky, an economist at the University of North Carolina at Charlotte, told me she believes that in the end, both Charlotte's banking industry and Charlotte itself will emerge from the crisis all the stronger: "The Wells Fargo deal has saved thousands

of jobs by keeping Wachovia afloat. More importantly, Bank of America has taken to the banking crisis like a shopaholic with a new credit card; it has been bargain-hunting and cutting some astonishing deals. Bank of America will come out the other side far better than in any fantasy it might have entertained previously."

In recent years, Charlotte's leaders have made some smart decisions about how to attract businesses and professionals, enabling the city to grow into the nation's second-largest traditional banking center; in the lottery of business failure and consolidation, it was well positioned to win. But it was also lucky, and last fall, it escaped losing, big-time, by no more than a hair's breadth. Overall, the roster of places that benefit from the failure of their champions' rivals will probably be

When work disappears, city populations don't always decline as fast as you'd expect. Astonishingly, Detroit is still the 11th-largest city in the U.S.

pretty short, and the names on the roster somewhat unpredictable. Especially among cities built around declining industries, more places will be weakened than strengthened; as with all lotteries, most players will lose.

CITIES IN THE SAND:

THE END OF EASY EXPANSION

For a generation or more, no swath of the United States has grown more madly than the Sun Belt. Of course, the area we call the “Sun Belt” is vast, and the term is something of a catch-all: the cities and metropolitan areas within it have grown for disparate reasons. Los Angeles is a mecca for media and entertainment; San Jose and Austin developed significant, innovative high-tech industries; Houston became a hub for energy production; Nashville developed a unique niche in low-cost music recording and production; Charlotte emerged as a center for cost-effective banking and low-end finance.

But in the heady days of the housing bubble, some Sun Belt cities—Phoenix and Las Vegas are the best examples—developed economies centered largely on real estate and construction. With sunny weather and plenty of flat, empty land, they got caught in a classic boom cycle. Although these places drew tourists, retirees, and some industry—firms seeking bigger footprints at lower costs—much of the cities’ development came from, well, development itself. At a minimum, these places will take a long, long time to regain the ground they’ve recently lost in local wealth and housing values. It’s not unthinkable that some of them could be in for an extended period of further decline.

To an uncommon degree, the economic boom in these cities was propelled by housing appreciation: as prices rose, more people moved in, seeking inexpensive lifestyles and the opportunity to get in on the real-estate market where it was rising, but still affordable. Local homeowners pumped more and more capital out of their houses as well, taking out home-equity loans and injecting money into the local economy in the form of home improvements and demand for retail goods and low-level services. Cities grew, tax coffers filled, spending continued, more people arrived. Yet the boom itself neither followed nor resulted in the development of sustainable, scalable, highly productive industries or services. It was fueled and funded by housing, and housing was its primary product. Whole cities and metro regions became giant Ponzi schemes.

Phoenix, for instance, grew from 983,403 people in 1990 to 1,552,259 in 2007. One of its suburbs, Mesa, now has nearly half a million residents, more than Pittsburgh, Cleveland, or Miami. As housing starts and housing prices rose, so did tax revenues, and a major capital-spending boom occurred throughout the Greater Phoenix area. Arizona State University built a new downtown Phoenix campus, and the city expanded its convention center and constructed a 20-mile light-rail system connecting Phoenix, Mesa, and Tempe.

And then the bubble burst. From October 2007 through October 2008, the Phoenix area registered the largest decline in housing values in the country: 32.7 percent. (Las Vegas was just a whisker behind, at 31.7 percent. Housing in the New York region, by contrast, fell by just 7.5 percent over the same period.) Overstretched and overbuilt, the region is now

experiencing a fiscal double whammy, as its many retirees—some 21 percent of its residents are older than 55—have seen their retirement savings decimated. Mortgages Limited, the state’s largest private commercial lender, filed for bankruptcy last summer. The city is running a \$200 million budget deficit, which is only expected to grow. Last fall, the city government petitioned for federal funds to help it deal with the financial crisis. “We had a big bubble here, and it burst,” Anthony Sanders, a professor of economics and finance at ASU, told *USA Today* in December. “We’ve taken Kevin Costner’s Field of Dreams and now it’s Field of Screams. If you build it, nobody comes.”

Will people wash out of these places as fast as they washed in, leaving empty sprawl and all the ills that accompany it? Will these cities gradually attract more businesses and industries, allowing them to build more-diverse and more-resilient economies? Or will they subsist on tourism—which may be meager for quite some time—and on the Social Security checks of their retirees? No matter what, their character and atmosphere are likely to change radically.

THE LIMITS OF SUBURBAN GROWTH

Every phase or epoch of capitalism has its own distinct geography, or what economic geographers call the “spatial fix” for the era. The physical character of the economy—the way land is used, the location of homes and businesses, the physical infrastructure that ties everything together—shapes consumption, production, and innovation. As the economy grows and evolves, so too must the landscape.

To a surprising degree, the causes of this crash are geographic in nature, and they point out a whole system of economic organization and growth that has reached its limit. Positioning the economy to grow strongly in the coming decades will require not just fiscal stimulus or industrial reform; it will require a new kind of geography as well, a new spatial fix for the next chapter of American economic history.

Suburbanization was the spatial fix for the industrial age—the geographic expression of mass production and the early credit economy. Henry Ford’s automobiles had been rolling off assembly lines since 1913, but “Fordism,” the combination of mass production and mass consumption to create national prosperity, didn’t emerge as a full-blown economic and social model until the 1930s and the advent of Roosevelt’s New Deal programs.

Before the Great Depression, only a minority of Americans owned a home. But in the 1930s and ’40s, government policies brought about longer-term mortgages, which lowered payments and enabled more people to buy a house. Fannie Mae was created to purchase those mortgages and lubricate the system. And of course the tax deduction on mortgage-interest payments (which had existed since 1913, when the federal income-tax system was created) privileged house purchases over other types of spending. Between 1940 and 1960, the homeownership rate rose from 44 percent to 62 percent.

Demand for houses was symbiotic with demand for cars, and both were helped along by federal highway construction, among other infrastructure projects that subsidized a new suburban lifestyle and in turn fueled demand for all manner of household goods. More recently, innovations in finance

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like adjustable-rate mortgages and securitized subprime loans expanded homeownership further and kept demand high. By 2004, a record 69.2 percent of American families owned their home.

For the generation that grew up during the Depression and was inclined to pinch pennies, policies that encouraged freer spending were sensible enough—they allowed the economy to grow faster. But as younger generations, weaned on credit, followed, and credit availability increased, the system got out of hand. Housing, meanwhile, became an ever-more-central part of the American Dream: for many people, as the recent housing bubble grew, owning a home came to represent not just an end in itself, but a means to financial independence.

On one level, the crisis has demonstrated what everyone has known for a long time: Americans have been living beyond their means, using illusory housing wealth and huge slugs of foreign capital to consume far more than we've produced. The crash surely signals the end to that; the adjustment, while painful, is necessary.

But another crucial aspect of the crisis has been largely overlooked, and it might ultimately prove more important. Because America's tendency to overconsume and under-save has been intimately intertwined with our postwar spatial fix—that is, with housing and suburbanization—the shape of the economy has been badly distorted, from where people live, to where investment flows, to what's produced. Unless we make fundamental policy changes to eliminate these distortions, the economy is likely to face worsening handicaps in the years ahead.

Suburbanization—and the sprawling growth it propelled—made sense for a time. The cities of the early and mid-20th century were dirty, sooty, smelly, and crowded, and commuting from the first, close-in suburbs was fast and easy. And as manufacturing became more technologically stable and product lines matured during the postwar boom, suburban growth dovetailed nicely with the pattern of industrial growth. Businesses began opening new plants in green-field locations that featured cheaper land and labor; management saw no reason to continue making now-standardized products in the expensive urban locations where they'd first been developed and sold. Work was outsourced to then-new suburbs and the emerging areas of the Sun Belt, whose connections to bigger cities by the highway system afforded rapid, low-cost distribution. This process brought the Sun Belt economies (which had lagged since the Civil War) into modern times, and sustained a long boom for the United States as a whole.

But that was then; the economy is different now. It no longer revolves around simply making and moving things. Instead, it depends on generating and transporting ideas. The places that thrive today are those with the highest velocity of ideas, the highest density of talented and creative people, the highest rate of metabolism. *Velocity* and *density* are not words that many people use when describing the suburbs. The economy is driven by key urban areas; a different geography is required.

THE NEXT ECONOMIC LANDSCAPE

The housing bubble was the ultimate expression, and perhaps the last gasp, of an economic system some 80 years in the making, and now well past its "sell-by" date. The bubble encouraged massive, unsustainable growth in places where land was cheap and the real-estate economy dominant. It encouraged low-density sprawl, which is ill-fitted to a creative, postindustrial economy. And not least, it created a workforce too often stuck in place, anchored by houses that cannot be profitably sold, at a time when flexibility and mobility are of great importance.

So how do we move past the bubble, the crash, and an aging, obsolescent model of economic life? What's the right spatial fix for the economy today, and how do we achieve it?

The solution begins with the removal of homeownership from its long-privileged place at the center of the U.S. economy. Substantial incentives for homeownership (from tax breaks to artificially low mortgage-interest rates) distort demand, encouraging people to buy bigger houses than they otherwise would. That means less spending on medical technology, or software, or alternative energy—the sectors and products that could drive U.S. growth and exports in

the coming years. Artificial demand for bigger houses also skews residential patterns, leading to excessive low-density suburban growth. The measures that prop up this demand should be eliminated.

If anything, our government policies should encourage renting, not buying. Homeownership occupies a central place in the American Dream primarily because decades of policy have put it there. A recent study by Grace Wong, an economist at the Wharton School of Business, shows that, controlling for income and demographics, homeowners are no happier than renters, nor do they report lower levels of stress or higher levels of self-esteem.

And while homeownership has some social benefits—a higher level of civic engagement is one—it is costly to the economy. The

economist Andrew Oswald has demonstrated that in both the United States and Europe, those places with higher homeownership rates also suffer from higher unemployment. Homeownership, Oswald found, is a more important predictor of unemployment than rates of unionization or the generosity of welfare benefits. Too often, it ties people to declining or blighted locations, and forces them into work—if they can find it—that is a poor match for their interests and abilities.

As homeownership rates have risen, our society has become less nimble: in the 1950s and 1960s, Americans were nearly twice as likely to move in a given year as they are today. Last year fewer Americans moved, as a percentage of the population, than in any year since the Census Bureau started tracking address changes, in the late 1940s. This sort of creeping rigidity in the labor market is a bad sign for the economy, particularly in a time when businesses, industries, and regions are rising and falling quickly.

Suburbanization—and the sprawling growth it propelled—made sense for a time. But that was then; the economy is different now. A new geography is required.

The foreclosure crisis creates a real opportunity here. Instead of resisting foreclosures, the government should seek to facilitate them in ways that can minimize pain and disruption. Banks that take back homes, for instance, could be required to offer to rent each home to the previous homeowner, at market rates—which are typically lower than mortgage payments—for some number of years. (At the end of that period, the former homeowner could be given the option to repurchase the home at the prevailing market price.) A bigger, healthier rental market, with more choices, would make renting a more attractive option for many people; it would also make the economy as a whole more flexible and responsive.

Next, we need to encourage growth in the regions and cities that are best positioned to compete in the coming decades: the great mega-regions that already power the economy, and the smaller, talent-attracting innovation centers inside them—places like Silicon Valley, Boulder, Austin, and the North Carolina Research Triangle.

Whatever our government policies, the coming decades will likely see a further clustering of output, jobs, and innovation in a smaller number of bigger cities and city-regions. But properly shaping that growth will be one of the government's biggest challenges. In part, we need to ensure that key cities and regions continue to circulate people, goods, and ideas quickly and efficiently. This in itself will be no small task; increasing congestion threatens to slowly sap some of these city-regions of their vitality.

Just as important, though, we need to make elite cities and key mega-regions more attractive and affordable for all of America's classes, not just the upper crust. High housing costs in these cities and in the more convenient suburbs around them, along with congested sprawl farther afield, have conspired to drive lower-income Americans away from these places over the past 30 years. This is profoundly unhealthy for our society.

In his forthcoming book, *The Wealth of Cities*, my University of Toronto colleague Chris Kennedy shows that only wholesale structural changes, from major upgrades in infrastructure to new housing patterns to big shifts in consumption, allow places to recover from severe economic crises and to resume rapid expansion. London laid the groundwork for its later commercial dominance by changing its building code and widening its streets after the catastrophic fire of 1666. The United States rose to economic preeminence by periodically developing entirely new systems of infrastructure—from canals and railroads to modern water-and-sewer systems to federal highways. Each played a major role in shaping and enabling whole eras of growth.

The Obama administration has declared its intention to open the federal government's pocketbook wide to help us get through this recession, and infrastructure spending seems poised to play a key role. Done right, such spending could position the United States for the next round of growth. But that will entail more than patching up roads and bridges.

If there is one constant in the history of capitalist development, it is the ever-more-intensive use of space. Today, we need to begin making smarter use of both our urban spaces and the suburban rings that surround them—packing in more people, more affordably, while at the same time improving

their quality of life. That means liberal zoning and building codes within cities to allow more residential development, more mixed-use development in suburbs and cities alike, the in-filling of suburban cores near rail links, new investment in rail, and congestion pricing for travel on our roads. Not everyone wants to live in city centers, and the suburbs are not about to disappear. But we can do a much better job of connecting suburbs to cities and to each other, and allowing regions to grow bigger and denser without losing their velocity.

Finally, we need to be clear that ultimately, we can't stop the decline of some places, and that we would be foolish to try. Places like Pittsburgh have shown that a city can stay vibrant as it shrinks, by redeveloping its core to attract young professionals and creative types, and by cultivating high-growth services and industries. And in limited ways, we can help faltering cities to manage their decline better, and to sustain better lives for the people who stay in them.

But different eras favor different places, along with the industries and lifestyles those places embody. Band-Aids and bailouts cannot change that. Neither auto-company rescue packages nor policies designed to artificially prop up housing prices will position the country for renewed growth, at least not of the sustainable variety. We need to let demand for the key products and lifestyles of the old order fall, and begin building a new economy, based on a new geography.

What will this geography look like? It will likely be sparser in the Midwest and also, ultimately, in those parts of the Southeast that are dependent on manufacturing. Its suburbs will be thinner and its houses, perhaps, smaller. Some of its southwestern cities will grow less quickly. Its great mega-regions will rise farther upward and extend farther outward. It will feature a lower rate of homeownership, and a more mobile population of renters. In short, it will be a more concentrated geography, one that allows more people to mix more freely and interact more efficiently in a discrete number of dense, innovative mega-regions and creative cities. Serendipitously, it will be a landscape suited to a world in which petroleum is no longer cheap by any measure. But most of all, it will be a landscape that can accommodate and accelerate invention, innovation, and creation—the activities in which the U.S. still holds a big competitive advantage.

The Stanford economist Paul Romer famously said, "A crisis is a terrible thing to waste." The United States, whatever its flaws, has seldom wasted its crises in the past. On the contrary, it has used them, time and again, to reinvent itself, clearing away the old and making way for the new. Throughout U.S. history, adaptability has been perhaps the best and most quintessential of American attributes. Over the course of the 19th century's Long Depression, the country remade itself from an agricultural power into an industrial one. After the Great Depression, it discovered a new way of living, working, and producing, which contributed to an unprecedented period of mass prosperity. At critical moments, Americans have always looked forward, not back, and surprised the world with our resilience. Can we do it again? ■

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#3

Ricardo's Law of Rent applied to industrial sites: the advantages of sites in the Manchester region, in Lancashire County, England, for cotton manufacturing, 18th-19th Centuries

- lime-free water. Only a few locations possessed it;
- Manchester's central location, surrounded on three sides by water power, and on the fourth by easy access to ocean shipping;
- the scarcity value of water drops. There was a Ricardian rent gradient as new mills resorted to poorer resources and remote sites;
- the dense network of rail, canal, and road transportation that facilitated movement of goods and people around Manchester;
- local availability of coal, as steam replaced water power. This let industry remain near Manchester, with slight migration northward toward coalfields;
- interdependence of spinning, weaving, and chemical treatment of yarn and cloth (bleaching, especially);
- need for ore imports (limestone and salt by canal, pyrites by ocean);
- growth of allied chemical industry at head of Mersey River; need of cotton industry for proximity to chemical industry;
- differentiation of products, and specialization of mills and subcenters in different kinds of cloth;
- economies from clustering of textile industry and its appanages in one region.

(Source: Atwood, Rollin S., 1928. "Localization of the Cotton Industry in Lancashire, England." Economic Geography IV (2), April:187-95)

Similar analyses have been published explaining the clustering of the steel industry around the "Mon" (Monongahela) Valley; electronics in Silicon Valley (Palo Alto to San Jose); cinema around Hollywood ("a state of mind between Burbank and Century City"); finance in Manhattan; vehicles around Detroit; aircraft in Seattle; etc.

More generally, though, big cities are diversified, so as one industry tanks, others take its place. The steep rent gradients out from the prime locations reflect general advantages for many kinds of businesses and residences, with retailing usually commanding the highest rents.

Thus, Ricardo's Law of Rent applies to all kinds of land uses, not just farming.

About the time this was written, Manchester was already losing its advantages relative to Birmingham. Manchester's geographical advantages as Atwood describes them were permanent, but her economy and culture stagnated. Birmingham had something else that we will come to know as "synergy": large numbers of small firms producing a wide variety of products. These firms were flexible and adaptable and innovative, as described by Jane Jacobs in her *Cities and the Wealth of Nations*.

How Inflation adds to intertemporal bias.

Let:

t = tax rate at 60%

i = annual return or growth of investment before taxes, measured in current \$.

r = annual growth of inv. after tax. (See note)

	<u>$i=.01$</u>	<u>$i=.05$</u>	<u>$i=.10$</u>	<u>$i=.20$</u>	<u>$i=.30$</u>
<u>n</u>	<u>r</u>	<u>r</u>	<u>r</u>	<u>r</u>	<u>r</u>
1	.0040	.0200	.0400	.0800	.1200
10	.0041	.0227	.0506	.1189	.1985
20	.0042	.0257	.0614	.1485	.2423
50	.0046	.0335	.0803	.1782	.2764
100	.0052	.0405	.0900	.1891	.2881

Effective tax rates, when $n=1$, are same as the nominal tax rate, i.e. 60%.
But when $n=50$, here are effective rates:

<u>i</u>	<u>Effective tax rate = $\frac{i-r}{i}$</u>	<u>Effective rate/nominal rate</u>
.01	.54	.90
.05	.33	.55
.10	.20	.33
.20	.11	.18
.30	.04	.07

Two conclusions follow.

1. The benefit of tax-deferral is regressive as among rates of gain. A lower rate of gain, e.g. 1%, has a higher effective rate than a higher, e.g. 30%. The effective rate on a 1% gain is 90% of the nominal rate; the effective rate on 20% is 18% of the nominal rate; and on 30%, only 7% of the nominal rate.

2. Inflation steepens the gradient of bias in favor of slower paybacks. This is because inflation raises the value of i , measured in current \$.

Indeed, in the absence of inflation, the present problem would not be very serious, relative to other tax loopholes. But inflation at 10% or 15% yearly raises all nominal yields and profits, and shifts us from, say, the 5% column to the 20% column.

NOTE: " r " is the value that satisfies: $(1+r)^n = (1+i)^n(1-t) + t$

Effects of a tax on capital (not land) on the value of land, calculated as a residual after taxes.

Notes for use in Econ 132, Public Finance, Monday, 2 October 2000.

----> N.B.: THESE NOTES REPLACE THOSE DISTRIBUTED ON FRIDAY, 29 SEPTEMBER.

Discard the original notes and replace them with these.

Purpose: to show how this tax biases landowners against uses more heavily taxed. Landowners have choices among several different uses, and different intensities of each different use. The use yielding the highest site value is called "the highest use." The tax on buildings changes the ranking of different uses, so the highest use before-tax becomes a lower use after-tax.

Nature of tax: we treat here of an American-style property tax, levied annually at a rate "t" on the base of the assessed value of the building on a site. We assume this building to have an assessed value of "K", the capital cost of the building when new.

However, the tax considered here is only PART of the usual property tax: the part that is based on the building value, K. The American-style tax also includes the site value, which we will treat separately, later. The present model treats the tax on the building, K, in isolation.

Assumptions:

Supply of land is fixed inside the taxing jurisdiction.

Supply of capital is elastic - it flows across boundaries.

Supplies of labor, materials, utilities, etc. are also elastic.

Demands for products and services are elastic.

Notation and Definitions:

CF = cash flow from land and building.

Cash flow = gross revenues less operating expenses, but not net of Capital cost of building

DCF = Discounted cash flow from land and building. You find this by multiplying the annual CF by the DCFF (see below).

K = capital cost of building, at time zero.

S = site value of land, net of costs of improving and operating land, but before taxes on building.

$$S = DCF - K$$

(1)

DCFF = Discounted cash flow factor, a standard expression in finance for converting a stream of future payments into the equivalent present value, allowing for the time value of money

θ (theta) = shorthand for DCFF, used in equations

t = property tax rate applied annually to value of building, K. [In practise today, this generally runs around 1-2% in most American jurisdictions, ranging widely from 4-5% in a few states

like New Hampshire and New Jersey to .2% or so in Alabama and New Mexico.]

For simplicity I assume here that the K used as the tax base remains fixed over building life. In practice this tax base falls toward the end of life, but this simplification is tolerably accurate here, for the present purpose, because of the time value of money: the value found by applying the DCFF (θ) to a 50-year stream of building taxes is little affected by what happens after the first 25 years or so of building life. [Later in the course we will contrast the effect of taxes on the choice between old buildings and new ones, and then this simplification will not do at all.]

SAT = Site value after deducting taxes on building. Note that the high elasticity of supply of capital means that all taxes levied on buildings are shifted to the landowners in the form of lower land values. Capital runs away from taxes; land cannot. This is why we have set up the model as we have, to focus on the sensitivity of SAT to building taxes.

$$\text{SAT} = \text{DCF} - K(1+t\theta) = S - Kt\theta \quad (2)$$

R = Resale value of land after life of new building (valued at K, above). [I list this for completeness, but at this stage we will omit it, for simplicity, by assuming its discounted value to be zero, or so near zero we can overlook it. Note, however, that this simplifying assumption is not generally true, and R must be treated, and will be - later, when we study taxation of "capital gains."]

n = economic life of building of initial cost K. The tables below assume that n = 50 years.

i = interest rate used for discounting. The tables below assume that i = .07.

With n=50, and i=.07, DCFF = 14

Technique of Analysis

The technique of analysis is to calculate ratios of SAT/S for various ratios of K/S. If these values were all the same, e.g. 50%, then a tax would have no effect on the ranking of land use choices. It would thus be what is called "neutral," i.e. the landowners choices after-tax would be the same as his or her choices before tax, and we could raise the rate as high as we please without any tilting or suppressing of incentives. We show below, however, that the tax on buildings is much harder on land uses with higher ratios of K/S. This tilts the choices in favor of those uses more lightly taxed, i.e. those with lower ratios of K/S.

$$\text{SAT}/S = [S - Kt\theta]/S = 1 - [K/S]t\theta \quad (3)$$

Table 1, below, shows how SAT/S varies with different ratios of K/S. The assumed tax rate is 2%, and the DCFF (θ) is 14, derived from $n=50$ and $i=.07$, as shown above.

Table 1: Effect of building tax on site values

K/S	14t(K/S)	SAT/S	EXAMPLE
(1)	(2)	(3)	(5)
0.0	0.00	1	Parking lot, unpaved
0.5	.14	.86	Gasoline station
1.0	.28	.72	Auto repair shop
2.0	.56	.44	Tract house
4.0	1.12	-.12	Garden apartment
5.0	1.40	-.40	Elevator apartment

Columns (2) and (3) above are complements, so column (2) shows the fractional drop in site value caused by the 2% tax on K. For the percentage drops, multiply each figure by 100. Thus, when K/S is 2.0, SAT is 56% less than S.

The point of Table 1 is that the tax on buildings wipes out the entire gain from intensive uses like apartments, while not affecting low-intensity uses like parking lots at all. This is tax-induced bias, or tilting: the opposite of tax neutrality.

Sensitivity

Table 2, below, shows the effect of t , at various levels, on SAT.

Table 2: Effects of t on SAT.

Parameters: $S=100$, $K=100$, $\theta=14$

$t \rightarrow$	0	.01	.02	.04	.08
$Kt\theta$	0	14	28	56	112
SAT	100	86	72	44	-12
$-\delta\text{SAT}$	-	14	14	28	56
$-\delta\text{SAT}/\text{SAT}$	-	.14	.16	.39	1.27

This sensitivity grows fast, as t rises. Doubling t from .01 to .02 lowers SAT by only 14%. Doubling t from .04 to .08 lowers SAT by 127%. A condition like this is called "leverage."

How about the leverage of K/S on SAT? Table 1, above, already deals with that. Doubling K/S from 2 to 4 lowers SAT by more than 100%.

How about the leverage of θ ? This is more complex, because $DCF = a\theta$, (where "a" denotes Cash Flow or CF, to make the equation easier to follow). In the absence of taxes, $S = a\theta - K$ (this is modified from Eqn. (1), on p.1). After taxes,

$$SAT = a\theta - K - Kt\theta = \theta[a - Kt] - K \quad (4)$$

The presence of Kt in (4) lowers SAT and, as $SAT \rightarrow 0$, gives great leverage to θ . This is all very interesting, but we do not pursue it further at this point.

Note that a tax based on DCF, or any element of DCF, without deduction of K, will produce similar tilting and suppression of incentives to put land to the highest use. The only way to raise taxes without such tilting is to base them on the excess of DCF over K, that is, on S. [In practice, a tax based on S is even more free of tilting than the above suggests, because it is based on the highest use, not the existing use. That is, parking lots are taxed based on the site value, S, that might be derived from higher uses, rather than on their value merely as parking lots. We need not pursue this point here, but it does reinforce the present point.]

S is derived from the net product of the site, often called "economic rent."

Do not confuse this with the net income of any person. Thus a tax on wage income will be shifted, in whole or in part, to employers, and through them to landowners, by lowering DCF. It will discourage labor-intensive uses. A tax on property income includes a tax on the income imputable to K. A tax on the landowner's personal income is reduced by the landowner's debt payments, is augmented by the landowner's work as a manager or laborer, and by capital that the landowner furnishes. It is not, therefore, at all the same as a tax on site value or site income.

A sales tax, under our assumptions, is not borne by the buyer, but is shifted back to the landowner. It is based on gross sales, without even deducting expenses - i.e. it is greater than cash flow, which in turn is greater than land income. It is death on downstream operations of high turnover.

The reason for picking the site value as the indicator of bias is that the supply of land is inelastic, so the effects of all taxes are reflected in land rents and prices. The S-values derived from competing uses simply decide to what use the landowner will put the land: the highest use.

Findings, summarized.

1. Taxes based on K tilt landowner incentives against uses with higher ratios of K/S.
2. Taxes based on DCF, or some part of DCF, tilt landowner incentives against land uses with higher ratios of DCF/S.
3. Taxes based on S have no such bias; they are "neutral."
4. Taxes based on personal income are not the same as taxes on S, and so are not neutral. Taxes on S are based on the net income "imputable" to the site, which is not the same as the net income of the owner.
5. Taxes based on sales tilt landowners against downstream uses, and uses of high turnover.
6. Taxes based on payrolls tilt landowners against labor-intensive land uses.

Ideas and observations for brainstorming and get-acquainted session, Mason Gaffney with leaders of Building Industry Association, Riverside County, May 7 2008

1. We can't win most of today's listeners with yesterday's pitch. Today we are on a steep downswing, from yesterday's steep upswing.
By the same token, however, the impact fees imposed yesterday and borne lightly are heavy today, a point we can make.
2. There are several elements of positive feedback (or "spiral effects") in a boom/bust cycle. These work for us on the upswing, and against us on the downswing, raising the amplitude of waves and troughs much above and below what simple analysis would indicate:
 - a. House builders and earners in all the dependent and associated activities also buy houses
 - b. A bigger market spawns import-competing industries and services, making a region more self-contained, having the same good effect on its balance-of-payments as spawning new export (so-called "basic") industries. (The Riverside CoC under Art Pick undervalued small local service industries and merchants. I hope the Chamber has evolved from this attitude.)
 - c. Growth attracts outside capital, both to finance building and to speculate in land. Thus, construction in a fast-growing region looks for a while like a "basic" industry, "selling" (i.e. mortgaging) its products to outsiders; but this cannot last forever. When it stops, a reverse flow takes over, in debt service and rents.
 - d. Private building calls for more public infrastructure, which is also usually financed from outside sources of capital
 - e. The above factors are temporary and unstable. The period of major building and land-development cycles, historically, has been about 18 years. Again, what works for us on the upswing works against us on the downswing.
3. The amplitude of cycles has always been greatest at the growing fringe of settlement, i.e. in places resembling unincorporated Riverside County today, and the far-out cities with high percentage growth rates
4. 1978 was a watershed change in California's attitude toward growth, from boosterism to "welcome, stranger!" laws and taxes. Impact fees were the inevitable consequence. Complaining won't change that very much.
5. There are several basic ways of raising public funds that do not discriminate against new building:
 - a. Raise property taxes overall. Prop 13 of course blocks that.
 - b. Raise revenues from land rents and values. Prop. 13 also seems to cap that, but there are other ways to explore, like improvement districts, Mello-Roos financing, TIF, etc.
 - c. Receive more outside funds, but of course everyone else is trying this all the time
 - d. Raise sales and income and business taxes, but these make it harder to sell houses because the buyers have less disposable income

- e. Raise user charges, e.g. for roads. These would make outlying County lands relatively less attractive, and therefore not look good to those members of the BIA who hold inventories of land in those areas. The BIA may need to make a hard choice on this point.
- 6. Riverside County has bucked a statewide trend to regulate against new building, and so has attracted more than its normal share of regional growth. It is changing rapidly, however, and old contrasts between us and coastal counties are not likely to endure or return.

This seems to call for lower expectations. It goes against the grain of BIA psychology, for builders are boosters and optimists, but would help communicate with pols and planners who may prefer infilling
- 7. We are now overbalanced towards single-family detached dwellings
 - a. The overhang of unsold stock
 - b. The new overhang of repo's
 - c. Housing construction as a fraction of the regional domestic product
 - d. The most pressing current need is to fill up existing houses. Boosting new jobs in the region seems indicated.
- 8. Homeownership is nice, but financial solvency is nicer in times like these. This may be the time to build rental units
- 9. It would be good to inventory lands already graded and roaded but not built upon.

There is more, but time has run out on me.

SUPPLEMENTAL GLOSSARY (gleaned from Lovins by an amateur physicist)

1. dk, deka- is 10^1
k, kilo- is 10^3 or thousand
M, Mega- is 10^6 [†] or million
G, Giga- is 10^9 or billion
T, Tera- is 10^{12} [§] or trillion
q, quad- is 10^{15} or quadrillion
(quad, used alone, is 10^{15} BTU)
2. 1 hp is 550 ft.-lbs. of "work" per second
A pound is "force"
Force x distance is "work." ("Ft.-lb." means feet times lbs., etc.)
Work per unit of time is "energy" (our subject)
Thus, hp is a unit of energy: work per second.

Cars of course are rated in hp. Electric generators are rated in kW(e), kilowatts of electrical output.

1 kW = 1.341 hp; or 1 hp = .75 kW

Your body uses about 100W, like a light bulb, and 1/13 hp. How humbling!
But look how efficient, and be proud.

3. The unit of work is:
1 joule = .737 foot-lbs.
= 1 watt-second
= 948×10^{-6} BTU

The product of energy & time is "work" again. The usual unit is the kilowatt-hour, (kW-h.)

1 kW-h = 3.6 MJ
= 3413 BTU
= 1.341 hp-h

Energy is a flow; a bbl. of oil is a fund, containing so many units not of energy, but of work: not kW, but kW-h, or BTU, or Joules.

The gross measure of national "energy" use is the quad, or 10^{15} BTU or 293×10^9 kW-h, or 293 TW-h.

[†](In U.S. engineering literature, M is 10^3 and MM is 10^6)

[§]T also is "metric ton," or 2204.6 lbs.

3. [cont.]

In 1973, U.S. primary energy use was 75 quads.

A bbl. per day is a flow.

One bbl./d = 67.1 kW (thermal)

4. A flow of electric energy has voltage & current. Voltage is the potential for work; current is the flow at that potential.

Voltage is analogous to a power drop (of water) in feet; current is analogous to the flow of water taking that drop. This product is energy.

But voltage & current are convertible, subject to the law of conservation of energy. That is,

$$A_1 V_1 = A_2 V_2$$

when voltage is changed in a transformer.

The higher the voltage, the less the line loss, hence the use of high voltage transmission for long distances & large volumes. (We find the analogous contrast in all distributive networks, including your body circulation system, between high-volume trunk lines and low-volume, small-scale distributors at the end of the line where the freight leaves the network in usable form.)

5. A means of transmission (or any transportation) is called a "mode."

"Modal split" is the percentage of energy carried on lines of different voltages, each of which is a "mode."

Heavy costs of transmission & ^{distribution} ~~transmission~~ (henceforth "wheeling") are incurred to achieve scale economies in "central" plants (which may in fact be peripheral). Wheeling costs tend to be understated by scale enthusiasts, which includes most engineers; and lost in central accounting systems (remember Averch-Johnson Effect). Lovins is trying to compensate for this. The trade-off between scale & less wheeling is a large part of what life is all about. Optimal scale is constrained by the incremental wheeling costs of larger plants, but many studies fail to include this factor; or worse, muddy the waters by pretending to include it while understating it.

6. To compare energy sources, we must develop standard units & conversion factors for commensurability. A common standard is cost per kW-h. A way-station to this is cost per kW of capacity, but capacity is not used constantly. "Load factor" is the percentage of capacity in use, at any time; averaged over time, it is the percentage of time that capacity is used. Capital and overhead costs per kW-h vary inversely with load factors. Variable costs of storable fuel are independent of load factors.

7. If one bbl/d yields 67.1 kW(t), then the oil cost of one kW(t) is 1/67.1 bbl/d or .015 (to 3 figures) bbl/d. At \$40/bbl., that is 60¢ a day. 60¢ for 24 kW-h(t) is 2.5¢ per kW-h(t). But remember that is kW(t), where t means thermal. The cost per kW(e) delivered is several times higher.

8. A large central power plant yields about one GW(e) (or 10^9 W(e) or MkW(e)). Lovins costs out a unit of this scale.
9. Costs are divided into capital or up-front costs, and running costs or annual expenses. These must be combined to find total costs. But they are incurred at different times. To make them commensurable, we use interest rates.

"Life-cycle costing" does this by discounting future running costs to the present and adding them to capital costs.

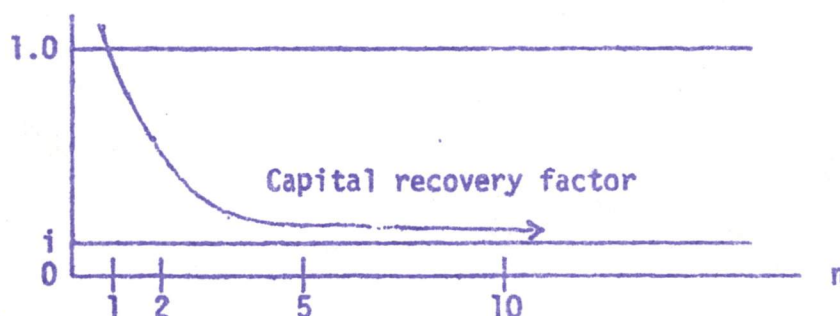
Another method is to "annualize" the lump of capital costs, putting all costs on a yearly basis. There are several ways to annualize. I will use a simple basic way, the "installment-plan" pay out, often called "capital recovery factor." This is the annual payment required to retire a debt of \$1 in n years at i interest.

To find this payment, begin with the present value of a constant (or level) annuity (a):

$$P = a \frac{1 - (1+i)^{-n}}{i} \quad (\text{we have been here before})$$

$$a = P \frac{i}{1 - (1+i)^{-n}}$$

a is the factor when $P=1$. The factor is a decreasing function of n , approaching i asymptotically for large n , as graphed below.



For durable capital, the factor is only slightly higher than the interest rate, so as a simple approximation we often think of annual capital costs simply as interest on capital.

"Capital intensity" means 2 things:

- a) Front costs are high compared to running costs.[‡]
- b) Payback of front costs is slow; capital is tied up a long time. This is roughly related to durability of carcass, but the essential point is slow recovery of value.

[‡] Fuel feedstock is a running cost to the power plant. But its own production is capital-intensive, and in a vertically-integrated or comprehensive analysis we would allow for this.

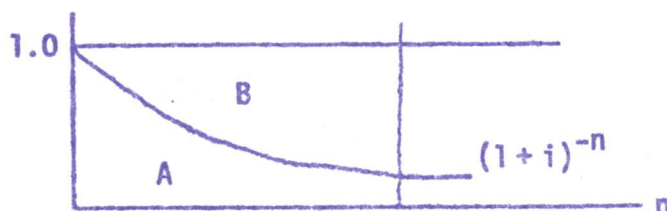
9. [cont.]

Conditions (a) + (b) make for capital intensity. Capital-intensity makes interest a high share of total costs (and you maybe thought wages caused all inflation?).

There is an array of alternative technologies differing in capital-intensity. High interest rates (as today) tell us to prefer those of lower capital-intensity. Utilities have been slow to pick up this signal, partly because rate regulation criteria reward them for padding their rate bases (Averch-Johnson Effect again). So has the whole energy industry, because of preferred access to capital, perhaps a touch of megalomania, and other reasons. Among them, they have plans to invest more capital than there is, leading to some sort of crunch or crisis at worst, and massive review and reformulation at best.

Lovins' point is to emphasize the high capital costs of the "hard" technologies he opposes. He wins easy victories because traditional utility managers have been working and planning ahead with low interest rates.

10. A way to estimate the share of interest in capital costs is this.



$$PV = A$$

$$\text{Interest} = n - A = B$$

$$\text{Total cash flow} = A + B = n$$

$$\frac{\text{Interest}}{\text{Total cash flow}} = \frac{B}{n} = \frac{n - PV}{n} = 1 - \frac{PV}{n}$$

For $i = 10\%$, this works out as below.

n	$1 - \frac{PV}{n}$
1	.09
2	.13
3	.17
4	.21
5	.24
7	.30
10	.39
15	.49
20	.57
30	.69
50	.80

Let $X\%$ of sales be imputable to front capital, C_0 ; the other $(1-X)\%$ is imputable to running costs, c . Then interest in total imputation of revenues is $X\%$ of $(1 - \frac{PV}{n})$.

11. The calculation above is over life of C_0 . The share of interest actually declines over time as plant ages, capital is recovered, and the rate base declines. The share going to capital is nearly 99% interest in year zero, dropping towards nothing at demolition time. We will pursue this later.

NOTES

Friday, February 27, 1981

1. The ".6 Rule" and decreasing costs.

A rule of thumb often seen in engineering literature has it that the stage of decreasing cost in sizing many plants is characterized by an output-elasticity of cost equal to .6, meaning you increase output 1% by increasing costs only .6%.

This implies a cost function as below.

Let:

C = cost
P = product or output
b = a constant

$$C = b P^{.6} \quad (1)$$

Then,

$$\text{Average Cost} = \frac{C}{P} = \frac{b P^{.6}}{P} = b P^{-.4} \quad (2)$$

$$\text{Marginal Cost} = \frac{\partial C}{\partial P} = b \times .6 P^{-.4} \quad (3)$$

$$\frac{MC}{AC} = \frac{(3)}{(2)} = .6 \quad (4)$$

(4) says that MC is 60% of AC.

As to the elasticity implications, elasticity is a ratio of percentages, and (4) turns out to be that, as below.

$$\frac{MC}{AC} = \frac{\Delta C / \Delta P}{C / P} = \frac{\Delta C / C}{\Delta P / P} \quad (5)$$

Thus we can spot the scale info. in 3 places.

- a) The exponent of output in the cost function
- b) The output-elasticity of cost
- c) MC/AC

These are all the same: .6

2. Sources of the .6 Rule.

We get a feel for the origins of this "rule" by looking at an ordinary garden hose or water pipe. The cross-section area increases with the square of the circumference. The cost increases only directly with the circumference. The flow depends on the cross-section area. Let:

A = Area of cross-section
C = Circumference
r = radius

$$A = \pi r^2 \quad (6)$$

$$r = \frac{C}{2\pi} \quad (7)$$

$$A = \pi \left(\frac{C}{2\pi} \right)^2 = \frac{C^2}{4\pi} \quad (8)$$

$$C^2 = 4\pi A$$

$$C = 2\pi^{\frac{1}{2}} A^{\frac{1}{2}} = b A^{\frac{1}{2}} = b A^{.5} \quad (9)$$

where b is a constant = $2\pi^{\frac{1}{2}}$

But cost varies with C, and output with A, so now let C be Cost, and P be output, and we are nearly back to (1).

How do they get from a .5 rule to a .6 rule? Experience, they say. You can imagine many factors like a need for stronger materials, heavier weights to move, wider rights-of-way, etc.

3. Limits to the "rule."

But note that this scale effect involves volume, not distance. While moving larger volumes of almost anything is cheaper per unit and per mile, it is inherent in larger volumes that they have to move longer distances. There is more collection cost at the input, and distribution cost at the outlet. There is more "cross-hauling," i.e. shipping feedstock south and product back north. And the product at the retail destination must end its journey in a narrow line of low capacity.

When we add associated wheeling costs then to plant costs, we will be overwhelmed by diseconomies of scale at lower volumes than if we look only at the central plant.

4. Here are some cost data on alternative energy sources, currently circulated by SCE. I have not checked their accounting methods specifically. No definitions are given.

"Levelized lifecycle power costs in ¢/kW-h" (1980 \$)

$\frac{K/kW}{LF}$	Source	Fuel	C & M	Capital	(%)	Total	Rank
$\frac{1500}{.70} = 2142$	Nuclear	1.2	.9	6.0	75	8.1	1
$\frac{1400}{.60} = 2333$	Coal	4.3	1.7	6.0	55	11.0	3
$\frac{350}{.05} = 538^{\dagger}$ (7000)	Combustion Turbines	18.5	.5	1.1	5	20.1	7
$\frac{900}{.25} = 3600$	Wind	--	.9	8.9	91	9.8	2
$\frac{1200}{.25} = 4800$	Solar Photo-Voltaic	--	.9	12.3	93	13.2	4
$\frac{2500}{.40} = 6250$	Solar Thermal	--	1.0	16.0	94	17.0	5
$\frac{1500}{.75} = 2000$	Geothermal	10.7	1.5	5.3	30	17.5	6
$\frac{500}{.40} = 1250$	Fuel Cells	18.4	1.3	2.3	10	22.0	8

It is not explained how they got from left column, K/kW, over to Capital costs per kW-h. A logical route would be as below:

$$\frac{K/kW}{LF} \frac{r/yr}{8766 \text{ hrs/yr}} = \frac{\text{levelized cost}}{\text{kW-h}} \quad (10)$$

but this works out to $r = 25\%$ or so, or else short, short lives of capital. They mention 15% elsewhere as their cost of money. If interest is at 15%/yr., and the c.r.f. is 25%, the economic life is only 6.5 years. Chances are they are doing something else. Maybe we can track it down.

Meantime, compare these with Lovins' figures.

[†] Make-up energy from system oil generation to yield a 65% load factor included.

A Step in Finding Optimal Area of Engineering Bloc

(1)	(2)	(3)	(4)	(5)	(6) MNP: 1,5 Increase of Net Product per Additional Acre $\Delta(5) \div \Delta(1)$
Acres	Cut per Acre (\$)	Cost per Acre (\$)	Net Product Per Acre (2) - (3)	Net Product (1) x (4)	
50	4,000	6,000	-2,000	-100,000	-
100	5,000	5,000	0	0	2,000
150	5,000	4,000	1,000	150,000	3,000
200	5,000	3,500	1,500	300,000	3,000
250	5,000	3,500	1,500 ²	375,000	1,500
300	4,900	3,600	1,300	390,000	300
350	4,800	3,700	1,100	385,000	-100
400	4,700	3,800	900	360,000	-500
450	4,600	3,900	700	315,000	-900
500	4,500	4,000	500	250,000	-1,300 ⁶

- Notes.
1. MNP means Marginal Net Product
 2. Optimal scale: 250 acres, where (4) = (6), and (4) is max.
 3. Numbers are hypothetical. Use discounted values to allow for time factor. Value of cut per acre falls with acreage because of deferral of cut as well as recourse to less productive sites.
 4. Costs per acre rise with acreage because of increased distances. (Initial drop is due to spreading fixed cost over more land). Environmental costs also increase with acreage because a) We go to steeper land, more erosive and slower to come back; and b) longer skids and low standard forest roading required.
 5. Note how much more sensitive an indicator Marginal Net Product (MNP, Column 6) is than any other.
 6. A common error is to make areas too big. The profitable core is used to subsidize the submarginal fringes. To avoid, either abandon the fringe areas, or increase the number of blocs. Increasing the number of blocs may call for additional mileage of trunk roads and spurs. To allow for this factor, include a pro rata share of trunk road costs in the overhead of each bloc.

L. Data on some important macro factors

1. Annual % growth, U.S. real private capital stock (non-residential).
Excludes "capital gains," i.e. growth of land values, using methods whose accuracy is so-so.

1949-59	4.0%
1959-69	4.6
1969-74	4.2
1974-79	3.0

Growth of real capital shifts AK curve to right, but not fast enough to keep up with growth of population; and growing need to offset diminishing returns to land; plus needs of rising real income, and increased "otiosity" (look it up) caused by the combination of progressive taxes on work and various subsidies for not working; plus knee-jerk engineering dream of raising capital/output ratios in many industries, utilities, etc.

The recent decline calls for reduced capital/output ratios. The pattern of response is that many industries are scrimping on capital--e.g. broilers, reducing period from 13 weeks to 7. But others are sheltered from interest rates, the price that rations capital, and continue to lavish capital wastefully.

2. % growth in money stock (M). 1976-80, ca. 7%/year, compound.

This would shift LM curve to right, but prices (P) have risen at a higher rate, so $\underline{m}$ (= m/p) has fallen.

What is driving up prices faster than M? A rapid rise in velocity, or deposit turnover at about 12% a year, although figures are fuzzy. Each \$ does more work.

3. Commercial bank holdings of various investments, in G\$ (Gigabucks, or billions of \$)

Year	All loans & investments	Fed. Debt		Mortgage Debt		Securities (pvt.)	
		Am't	%	Am't	%	Am't	%
1967	352	55	16	59	17	61	17
1970	435	53	12	73	17	86	20
1975	745	69	9	136	18	146	20
1980 III	1221	101	8	258	21	212	17

When commercial banks lend, they "buy securities." This "monetizes" the securities, which become the asset backing the banks deposits (Ch. 13). There is a belief that federal deficits play an increasing role in this deposit expansion. The data show, however, a sharply decreasing role, 16% down to 8%. Commercial banks are going private.

Much of the increased private lending is based on increased private "credit worthiness," i.e. values of collateral. The big rise of mortgage debt exemplifies this.

It is dangerous for banks to lend on mortgages. These are long-term loans, 30 years long, at fixed $\underline{r}$. When market $\underline{r}$ rises, banks are squeezed. S&Is are in big trouble currently because all their assets are mortgages. Their troubles are mainly theirs alone. Bank troubles are everyone's troubles, because banks create our money supply.

3. [cont.]

We have perhaps come full circle to the conditions of 1925-30, when banks were heavily invested in mortgages. Then came a shortage of disposable liquid capital, a sharp rise of r , and efforts to unload. But when everyone is unloading at once, no one succeeds. There was a liquidity panic, stifling the flow of new investment, gross as well as net. This in turn reduced consumer spending, causing many to see the source of trouble in underconsumption, even though this is contra-indicated by the escalation of r that triggered the panic. Too low a rate of capital recovery is the explanation that seems to fit the facts.

Liquidity panic led to bank panic, a loss of faith in bank deposits. Depositors demanded currency, and got none. Half the banks failed.

It was after this calamity that the U.S. government began to practise the idea of running deficits, borrowing from banks. It made some sense at the time. Private collateral had collapsed; federal debt was a substitute base for the money supply. In the circumstances it seemed more restorative than disruptive, by obviating the alternative solution of a deeper drop in prices, which had already dropped so much. The unfortunate long-term side-effect, however, was to create a mechanism for financing wars without the Congressional and popular approval required to raise taxes; and to validate inflationary price hikes later on.

4. The federal role.

Federal Rec'ts, \$G

	<u>Total</u>	<u>Psnl. Inc. Tax</u>		<u>Corp. Inc. Tax</u>		<u>Indirect</u>		<u>Soc. Sec</u>	
		<u>Am't</u>	<u>%</u>	<u>Am't</u>	<u>%</u>	<u>Am't</u>	<u>%</u>	<u>Am't</u>	<u>%</u>
Year									
1958	78.1	36.3	46	17.9	23	11.6	15	12.3	16
1980	527.3	249.7	47	70.6	13	35.7	7	171.3	32

Federal Spending (on budget)

	<u>Total</u>	<u>Goods & Services</u>		<u>Tsfr. Pmts.</u>		<u>To St. & Local</u>		<u>Interest</u>	
		<u>Am't</u>	<u>%</u>	<u>Am't</u>	<u>%</u>	<u>Am't</u>	<u>%</u>	<u>Am't</u>	<u>%</u>
Year									
1958	83	51	61	13	22	4.7	5.7	5.4	6.5
1980	578	190	33	235	41	87.0	15.0	51.0	8.8

In 1958, you could broadly say the feds taxed business and workers to provide "goods & services" (much of it military, to be sure).

In 1980 you see an enormous change. The feds tax workers more, and "business" (property) less, to provide welfare, pay interest, and subventions to state and local governments, largely to reduce property taxes. Part of the welfare is social security for retirees, which can be construed in part as interest on their earlier tax payments. As far as current work incentives go, the effect is the same as welfare.

4. [cont.]

The whole thing adds up to a huge machine for reducing work incentives. Old folks waste their breath moralizing against the decline of the work ethic, but the cause is more objective than spiritual. The federal budget mandates it, taxing the young and middle-aged to support the idle old, and inflate the value of their property.

Remember, it is not the level of wages, but the structure, that creates incentives to work. We tax work to subsidize leisure, and reap the results you would predict.

5. Federal Deficits.

Large deficits occurred in World War II, 1940-45. The Korean and Vietnam wars had no such effect, however.

Deficits began running wild from 1975, especially in election years. That this pattern did not occur earlier is some indicator of a serious decline of public rationality and responsibility.

6. The federal "capital budget"

The early rationale for public debt emphasized public works. In recessions, the feds would finance more roads, dams, harbors, etc., taking up the slack and creating useful capital.

The federal budget today, however, shows capital spending swamped by consumption. Here are the top 12 outlays, 1980:

1. Income Security, GS	193	7. Veterans	21
2. Defense	136	8. Natural Resources, Env.	14
3. Interest*	65	9. Intl. Affairs	11
4. Health	58	10. Regional Dev.	10
5. Educ., trng., empl.,	31	11. Fiscal Assistance	9
soc. svcs.		12. Commerce & Housing	8
6. Transportation	21		

There is little capital formation evident there until #6, Transportation. There is a large capital wastage, however, because annual deficits of G\$40-70 draw capital from private lenders and crowd out real capital formation by private borrowers

7. Funds raised in credit markets by "non-financial sectors," 1979, ranked by size, in G\$.

1. Mortgages	160.0
a. Residl., "home"	109
b. Commercial	26
c. Farm	16
d. Multi-family residl.	9
2. "Other" (Consumer loans,	133.0
bank loans n.e.c., open	
market paper, other)	

* Why is this figure different from the G\$51 in #4? They came from different pages of the same report. Gives you an idea of how numbers vary, depending on details of inclusion and definition.

7. [cont.]

3. U.S. Govt.	37.4
4. "Foreign"	21.2
5. Corporate bonds**	21.2
6. State & local govt. bonds**	19.0
7. Corporate equity (new stocks)	3.5

Private debt is rising much faster than federal debt, currently. Individuals borrowing on homes make the largest single component.

The stock market no longer raises enough new capital to spit at. It is all to make a market in old assets, and prove equity values on which to sell bonds (i.e., to mortgage).

A lot of our capital is leaking abroad.

Capital gains are turned into cash, tax-free, by borrowing on them. Loans secured by mortgage notes ("deeds of trust" in Calif.) are usually long term. Long-term loans let borrowers finance hard capital, with long payback periods. This hardens up part of our capital stock, raising capital/output ratios. Could this create any problems?

8. Mortgage debt outstanding, 1980 II

"All" mortgage debt***	G\$ 1386 (= ca. 1.4 trillion \$)
Farm	101
1-4 family houses	904
Multi-family houses	134
Commercial	247

Federal debt held by other than federal agencies and the Federal Reserve System is G\$ 595, or about half the mortgage debt.

** Corporate bonds and local govt. debts are technically mortgages, too, being secured by real property.

*** But excluding bonds of corporation and local govts.

Major peace treaties or victories that launched or reinforced booms, in American economic history

90% complete as of March 23 2011

1637, Massacre of Pequods in CT

CT settlers are blocked by land speculators; NH fills up instead

16⁸³xx, England takes Nieuw Amsterdam with little effort *becs allied w. patroons*
Hudson Valley fails to fill up due to patroon monopoly

16¹⁹xx, 30-years war over Germany pre-occupies Big European states, frees Amsterdam for commerce, shipping, and the Tulip Bubble, crashing in 1637
1619-48

1675, Victory in King Phillip's War opens nw of New England to settlers

Crash came in ?

1713, Treaty of Utrecht ends War of Spanish Succession, launches Mississippi Bubble (French) and South Sea Bubble (English)

Great Crash of both comes in 1720

1763, Treaty of Paris? Ends French and Indian War (aka 7-years war)

English settlers move west. Crash comes in 177?

1781, American Revolution succeeds at Yorktown, aided by France, financed by Dutch (who still owned Hudson Valley); 1788, Americans unite as the new U.S.A.

Small midterm crash followed in 1792; Major crash, 1798

1814, Treaty of Ghent ends War of 1812, capped by victory in battle of New Orleans

Crash follows in 1819

1820-30, several easy wins for Americans:

- Gov. DeWitt Clinton (Dutch-English) unites factions in NY, opens Erie Canal
- Pontiac's Conspiracy undone
- Blackhawk War won
- Jackson removes Cherokees from Carolinas
- Texas rebels from Mexico
- Missouri Compromise keeps the peace in westward expansion
- Etc.

Followed by Crash of 1837

1846, Treaty of Guadalupe-Hidalgo, U.S. takes most of s.w., from Texas to California

- 1846, U.S. annexes Oregon Territory, settles peacefully with England
- 1848, Calif gold rush begins; expansionism (aka "Manifest Destiny") triumphs, but under shadow of sectional rivalry
- First r.r. boom opens the west. *Gadsden Purchase*

Followed by crash of 1857

1865, Lee surrenders at Appomattox, ends Civil War and decades of sectional rivalry

- Reconstruction begins
- ~~2nd r.r. boom goes wild~~, along with vast land grant subsidies *1869, Golden Spike*
- The first "gilded age", wild consumption

Followed by crash of 1873

1876, Propertied interests fuse in resolving disputed Tilden-Hayes election, put down blacks in south and immigrant workers in north and west, win class war, enjoy the second gilded age

1893, Crash of 3rd r.r. boom; rise of progressive and radical parties

1919, Treaty of Versailles ends W.W. I

Followed by suppression of radicalism, and boom of 1920s

1929 Crash and long depression

1944 Bretton Woods agreement makes U.S. \$, gold-backed, the reserve currency of the World

1946 Defeat of Axis Powers

Peace dividend is deferred by start of long expensive Cold War, containment policy to hold back USSR and its allies. U.S., in spite of huge military budgets, suffers setbacks in Korea, Cuba, Viet Nam

1960, Interlude between Korean and Viet Nam wars - *"Soaring Sixties"*
Truce in class war under Eisenhower, JFK. 2nd Reconstruction of South moves ahead moderately under LBJ, MLK, Jr., Earl Warren.

1969, Nixon allies formerly Democratic "Solid South" with Republicans (echo of the Hayes Presidency, 1877-81), realigns national politics.

1971, Nixon devalues the \$, takes it off gold. Kissinger works out deals with Saudi Arabia et al. to back the \$ with their oil

1973-81, Nixon victory in class war stalled by Watergate, OPEC embargo, etc.
Trough in land values about 1975

1977-81, Serious stagflation under Ford, then Carter, 1977-81. Carter appts. Volcker to lead against inflation, but too late for him, Reagan seizes and wins on the issue. FRB stops holding down i.r.s, they soar, but then Reagan stops them in time to get reelected in 1984.

1981, Carter loses to Reagan; property makes major advances in class war.
Reagan cuts tax rates, begins era of permanent deficits. *Laffer Curve*

1981-90, Japan real estate boom breaks previous records. U.S. is paying for military protection of Japan.

1989, Berlin Wall falls, USSR makes nice with U.S.A., starts falling apart.

1990, major bust, featuring the debacle of real estate and the "Thriffs" – Savings and Loan banks. Japan, now our major ally in east Asia and a major financier, falls hard, hasn't recovered yet.

2001, Disputed election, Bush wins over Gore, completes dismantling of New Deal regulatory reforms. Wild speculative boom ensues in banking and real estate

2008, Huge Crash in U.S., Europe, Japan

2011, No signs of major recovery.

2011 -12, U.S. \$ survives major scare as Congress toys with skipping debt payments, but Europe is in even worse shape, the \$ survives.

2013, China emerges economically stronger than U.S. or Europe

Maturity of timber, summary of alternative solutions. Display graphically on chalkboard in class.

1. Faustmann: maximize annual rent (*Bodenrente, Bodenerwartungswerte*)
2. Fisher-Allen et al.: maximize DCF of one generation, ignore future generations
3. Boulding: maximize internal r.o.r.
4. U.S. Forest Service and others: maximize stumpage per year (*Waldrente*), ignore interest on capital but overvalue rent of site
5. Maximize stumpage less compounded planting costs
6. Maximize gross stumpage
7. Maximize gross yield

Notice on table of restaurant near Solvang, CA:

“We do not serve water unless you request it. By order of local water district, to conserve water.”

Said restaurant is surrounded by horse pastures, and a few golf courses.

Is this just tokenism? How many glasses of water for a golf course?

2 glasses = 1 pt

2 pts = 1 qt

4 qts = 1 gal

7.5 gals (approx) = 1 cubic-foot (cf) , so 120 glasses = one c.f.

43,560 cf = 1 acre-foot (af)

6 af per acre (afa) = water use per year for grass

200 acres = one golf course; the course uses 52.272m c.f. per year.

Question: How many glasses of water per year must you give up to water one golf course? Ans. $52.272\text{m c.f.} \times 120 \text{ glasses/c.f.} = 6.276 \text{ billion}$

Yes, tokenism it is!

Research project: how many horses are kept as pets in s. California?

How many acres of grass does each horse need and get?

How much hay does the average horse eat per month?

How many acres are needed for that hay?

How many bales of hay per acre is the average yield?

How many acres in hay are needed per horse?

How many acres in hay are needed for s. Calif. horses?

How many a.f. of water are needed, at 6 a.f.a.?

How many single-family houses and yards would that many a.f. supply, at .5 a.f. per house-and-yard? (That is 1/12 as much water per acre.)

Ways of claiming water in California

Kind of Claim	Initial Basis	Continuing Basis	Transfer-Ability	Constraints On Use	Constraints on Service area		
Riparian	Owning Riparian Land	Owning riparian land	None, except by non-assertion	Downstream Riparian Claims	Extent of riparian Land in one parcel		
Appropriative	Priority of withdrawal and "use"	History of continued use	Limited in fact	Beneficial use, loosely construed	Few and weak		
Correlative	Owning overlying land	Owning overlying land	None, except by non-assertion	Other correlative claims	Overlying lands only		
Mutual prescription	Overlying land + history of use	Same, + adjudication	No history of use	Adjudication	Mainly overlying lands, + limited "export"		
Prescriptive	Adverse possession	Adverse possession	None	Needs of land held by possessor	None		
Domestic	Urban use of land	Urban use of land	Abandonment of urban use of land	Urban use of land	Urbanized area		
Navigation	Navigability	Navigability	None	None	Natural rivers		
Other Instream	Public trust doctrine	Legal and political support	None	Political bargaining	Natural rivers, lakes		
Inside Public Utility	Area of land, and/or price paid	Area of land, and/or price paid	Automatic, when basis is price paid	Area of land, and/or price paid	Inside franchise area		
Empire building	Priority of contract	Custom + political pressure	Political pressure	Price and/or regulation (by USBR)	High natural barriers		
Market system	Payment to owner – once that is established	Either title deed, or continuing rental	Nonpayment of rent, or sale of deed	Willingness and ability to pay	none		

5-1

4-1.

Religious cycles in the U.S.A., 1741-date, Outline of Contents

- a. Gt Awakening and Revolution, 1741-89
- b. Federalist reaction, 1789-1801
- c. Virginia dynasty, 1801-37
- d. 2nd Gt Awakening and Civil War, 1837-69
- e. First Gilded Age, 1869-73
- f. 3rd Gt Awakening and Populism, 1873-96;
- g. 2nd Gilded Age and Mauve Decade, 1886-1901
- h. Progressive Era and Social Gospel, a resumption of the 3rd Great Awakening, 1901-1918
- i. 3rd Gilded Age, pacifism, materialism and isolationism, 1918-29
- j. 4th Gt Awakening, Thomism and The New Deal, 1929-48
- k. Reaction, stasis, and revived fundamentalism, 1948-58
- l. 5th Gt Awakening, Vatican II, 1958-68
- m. Fundamentalist reaction, Southern Baptists and The Personal Gospel, 1969-date

U.S. Presidents and dates

Presidential Calendar, 1789-2011

(To be filled out a bit more. This is as of 3-25-2011)

Election Year	Winners	Party	Losers	Years in office
1788	Washington	Federalist		1789-97
	Adams			
1796	Adams	Federalist		1797-1801
	Jefferson			
1800	Jefferson	Repub		1801-09
	Burr			
1804	Jefferson			
	George Clinton			
1808	Madison	Repub	1809-13	
	George Clinton			
1812	Madison	Repub	1813-17	
	George Clinton			
1816	Monroe	Repub	1817-21	
	Tompkins			
1820	Monroe	Repub	1821-25	
	Tompkins			
1824	Adams, J.Q.	"National Republican"		1825-29
	Calhoun			
1828	Jackson	Dem		1829-33
	Calhoun			
1832	Jackson	Dem		1833-37
	Van Buren			
1836	Van Buren	Dem		1837-41
1840	Harrison	Whig		1841-41
	Tyler			
	Tyler	Whig & Dem		1841-45
1844	Polk	Dem		1845-49
1848	Taylor	Whig		1849-50
	Fillmore			1850-53
1852	Pierce	Dem		1853-57
1856	Buchanan	Dem		1857-61
1860	Lincoln	Repub		1861-65
	Hamlin			
1864	Lincoln	Republican	McClellan	1865-66
	Johnson			
	Johnson	Unionist		1866-69
1868	Grant	Repub	H. Seymour	1869-73
1872	Grant	Repub	Greeley	1873-77
1876	Hayes	Repub	Tilden	1877-81
1880	Garfield			
	Arthur	Repub		1881
				1882-85
1884	Cleveland	Dem	Blaine	1885-89
1888	Harrison, B	Repub	Cleveland?	1889-93
1892	Cleveland	Dem	Harrison?	1893-97
1896	McKinley	Repub	Bryan	1897-1901
			Weaver	
1900	McKinley	Repub	Bryan	1901-02
	T. Roosevelt			1902-05
1904	T. Roosevelt	Repub	Bryan	1905-09
1908	Taft	Repub		1909-13
1912	Wilson	Dem	T. Roosevelt	1913-17
			Taft	

U.S. Presidents and dates				
1916	Wilson	Dem	Hughes	1917-21
1920	Harding	Repub		1921-23?
	Coolidge	Repub		1923-25
1924	Coolidge	Repub		1925-29
1928	Hoover	Repub		1929-33
1932	FDR	Dem	Hoover	1933-37
	Garner			
1936	FDR	Dem	Landon	1937-41
	Garner			
1940	FDR	Dem	Willkie	1941-45
	Wallace			
1944	FDR	Dem	Dewey	1945-46
	Truman			1946-49
1948	Truman	Dem	Dewey	1949-53
1952	Eisenhower	Rep	Stevenson	1953-57
	Nixon			
1956	Eisenhower	Rep	Stevenson	1957-61
	Nixon			
1960	Kennedy Dem		Nixon	1961-62
	Johnson			
	Johnson Dem			1962-65
1964	Johnson Dem		Goldwater	1965-69
1968	Nixon	Rep	Humphrey	1969-73
	Agnew			
1972	Nixon	Rep	McGovern	1973-75
	Ford			1975-77
1976	Carter	Dem	Ford	1977-81
1980	Reagan	Rep	Carter	1981-85
1984	Reagan	Rep	Mondale	1985-89
1988	GHW Bush	Rep		1989-93
1992	Clinton	Dem	Bush	1993-97
1996	Clinton	Dem		1997-2001
2000	GW Bush Rep		Gore	2001-05
2004	GW Bush Rep		Kerry	2005-09
2008	Obama	Dem		

Presidents with same family names

Last	First	Dates elected	Relationship
Adams	John	1796	Father
Adams	John Quincy	1824	Son
Harrison	Wm Henry	1840	Distant relative
Harrison	Benjamin	1888	Distant relative
Johnson Andrew	1864		
Johnson Lyndon	1960	No relation	
Johnson Lyndon	1964		
Roosevelt	Theodore	1900	
Roosevelt	Franklin D	1932, 1936, 1940, and 1944	Cousin once removed
Bush	G.H.W.	1988	Father
Bush	G.W.	2000, 2004	Son

Presidents who died in office

1. All edns OK

2. Not G's 1st book, nor longest

a. Land & Land Policy, 1873. Attacks corruption, concn.
Pioneer historical work. SP; K.C.L.C. Shocking map of land grants

b. G. wrote from CA, as a journalist - investigative reporter
Primary sources. Like George Fletcher, he knew what he saw.

c. Read classical econs, esp. J. S. Mill & Ricardo

3. Moved to NYC, links w. Irish. They popularized him, ran him
for Mayor, 1886 - a major threat. Counted out. Role of
Hewitts of T.R.

4. Best seller. Fr. McGlynn. Perum Novarum

5. No longer widely read. Did he fall or was he pushed? NCE
as defense vs. G.

6. Stolen election of 1876. Voters were P.O. 'd

7. Note dedication

8. Ten Books. We start w. Intro, + Bk II.

9. Intro: The Problem, Wealth & Want-

a. Progress itself generates poverty

b. An immense wedge driven through society (1% v. 99%)

c. Econ's shd answer, but fail. To challenge authority.

U.S. Presidents and dates

Name	Year elected	Year died	Cause	Succeeded by
Harrison, Wm H.	1840	1841	Illness	Tyler, John
Taylor, Zachary	1848	18??	Illness	Fillmore, Millard?
Lincoln, Abraham	1864	1865?	Shot	Johnson, Andrew
Garfield, James A.	1880	1881	Shot	Chester Arthur
McKinley, Wm	1896, 1900	1901	Shot	Theodore Roosevelt
Harding, Warren	1920	1923	Illness	Calvin Coolidge
Roosevelt, Franklin	1944	1945	Illness	Harry Truman
Kennedy, John F.	1960	1962	Shot	Lyndon
Johnson				

Presidents from Virginia

Name	Year or Years Elected
Washington, George	1788, 1792
Jefferson, Thomas	1800, 1804
Madison, James	1808, 1812
Monroe, James	1816, 1820
Tyler, John	1840
Polk, John	1844
Wilson, Woodrow	1912, 1916

Presidents from Ohio

Name	Year Elected
Hayes	1876
Garfield	1880
Cleveland	1884, 1892
McKinley	1896, 1900
Taft	1908
Harding	1920

Timothy Chang

121 E Boyce 1471
X7

Behind Weber

List of economic basics useful in public finance, or any course: ideas, tools, principles, vocabulary. (Experience has taught me that most students were never taught, or never learned, or have forgotten these basics, and stumble when they need to use them.)

A, Measurements, mathematics, and statistics

- 1, Commensurability and trade-offs
 - The dollar, a way to reconcile otherwise dissonant values
 - The interest (or discount) rate, for intertemporal trade-offs
 - Dollar equivalents, imputed values, service flows, and measurement bias
 - Fungibility of dollars
 - Fungibility of capital each time it turns over
- 2, All economic values are of 3 kinds: point values, flow values, and rates
 - Conversion rates between them: discounted cash flow (DCF), and price/earnings (P/e) ratios (aka "capitalization") (over)
 - 2 kinds of point values: funds (aka stocks) and perpetuities
- 3, Elasticity (ϵ), a ratio of 2 fractional changes: ϵ of supply, and demand; ϵ of commodities, and factors of production; ϵ of production (= MP/AP) (over)
 - ϵ and mobility;
 - ϵ and taxable surplus
- 4, Rates as ratios. 2 kinds of "growth rates," absolute and fractional
- 5, Leverage: raising a fractional growth rate by subtracting a constant from the variable that grows
- 6, "Regression fallacy" in correlations, a common and mischievous error

B, Government and law

- 1, Sovereignty
- 2, Federalism, and division of powers
 - "Fiscal federalism" = intergovernmental transfers
- 3, Competition among sovereigns – it takes many forms
- 4, Tenure
- 5, Property

C, Entitlements and Distribution

- 1, Factors of production
- 2, Factoral income vs. personal income
- 3, Cash flow vs. income vs. rent
- 4, Dissipation of rent
- 5, Rentiers
- 6, Distribution:
 - Personal vs. factoral incomes
 - Wealth vs. income
 - Origins of wealth: earnings, findings, savings, and stealings, not necessarily in that order
 - Concentration and its measurements (cf. "regression fallacy," above)
 - "Redistributive" taxation – from what base?
 - Functional vs. non-functional incomes

$$P = \frac{a}{i}$$

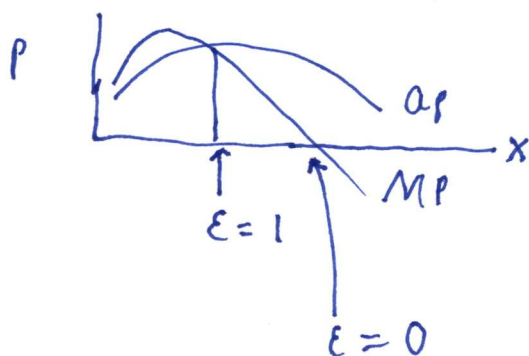
$$P_0^n = \frac{a}{i} - \frac{a(1+i)^{-n}}{i} = a \frac{1 - (1+i)^{-n}}{i}$$

$DCEF = \frac{P}{a}$

$$\frac{P}{a} = \frac{1}{i}$$

$$i = \frac{a}{P}$$

$$E = \frac{\Delta P/P}{\Delta X/X} = \frac{\Delta P/\Delta X}{P/X} = \frac{MP}{AP}$$



D, Allocation, and social efficiency

- 1, Consumer sovereignty (but ask, "which consumers"?)
- 2, Highest and best use of factors – before and after taxes
- 3, Factor proportions – they vary extremely, unlike chemical valences. The 3 stages of production. Optimal factor mixes.
- 4, Factor substitution and trade-offs
- 5, "Public" (non-congestible) goods
- 6, Artificial scarcity, the essence of monopoly
- 7, Mobility and Arbitrage – equalizing marginal rates of return after taxes (MRORAT). Labor arbitrage: equalizing wage rates. Immobility of land.
- 8, The equimarginal principle of optimal allocation of a factor

E, Some dynamics

- 1, The 4 different "Re-"s: Recovery, Replacement, Renewal, and Revival
- 2, Investing: net vs. gross, creative vs. acquisitive, active vs. passive, individual vs. aggregate
- 3, The "wealth effect"
- 4, Depreciation and appreciation
 - What factor does which? (Land as catalyst vs. capital as a reactant, incorporated in the product. The legal concept of "usufruct".)
 - Effects on income
- 5, Fungibility of recovered "capital consumption allowances" (CCA's). "Protean" nature of capital as it turns over.
- 6, Rent-seeking (racing).

D. Raising output by removing tax bias

This section involves some analysis, some definition, some accounting, and some hard thinking: it calls for a slower reading pace than what precedes. I urge the reader to give it the close attention it needs; I promise that the effort will repay you well. This is the heart of the thesis, and makes sense of everything else.

When you base a tax on taxable surplus, and keep the tax proportional to taxable surplus, you levy taxes without twisting and inverting the landowner's or land manager's ranking of land uses. As noted before, the owner's preferred use after tax remains the same as it would be without any tax. On the other hand, if you tax on some other basis (Gross Revenue, for example), you bias the owner against uses more heavily taxed. To keep the example simple, and generally realistic, we assume here that the seller is a "price-taker," meaning he sells on a world market and cannot raise the price, and so has no choice but to bear the tax.

Bear in mind that Net Revenue is the Taxable Surplus: you cannot tax more than that without aborting the land use. The ratio of Costs (C) to Gross Revenue (G) varies over a wide range, from zero up nearly to one (and even above one for subeconomic uses which, however, you do not want). Let's compare two rival uses, A and B, for the same piece of land. Use "A" yields more Net Revenue (N), but has a higher ratio of C/G. We levy a tax of 10% on Gross Revenue (G). To simplify, Expenses and Capital Costs are consolidated as "C", so $N = G - C$. Table 1 shows the effects of the tax on Net Revenue after Tax (NAT).

Table 1: Effect on Net Revenues of a 10% Tax on Gross Revenues

<u>Land</u> <u>Use</u>	<u>G</u> (\$k)	<u>C</u> (\$k)	<u>N</u> (\$k)	<u>G/N</u>	<u>Tax</u> (\$k)	<u>NAT</u> (\$k)	<u>Tax/N</u> (%)
A	100	90	10	10	10	0	100
B	20	15	5	4	2	3	40

The higher use, A, produces more goods, makes more jobs, and yields more Net Product: it is clearly the higher use. The tax on G, however, turns A into a lower use than B, in the eyes of the landowner or manager. A 10% tax on G is a 100% tax on the N from use A, wiping out the entire incentive to put land to use A. It is a 40% tax on the N from use B, leaving 60% of the Net Product for the landowner. The landowner would choose use A in the absence of taxes, or with a tax on N; but the tax on G forces him to choose use B, which is socially inferior. This, in a nutshell, expresses the damage done by imposing taxes on bases other than N, the Net Revenue of land. The tax lowers output, employment, and investment opportunities for capital, all three. Fourth, it lowers tax revenues well below their maximum possible level of \$10k, the Net Revenue from use A.

More generally, a tax on G is a tax on N at a rate equal to G/N times the tax rate on G. Algebraically:

$$NAT = N - tG = N(1 - tG/N) \quad (1)$$

The ratio G/N is a multiplier on the impact of the tax rate, t .

For every parcel of land there are usually many alternative uses, and even more alternative intensities of any given use, a whole spectrum of choices. Up and down the spectrum, a tax on G systematically aborts the "higher" (more intensive) uses in favor of lower uses. The effect is like a "scorched-earth" policy, but not one we inflict on the invading enemy in wartime: we inflict it on ourselves in peacetime by adopting a foolish tax policy.

If we tax C instead of G, we can illustrate the effects by another Table like Table 1, but this is now a simple exercise that I leave to the reader. Here the bias is in the same direction but a good deal worse, because the tax on N will be the tax on C multiplied times C/N . To visualize this effect most simply, premise a third land use, "D", that yields some G without using any C at all - a parking lot is a near-example. Use D would now be tax free, while uses A and B would still pay a good deal, and be displaced by use D. Parking would be ample, but there would be nothing there to park for.

There are many more possible tax types we might consider, taxes imposed on parts of C, but not all. A payroll tax is an example. This tax would discourage the use of labor on land, but not the use of capital, and so would have two biases: less labor use, with the same capital use, or even more capital use as capital substitutes for labor. We do not here pursue all such possibilities of bad tax policy, for they are too numerous. The major point is that taxes on any base other than N, the Net Product of land, bias the market against the best and fullest use of land.

Note, finally, that a cap on the price of G, such as discussed above, has the same effects as a tax based on G.

[Note how the usual approach to wedge effect is doubly minimizing.

1, It deals with commodity markets, not land uses. There is no provision for changes in the commodity produced, or the processes of producing it - just smooth, limited Marshallian curves. These deal with quantitative adjustments in small increments; not with **Qualitative** changes in large leaps.

2, It deals with one commodity at a time, and a tax on that commodity, as opposed to my model that deals with all the alternative uses of land, hence with highly elastic demands. Quantum leaps is the big difference. The Harberger triangle approach is similar to Prof. Hagen's approach to the effects of raising the price of farm water. He only allows for little savings in growing the same crop, using the same basic mode of irrigation. In fact, you can move from flood irrigation to drip, and from pasture to avocados.]

E. Maximizing public revenue.

When you focus taxes on the Net Product, N, you can raise the tax rate very high with no ill effects on land use. By contrast, you cannot raise taxes on G very high because a high rate will drive some land completely out of use, and all land out of its best use, a catastrophic outcome. To avoid the catastrophe you must lower the tax rate, but that means you cannot collect in taxes all of the rent from land uses like B, or much of any from uses like D. Thus, with taxes on G, you first abort some of the taxable surplus, and still fail to collect all that remains. In Table 1, the tax collected is only \$2k, or 40% of the Taxable Surplus (N) from use B; while the potentially taxable surplus is \$10k, from use A. With taxes on N, you can collect the entire taxable surplus from use A, \$10k, while aborting none of it.

Critics of the land tax policy would have us believe that the land tax base is "too small," and cannot support the government. How wrong and misleading they are! The truth is the opposite. Table 1, and the reasoning behind it, tell us we can collect more by taxing land, and exempting G and C, than in any other way.

3-2

Major peace treaties or victories that launched or reinforced booms, in American economic history

90% complete as of March 23 2011

1637, Massacre of Pequods in CT

CT settlers are blocked by land speculators; NH fills up instead

16xx, England takes Nieuw Amsterdam with little effort

Hudson Valley fails to fill up due to patroon monopoly

16xx, 30-years war over Germany pre-occupies Big European states, frees Amsterdam for commerce, shipping, and the Tulip Bubble, crashing in 1637

1675, Victory in King Phillip's War opens nw of New England to settlers

Crash came in ?

— 1713, Treaty of Utrecht ends War of Spanish Succession, launches Mississippi Bubble (French) and South Sea Bubble (English)

Great Crash of both comes in 1720

1763, Treaty of Paris? Ends French and Indian War (aka 7-years war)

English settlers move west. Crash comes in 1777

— 1781, American Revolution succeeds at Yorktown, aided by France, financed by Dutch (who still owned Hudson Valley); 1788, Americans unite as the new U.S.A. P

Small midterm crash followed in 1792; Major crash, 1798

— 1814, Treaty of Ghent ends War of 1812, capped by victory in battle of New Orleans

Crash follows in 1819

1820-30, several easy wins for Americans:

- a. Gov. DeWitt Clinton (Dutch-English) unites factions in NY, opens Erie Canal
- b. Pontiac's Conspiracy undone
- c. Blackhawk War won
- d. Jackson removes Cherokees from Carolinas
- e. Texas rebels from Mexico
- f. Missouri Compromise keeps the peace in westward expansion
- g. Etc.

Followed by Crash of 1837

— 1846, Treaty of Guadalupe-Hidalgo, U.S. takes most of s.w., from Texas to California

- a. 1846, U.S. annexes Oregon Territory, settles peacefully with England
- b. 1848, Calif gold rush begins; expansionism (aka "Manifest Destiny") triumphs, but under shadow of sectional rivalry
- c. First r.r. boom opens the west

Followed by crash of 1857

— 1865, Lee surrenders at Appomattox, ends Civil War and decades of sectional rivalry

- a. Reconstruction begins
- b. 2nd r.r. boom goes wild, along with vast land grant subsidies
- c. The first "gilded age", wild consumption

Followed by crash of 1873

— 1876, Propertied interests fuse in resolving disputed Tilden-Hayes election, put down blacks in south and immigrant workers in north and west, win class war, enjoy the second gilded age

1893, Crash of 3rd r.r. boom; rise of progressive and radical parties

— 1919, Treaty of Versailles ends W.W. I

Followed by suppression of radicalism, and boom of 1920s

Crash of 1929

— 1946 Defeat of Axis Powers

Peace dividend is deferred by start of long expensive Cold War, containment policy to hold back USSR and its allies. Setbacks in Korea, Cuba, Viet Nam

1960, Interlude between Korean and Viet Nam wars

Truce in class war under Eisenhower, JFK. 2nd Reconstruction of South moves ahead moderately under LBJ, MLK, Jr., Earl Warren. Nixon allies formerly "Solid South" with Republicans (echo of the Hayes Presidency, 1877-81), realigns national politics.

1973-81, Nixon victory in class war stalled by Watergate until Reagan, 1981

Serious stagflation under Carter, 1977-81; Carter and Volcker lead against inflation, but too late, Reagan hijacks the issue

— 1981, Carter loses to Reagan; property makes major advances in class war

Reagan cuts tax rates, begins era of permanent deficits.

198x, Berlin Wall falls, USSR makes nice with U.S.A., starts falling apart.

Followed by bust, 1990. Japan, now our major ally in east Asia and major financier, falls hard

2001, Disputed election, Bush wins over Gore, completes dismantling of New Deal

Followed by huge Crash of 2008

2011, no signs of major recovery

(-

19th Century U.S. transportation development, was marked by excessive e-w emphasis, when more economic routes were n-s. Each state wanted to establish its own route to the unorganized western lands, and was leery of becoming colonialized by more urban states to its north or south.

Rivers and valleys on the east and Gulf coasts mostly run n-s. Beginning in Maine, there are the following major ones:

RIVER or BAY

CITIES, IF ANY

(Cities in () are tiny, just happen to be at mouth of the river)

Penobscot,	Bangor
Kennebec,	Augusta
Cosco Bay	Portland
Merrimack,	Concord, Manchester, Nashua, Lowell, (Ne
Charles,	Boston
Narragansett,	Providence
Thames,	New London, Groton
Connecticut,	Hartford, (Saybrook)
Just a harbor,	New Haven
Housatonic,	(Stratford)
Hudson,	New York
Delaware,	Philadelphia
Susquehanna,	(Havre de Grace)
Patapsco,	Baltimore
Patuxent,	(Nothing)
Potomac,	D.C.
Shenandoah,	(Winchester)
Rappahannock,	Fredericksburg
York,	(Yorktown)
James,	Norfolk, Richmond
Roanoke,	(Albemarle Sound)
Cape Fear,	Wilmington, NC
Yadkin (Pee Dee),	(Nothing)
Catawba (Wateree),	(Nothing)
Congaree,	(Nothing)
Santee,	(Nothing)
Broad,	(Nothing)
Charleston Harbor	Charleston

Savannah,	Savannah
Altamaha,	(Nothing)
etc.	

Running south to the Gulf are the:

Suwanee,	(Nothing)
Chattahoochee & }	(Apalachicola)
Apalachicola, }	
Escambia,	Pensacola
Alabama & }	Mobile
Tombigbee, }	"
Pascagoula,	Nothing
Pearl,	Nothing
Mississippi	New Orleans
Sabine,	Port Arthur, Beaumont
etc.	

Angling into the Mississippi are the:

Big Black,
Yazoo,
Red,
White,
St. Francis,
Ouachita,
etc.

Some of these routes and junctions should have been more developed and used. Note lack of port cities in southeast.

Tributaries entering the Ohio produced few great cities at the confluences.

Tributaries entering the Mississippi, aside from the Missouri R. (St. Louis) produced few great cities.

Memphis on the MS R. has done well without any great river joining it. (Hurd mentions Wolf Crk, but it doesn't look like much.) Memphis is up on Chickasaw Bluff, protecting it from floods. A rare shelf of sandstone below provides a boat landing. It is alleged to be the best natural site for a "mart" between Cairo and Vicksburg.

Cairo, at confluence of Ohio and Mississippi Rivers,

and later on the I.C.R.R. as well, came to nothing. Also joining near there are the Wabash, Cumberland, Tennessee. This whole region, a super-confluence of big rivers and valleys, is dead, except for Evansville, IN, and Paducah, KY. Besides geography it takes a human response to make a city.

The Illinois R. joining the Mississippi is dead.

A few cities grew without much water transportation. Columbus is now Ohio's biggest city; Indianapolis is Indiana's; Las Vegas is Nevada's. These are still exceptional.

Some cities made great efforts to reach water: L.A. is notable. Seattle, up on a bluff, also needed great civic effort. Chicago had to spend heavily to develop its connection to the Mississippi Valley via the Illinois River. New York needed the Erie Canal to reach Buffalo, Lake Erie, and the Midwest.

4-1

1. Religious cycles

- ✓ a. Gt Awakening and Revolution, 1741-89
- b. Federalist reaction, 1789-1801
- c. Virginia dynasty, 1801-37
- ✓ d. 2nd Gt Awakening and Civil War, 1837-69
- e. First Gilded Age, 1869-73
- ✓ f. 3rd Gt Awakening and Populism, 1873- 96
- g. 2nd Gilded Age and Mauve Decade, 1886-1901
- h. Progressive Era, 1901-1918
- i. 3rd Gilded Age, pacifism, materialism and isolationism, 1918-29
- ✓ j. 4th Gt Awakening and New Deal, 1929-48
- k. Reaction, stasis, and revived fundamentalism, 1948-58
- ✓ l. 5th Gt Awakening, 1958-68
- m. Fundamentalist reaction, 1969-date

2-5-b

2-5-a

~~3-7-a~~, Highlights of ~~3-7~~, "Sales tax bias against turnover and jobs"

Page Para

- | | | | |
|----|---|---|---|
| 1 | 1 | 1 | Sales taxes tax capital for turning over |
| 2 | 1 | 1 | Replacement anticipates sales, and also finances them by making jobs (Week #7) |
| 3 | 1 | 1 | The circular flow of macro turns vicious when producers wait for consumers, and consumers wait for jobs. Turnover is what breaks this deadlock. |
| 3a | 1 | 1 | Turnover is measured by the sales/capital ratio. Sales taxes depress this. |
| 4 | 1 | 2 | This is a shot at sales taxes, not a grouch at all taxes |
| 5 | 1 | 3 | The prevailing canon holds that a general sales tax is neutral |
| 6 | 1 | 3 | It also holds that existing loopholes in the tax should be closed |
| 7 | 2 | 1 | The "Ramsey Rule" says that inelastic supplies and demands should be taxed higher, so uniformity is not neutral anyway. |
| 8 | 2 | 3 | Only the supply of land is inelastic |
| 9 | 2 | 4 | Textbooks accept Ramsey in principle, then ignore it in practice |
| 10 | 2 | 4 | They ignore supply and write only of demand inelasticities, even though there are no such things, while land supply is the only really inelastic kind |
| 11 | 2 | 6 | Modern neo-classical writers propose sales-taxing labor services, while ignoring the untaxed services of land and capital |
| 12 | 3 | 2 | Existing sales taxes exempt real property |
| 13 | 3 | 3 | There is no sales tax on consuming services of real property directly |
| 14 | 3 | 6 | John Due wrongly states that states have no alternative but sales taxes |
| 15 | 4 | 3 | Some economists favor taxing labor, to make people work harder |
| 16 | 4 | 4 | Economists write of taxing consumption, but fail to define consumption |
| 17 | 4 | 5 | Landowners consume land by preempting its time |
| 18 | 5 | 2 | Fixed capital is consumed slower than other (circulating or working) capital, and needs replacing less often |
| 19 | 5 | 7 | Sales tax is based on volume of sales, not the total of capital in stock, so the high-turnover, high-volume store pays much more sales tax per quantum of capital |
| 20 | 5 | 8 | Parking lot pays least sales tax of all because there is no capital to turn over |
| 21 | 6 | 3 | "Capital" is a quantum of value embodied temporarily in a concrete capital good |
| 22 | 6 | 4 | There are differences among kinds of capital goods in every industry, e.g. pies and pie-shelves |
| 23 | 6 | 7 | Land is like a catalyst; working capital is like a chemical reactant, it is embodied in the product, and taxed with each turnover |
| 24 | 7 | 2 | Fixed capital is a mixture of catalyst and reactant. How to divide a mixture between the two is done with the math of finance, which lenders and borrowers and I.R.S. agents use every day, and we have studied in Week #1. |
| 25 | 7 | 5 | Sales taxes are not all borne by buyers, but partly shifted to sellers. Some even say "ATCOR". |
| 26 | 8 | 1 | Sales from owner to owner are not "turnover" in the Mill sense of wearing out and being replaced |
| 27 | 8 | 3 | Capital used to plant timber takes 26,000 times the days to turn over as capital baked in a pie (like the fabled "Four and twenty blackbirds") |
| 28 | 9 | 5 | Capital, the quantum of value, is relayed from one concrete "capital good" to another. In relaying, the capital becomes "fungible". (Know what that means.) |

- 29 9 6 The average transit time of a molecule of liquid through a reservoir is the flow/fund ratio. In business, this is the sales/capital ratio. Dorfman cutely calls this "The Bathtub Theorem". The ratio is variable among common kinds of capital: HIGHLY variable.
- 30 10 3 Sales taxes slow turnover by redirecting capital from high-turnover forms (like pies) into low-turnover forms (like timber in boreal [cold northern] climes). Sales taxes thus lower demand for labor.
- 31 10 3 Property taxes (Week #4) and some kinds of income taxes (Week #9) have the opposite effects.
- 32 11 3 Gigantism in banking makes it harder for small businesses to get loans: giant banks funnel capital into giant firms. Small businesses, usually with higher turnover, are the ones that make most jobs (Week #7).

2-8-a

Highlights from 3-1, "Why Sales Taxes?"

Page Parag Item

- | | | | |
|----|----|-----|--|
| 1 | 1 | 1 | CA vs Amazon and the world |
| 2 | 1 | 2 | Is it bad to cap sales tax rates? |
| 3 | 1 | 3 | Sales tax is a novelty, historically |
| 4 | 1 | 4 | 5 states have no sales tax, and do quite well |
| 5 | 3 | 2 | Will show how and why to lower sales tax rates |
| 6 | 3 | 3,4 | The Commerce Clause of U.S. Constitution |
| 7 | 3 | 5 | Commerce Clause preserves interstate competition |
| 8 | 3 | 6 | Roles of Monroe, and Turgot |
| 9 | 4 | 3 | CA cannot make foreign nations pay or collect our sales tax |
| 10 | 4 | 4 | Congress could override Commerce Clause, but won't |
| 11 | 5 | 5 | Congress's tax power is constrained by uniformity |
| 12 | 6 | 4 | Devolution (decentralization) of power is in vogue, in U.S. and Europe |
| 13 | 6 | 4 | Rivlin et al are pushing for a national VAT, inconsistent with their former Keynesian views. Neo-cons are also inconsistent with their pro-market views. |
| 14 | 6 | 8 | Problem of double taxation, or "cascading" of sales taxes |
| 15 | 6 | 8 | Sales tax is more on trade or markets than on consumption as such |
| 16 | 7 | 2 | Sales taxes do not tax consuming time-slots of land |
| 17 | 7 | 3 | Commerce in intangibles has long been covered by the commerce clause |
| 18 | 8 | 5 | Old formulae for sharing revenues of MNC's do not cover e-commerce |
| 19 | 9 | 4 | Taxes must change, due to rise of e-commerce, and focus more on immobile assets, e.g. land |
| 20 | 9 | 5 | It is possible for a State to survive w/o a sales tax, since 5 states and Alberta still do |
| 21 | 10 | 1 | All States survived w/o any sales tax until 1929, using mainly property taxes |
| 22 | 10 | 2,3 | CA could replace sales tax 100% with property taxes by raising the latter by just 1.19% |
| 23 | 10 | 4 | This replacement would shift tax burden from poorer to richer counties |
| 24 | 11 | 2 | This shift would obviate other forms of bailing out poorer counties |
| 25 | 11 | 4 | C.S.A. went broke and repudiated its debts by refusing to tax property or income |
| 26 | 12 | 2 | Spain went broke and lost war with U.S. (1898) by refusing to tax |
| | | | The U.S. in the peace treaty repudiated debts that Spain had fastened on Cuba |
| 27 | 12 | 3 | The U.S. tax system is coming to resemble those of France and Spain before they went broke, lost revolutions, and repudiated their debts. We have repudiated our debts before, too: it could happen again. |

1-3, Components of any tax

1. Base
 - a. Measurements
 - i. Quantitative or qualitative;
 - ii. Specific vs. *ad valorem*;
 - iii. Net vs. gross.
 - A. Sales tax vs income tax
 - B. Well-head value vs. "well-foot" or rent value
 - C. Gross sales vs. Value-added
 - D. Cascading
 - iv. Kinds of income
 - v. Before-tax or after-tax value: the Rothbard fallacy
 - vi. Exclusions, exemptions
 - vii. Preferential measurements or assessments
 - viii. Deductions
 - ix. Tax credits
2. Rate
 - a. Flat
 - b. Graduated
 - i. Progressive
 - ii. Regressive
 - iii. Elasticity-tempered (Ramsey rates)
3. Taxable event
 - a. Timing tax liability
 - b. Timing deductions and credits
 - c. Penalties for delinquency
 - d. Avoidance vs. Evasion
 - e. "Unit of production" vs. lump sum
 - f. Confusion of lump sum and inelastic supply. Confused usage of "direct taxes" in U.S. Constitution
 - g. Economic "realization" of income vs. legal "recognition" of income
 - h. Imputed values vs. cash transactions: "Haig-Simons" income vs. I.R.S. income
 - i. Death as an event: is it taxable, or a time of tax forgiveness?
 - j. Analogies between taxes and lease payments
4. Taxable unit: who or what is liable?
 - a. Persons, corporations, commercial firms, nonprofits, parcels of real estate, personal property, stockholders, creditors, relatives, endorsers, sellers, buyers
 - b. *In personam* or *in rem*
 - c. Legatees or estates of donors?
5. Sovereignty
 - a. Locus
 - i. Point of sale
 - ii. Point of delivery
 - iii. Residence of tax payer

- iv. Border crossing
- v. Citizenship of taxpayer
- vi. Site of real property
- vii. Site of corporate charter
- viii. "Nexus"
- b. Federal, State, Local
- c. Balkanization vs, personalization
- 6. Shifting taxes: impact vs. incidence; role of elasticity; Ramsey Rule; effect of taxable event;
- 7. Enforcement, collection, sanctions, gages, liens. Danger of peonage bankruptcy.
- 8. Earmarking
- 9. Sumptuary element
- 10. Concepts of "equity"
 - a. Interregional
 - b. Interpersonal
 - c. Interracial
 - d. Reparational
 - e. Interfactoral

List of economic basics useful in public finance, or any course: ideas, tools, principles, vocabulary. (Experience has taught me that most students were never taught, or never learned, or have forgotten these basics, and stumble when they need to use them.)

A, Measurements, mathematics, and statistics

- 1, Commensurability and trade-offs
 - The dollar, a way to reconcile otherwise dissonant values *Meanings of capital*
 - The interest (or discount) rate, for intertemporal trade-offs *CIF*
 - Dollar equivalents, imputed values, service flows, and measurement bias
 - Fungibility of dollars
 - Fungibility of capital each time it turns over
- 2, All economic values are of 3 kinds: point values, flow values, and rates *(+ accruals)*
 - Conversion rates between them: discounted cash flow (DCF), and $f = p i$
 - price/earnings (P/e) ratios (aka "capitalization") $P = \frac{1}{i}$
 - 2 kinds of point values: funds (aka stocks) and perpetuities
- 3, Elasticity (ϵ), a ratio of 2 fractional changes: ϵ of supply, and demand; ϵ of commodities, and factors of production; ϵ of production ($= MP/AP$) $\frac{P'/P}{x'/x} = \frac{P'/x'}{P/x} = \frac{MP}{AP}$
 - ϵ and mobility;
 - ϵ and taxable surplus
- 4, Rates as ratios. 2 kinds of "growth rates," absolute and fractional
- 5, Leverage: raising a fractional growth rate by subtracting a constant from the variable that grows
- 6, "Regression fallacy" in correlations, a common and mischievous error

B, Government and law

- 1, Sovereignty
- 2, Federalism, and division of powers
 - "Fiscal federalism" = intergovernmental transfers
- 3, Competition among sovereigns – it takes many forms
- 4, Tenure
- 5, Property

C, Entitlements and Distribution

- 1, Factors of production
- 2, Factoral income vs. personal income
- 3, Cash flow vs. income vs. rent
- 4, Dissipation of rent
- 5, Rentiers
- 6, Distribution:
 - Personal vs. factoral incomes
 - Wealth vs. income
 - Origins of wealth: earnings, findings, savings, and stealings, not necessarily in that order
 - Concentration and its measurements (cf. "regression fallacy," above)
 - "Redistributive" taxation – from what base?
 - Functional vs. non-functional incomes

D, Allocation, and social efficiency

- 1, Consumer sovereignty (but ask, "which consumers"?)
- 2, Highest and best use of factors – before and after taxes
- 3, Factor proportions – they vary extremely, unlike chemical valences. The 3 stages of production. Optimal factor mixes.

- 4, Factor substitution and trade-offs
- 5, "Public" (non-congestible) goods
- 6, Artificial scarcity, the essence of monopoly
- 7, Mobility and Arbitrage – equalizing marginal rates of return after taxes (MRORAT). Labor arbitrage: equalizing wage rates. Immobility of land.
- 8, The equimarginal principle of optimal allocation of a factor

Competing away vs. inputting away.

E, Some dynamics

- 1, The 4 different "Re-"s: Recovery, Replacement, Renewal, and Revival
- 2, Investing: net vs. gross, creative vs. acquisitive, active vs. passive, individual vs. aggregate
- 3, The "wealth effect"
- 4, Depreciation and appreciation
 - What factor does which? (Land as catalyst vs. capital as a reactant, incorporated in the product. The legal concept of "usufruct".)
 - Effects on income
- 5, Fungibility of recovered "capital consumption allowances" (CCA's). "Protean" nature of capital as it turns over.
- 6, Rent-seeking (racing).

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1-1, The Trouble with Textbooks

Conventionality

- groupthink - convention and orthodoxy; reflexive rejection of heresies, new data and ideas
- mutual copying and imitating
- peer pressure towards conformity, resulting in junk economics
- groupthinkers are like timekeepers who all set their watches by each others' watches, instead of watching the stars, or when the sun rises
- they are like real estate appraisers or stock valuers who determine the value of one parcel or stock by observing ``comparable sales'' of other parcels or stocks - when the comparable sales prices have been and are being legitimized by other appraisers also observing comparable sales rather than intrinsic worth
- retaining obsolete and discredited ideas (like theories of Robert Barro) because groupthink changes slowly
- suppression of individual inspiration
- rote teaching leads to rote learning. When the authors themselves are not creative they are not likely to inspire students to become creative. Rote learning leads persons and nations to stagnate.

Anti-scientific Outside Pressures

- political pressure from special interest groups; power of some state textbook commissions
- compromises and fudgewords to avoid offending anyone with political firepower
- legitimizing biased ideas that have been introduced through private think-tanks, and some scholarly journals dominated by a few major donors
- overt censorship of ``unscripted'' statements, analogous to cutting off Kanye West, blackballing The Dixie Chicks, blacklisting the Hollywood Ten, etc.
- playing politics by limiting economic insights to what leads to policies that are politically acceptable currently (with that attitude, mankind would still believe the world is flat, and the sun and universe revolve around it)

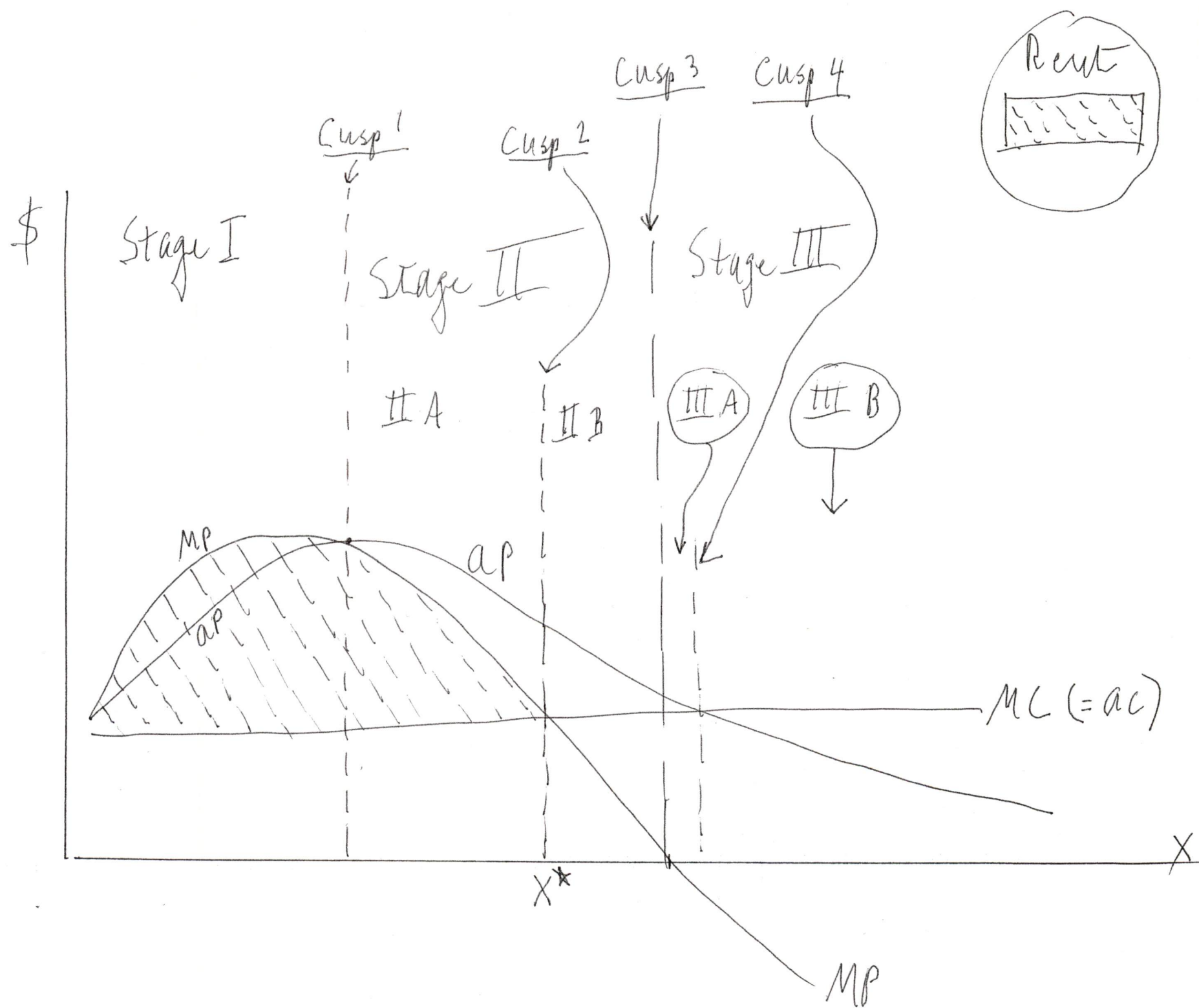
Commercial Strategies to Overprice

- semester coverage for a 10 week course
- padding to raise price; new editions that are not new
- writing and editing for the lowest common denominator, to maximize sales

- defensive coverage of more than anyone can learn
- dumbing down by company editors, progressive regression and homogenization, to tap the bottom tier of colleges. No textbook publisher ever went broke by underestimating the intelligence, wisdom, and judgment of his readers.
- making students buy canned review questions and gadgets to make it easier for professors, when they are just putting skin on baloney
- put in something to please everyone, to maximize sales, regardless of internal inconsistencies and contradictions

Catering to Professional Pretentiousness

- focus on technical gimmicks instead of real analysis and teaching
- the routines prepare you for dog shows -- to become an academic dog, as it were
- slinging around undefined terms, or tautologically defined terms (e.g. ``consumption is when consumers buy consumer goods'')
- catering to careerist students who worry about the ability to compete; they believe if they are not being taught the most complicated theory they are deprived
- narrowing students' intellectual interests to ``what is in the book''
- overcommitment to abstraction and formalism, regardless of usefulness or validity
- they encourage a belief that the facade, not the depth of knowledge is important
- obsessions with trivia: fiddling while Rome burns



5-8, Futility of B.C. export monopoly

While underpricing fosters wasteful consumption, it simultaneously cuts down production. The British Columbia Petroleum Corporation made considerable profit the first year it assumed a monopoly of marketing gas for export. Its notion is to collect rent by buying cheap in the field and selling dear at the border. The trouble is, of course, that a uniform low field price fails to distinguish low-cost from high-cost producers-it treats them all like low-cost producers and suppresses half the supply.

So in its second year the Corporation was forced to raise field prices to raise supply. Logically this would soon lead to a nonprofit marketing agency setting a market-clearing price. That is, it leads to the other extreme, the one the industry constantly promotes, of treating all like high-cost producers. The government cannot let that happen, however, and one hopes that the government will soon look for better ways to collect rent.

The lesson to learn is that rent arises because the earth is not uniform. Low-cost gas can sell for as much as high-cost gas, so low-cost gas yields rent. The only way to collect rent is at the source, by identifying the low-cost deposits and charging higher rents for them.

The kind of thinking that obstructs clear understanding of that simple, basic, and essential point is exemplified in the practice of equating "rent" and "windfall." Windfall results from unexpected luck like the rise of demand for our gas exports. It adds to rent, but it is not the whole of rent. Rent exists because land is finite, and some land is better than other land. People pay rent for better land because they can produce at less cost per unit of output. Such reasoning is simple and obvious, yet many people overlook it and do great damage as a result.

Two British Columbia mining companies have reported a net income equal to half their sales. " That is one indication of a low-cost, rent yielding mineral deposit. Many others report little or no net income at all. It is of considerable interest in a society threatened by overconcentration of wealth and economic power that the rent collecting firms average out much larger

than the marginal ones. Devices like general underpricing fail to distinguish the fat from the lean and fail to collect rent. At the same time they miss a splendid opportunity to strike at the core of concentration of wealth and market power.

EXCERPT BELOW IS FROM "Oil and Gas leasing on the OCS: a STUDY IN PSEUDO-SOCIALISM"

Distributive Socialism also means administering public lands pro-actively, affirmatively, to maximize revenue, in the manner of private landlords. Not to do so is to let private lessees keep and privatize the surpluses generated by resources in the public domain. The NDP in B.C. earned its Socialist stripes by raising rents on Crown lands owned by the Province ("The Crown Provincial," in Canadian terms). The Minister of Lands did this directly by renegotiating timber and other leases, on a site-specific basis. He could have huffed and bluffed less, and accomplished more, but he did seem to have the basic concept.

The NDP Administration tried to socialize the surpluses in gas extraction by joining Managerial and Distributive Socialism in the B.C. Gas export monopoly, a Crown Corporation. It was to levy a tax in the form of a monopoly profit on gas transmission and export. Here they stumbled by failing to recognize the differential, site-specific nature of rent. They made it too easy, thinking it was just a matter of buying low and selling high, across the board. They set a uniform field price. It was, naturally, too low not to stifle high-cost producers, and yet too high to tap most of the rent taken by low-cost producers. They failed to rifle in on the source of the surplus.

$$\text{Volume} = \text{Capital} \times \text{Turnover}$$

Picture a lake holding a constant amount or "fund" of water (K), with a steady flowthrough (F). Water here is "K" because water represents capital, as in an inventory. How long a period (P) does each unit of liquid spend in the lake? Currents and eddies will move some molecules through quicker than others. If the units were discrete and labeled we could still calculate a mean period. The general problem is that the units commingle and lose their identity: they are "fungible" (as opposed to merely "interchangeable"). This has boggled the minds of some influential writers, and passed on to boggle the minds of their students and other readers.¹

However, generations of physicists, as well as storekeepers and college registrars have long since observed that the mean period of the units in the fund is the fund/flow ratio:

$$P = K/F \quad (1)$$

where

P = Period of containment

K = Capital (the fund in storage)

F = Flowthrough per time unit

Why college registrars? If there are 4,000 students enrolled, and 1,000 graduate each year, the mean period is four years. See how simple? You already knew that.

Sales represents outflow from a fund of capital. With a constant fund it also represents inflow. In what follows, inflow is to come from more than one source, so for simplicity

¹The bane of economics is that many practitioners represent this or that lobby, or privileged group, whose aim is not to empower you with truth, but divert and weary you by leading you into labyrinths of fruitless speculation. They get too much cooperation in this from some economists who make a mystery of the subject, like ancient high priests, to aggrandize and shelter themselves.

Influential leaders of "The Chicago School" (Frank Knight, George Stigler) have devoted themselves to obscuring the distinction between capital, which has a finite life, and land, which has infinite life. To this end they have made a mystery out of capital replacement and turnover, sowing confusion.

we take outflow to represent inflow as well, and each equals flowthrough.

If the grocer's milk inventory equals sales per day, then $K/F = 1$ day. The oriental rug merchant may carry an inventory of 10 times his sales/month, giving a period of 10 months; and so on. We do not dwell on, but merely remind you of what is a standard concept in business. Many readers will find such a reminder useful, bearing in mind Samuel Johnson's saying that "men more frequently require to be reminded than informed." New ideas follow as well.²

The reciprocal of the period, P , is turnover, T . The period of investment is most often expressed that way in business: "volume equals capital times turnover." This is the easiest form of the equation to remember. Thus, the oriental rug merchant's volume/month is $1/10$ of his inventory. The grocer's milk volume/day equals his inventory. The college's yearly volume of graduates is $1/4$ of its inventory of students.³

Note well that the volume of business one does with a given capital rises directly with turnover. Employing workers and

²Returning to lakes, the mean period of water in Wisconsin lakes is about five years, ranging from 2 to 9. In California reservoirs used for seasonal storage, the period is a lot shorter: they fill up in April and empty by September. That is busy water storage, but your toilet tank is busier yet - 'nuff said about that, but think about it next time you flush 7 gallons down the drain. Reservoirs that are big relative to streamflow, like Lakes Mead and Powell on the Colorado, have much longer periods and are used for "cyclical" storage from wet cycles to dry ones. Sewage in Riverside's Acorn Street Treatment Plant takes 28 days in process: think how much more land would be needed if it took 112 days instead, and how much less if it took 7 days. Money in a typical student's bank balance? You know more about that than I; I would guess about 10 days. For some more common periods of investment, see the paper, "Some Economic Life Cycles."

³Interestingly, one of the earlier uses of "turnover" in the economics literature is in Karl Marx, Capital, Vol. III, Chap. VIII. We also find there that Marx used Adam Smith's concept and very wording about the turnover of capital "setting labor in motion." Methodologically, Marx tracked classical political economists in many ways, for better or worse: in this case it was for better.

producing goods are closely related to volume. Thus, a given capital can do a lot or a little depending on its turnover. Your business is not limited only by its capital, but by capital times turnover. The national volume, or GNP, is likewise not limited by its capital, but by capital times turnover. Individuals, businesses, and the whole economy can adapt to any amount of capital by adjusting the turnover.

Measures of Inequality, and comparisons of inequality of different distributions

Note: this is almost the same as the sheet distributed in Ec 132 class on Monday Dec 1 2008. I have typed in the items inked in originally, and in the process expanded the thoughts slightly, to explain them better.

1. "Bell" curves (aka Frequency Distribution Curves) skewed to the right
 - a. Skew means asymmetry
 - b. Symmetrical bell curves are called "normal"
 - c. This "normality" is found in biology, not in economics
 - d. Biological differences among humans are very slight, compared to economic differences
 - e. Recent writers who ignore this are Herrnstein and Murray, *The Bell Curve*. There is always a market for this point of view, which led in the extreme to the "eugenics" movement, 1900-41. Professor Greg Clark, U.C. Davis, leans this way in his recent *A Farewell to Alms*.
 - f. In biology, acquired characteristics are not inherited, so each generation starts fresh
 - g. In economics, one important acquired characteristic, wealth, is inherited, so it piles up over generations. So, to a lesser extent, are culture and the work and saving ethic. "memes"
 - h. A measure of skew is the mean/median ratio
 - i. Mean and median are both to the right of the mode
 - j. Skew is so extreme that economists prefer other measures of unequal distribution (e.g. of income, wealth, land, consumption, etc.)
2. In a "Pen Parade" we first rank all units (persons, families, adults, for example) by, say, income per unit. Graph the units on the abscissa; their incomes on the ordinate
 - a. Divide them into groups of 10% each. Each group is a "decile", starting from the poorest
 - b. Divide their wealth into percentages of the total, starting from the poorest in the lower left hand corner
 - c. Mark a point over the first decile of units showing its % of the income
 - d. Draw a vertical from the axis up to the point. Each such line is a marcher in the Pen Parade, with the tallest marcher to the right
 - e. The tallest marcher tells you that the top 10% have, say, 50% of the income. This is a measure of inequality (aka "concentration")
 - f. The mean of all lines is 10% of the income, so the top 10% of the units have 5 times as much income per unit as the mean groups, and more than 5 times as much as the mean of the lower 90%
3. In a Lorenz Curve, we pile the vertical lines on top of each other, starting from the left, so when we get to the top decile it hits the upper right hand corner, showing that 100% of the units have 100% of the wealth.
 - a. The first point is the same as in the Pen Parade
 - b. The second point shows that the lowest 20% have, say, 3% of the income, and so on
 - c. Join the points in a curve. This is the Lorenz Curve.

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 - d. The Gini Ratio (or G.R.) for income in the U.S.A. is about .35 to .40
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 - f. Here is the correct procedure. First, draw an "envelope" around the scatter. You now have an egg shape
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6. Check definitions and measurements of the units: it makes a big difference! Thus, most income measures focus on cash income, omitting imputed income, and unrealized or deferred capital

gains. Most are taken from I.R.S. data, so people with clever tax shelters show up in the lowest income bracketed, but consume a lot anyway. (For mnemonic purposes, I call them ZAGI-persons, where ZAGI means Zero Adjusted Gross Income.)

7. There are several other measures of dispersion, in any statistics book. Any one will do.
8. Another way of avoiding regression fallacy is to use "instrumental variables". These are variables other than the ones you are comparing. Geographical units are handy. Thus you can rank all the cities of the U.S. by income per capita, and on the ordinate plot wealth per capita. The higher income cities have more wealth per capita, and more wealth/income. (San Francisco, Belvedere, Rancho Santa Fe, La Jolla, etc., are near the top. Parlier, Duroville, and many towns in the lower Rio Grande Valley are near the bottom.)

6-3-b, "L-Shaped Curve" of health as function of wealth (or income, actually)

Henwood, Doug, 2000. "Health and Wealth." The Nation, 10 July, p.10

A scatter graph of "Income and life expectancy" by nations, 1997-98, from World Bank, World Dev. Indicators database.

P.c. income on abscissa; "life expectancy at birth" on ordinate. They are positively related, i.e. slope upward to the right. The dots form a strikingly definite L-shaped curve (very high correlation or clustering around trend line), with the L lying on its side, long-side on top forming a roof; short side forming a wall to the left.

The angle in the L is at about \$3500 annual income, and 70 years life. Above this, higher income has little effect on life exp; below that, effect is overpowering, down to 37 years in Sierra Leone.

INTERPERSONAL COMPARISONS, anyone? Life expectancy is basic, and hard to argue with.

Sierra Leone has lowest pc income, ca. \$1500, and lowest life exp., 37 years. Top nations have income of \$25,000-\$34,000, life of 75 years.

So you could transfer income from e.g. Japan, Canada, U.S. or Luxembourg to Sierra Leone, and gain years of life in Sierra Leone without losing much or any in Japan, etc.

[Now, graph l.v. p.c. horizontally, and output vertically. Output is also an objective measure - no problem of interpersonal comparisons. When lvpc is low, positive relationship is strong; then hit the angle, and it is weak.

Students and readers should be able to see this, w/o their having to learn about marginal products.]

Henwood also relates death rate to measures of inequality, independent of level of ave. income. No one knows for sure, but may be related to stresses, social and psych., that rise with level of inequality.

Data on death rates BY STATE, from Health, U.S., 1999, EPI and CBPP. May be available on <www.cbpp.org/1-18-00sfp.htm>.

Utah has least inequality: btm 40% get 18% of income and d.r. is 407/100,000 (that must indicate emigration - .4% could not occur in a stable population, unless they live over 200 years each!). Anyway, cf. that with neighboring NM!

(Note from another source. Robbins' studies of longevity found the longest-lived people in the Hunza region of central Asia (site of the fictional Shangri-la); Abkhazia (the northwest province of Georgia, in the Caucasus); a remote valley in Ecuador; and one or two other such enclaves. These are not marked by high average incomes, in our western sense, but steep hills the people climb on foot, stable communities with strong mutually supportive social structures, and very equal distributions of wealth and income. So average income is not the only relevant variable.)

8-A

~~#42~~ Undefined words and phrases in common use and misuse. Includes terms of art designed to confuse and manipulate readers, rather than to clarify reality

A \$25 billion business (Assets? Gross revenues? Net revenues? Most reporters pick the highest number)
A rough patch

Amplitude (the extremity of a cycle, by some metric, from peak to trough; cf. period)

Analysts predict (What analysts? Who pays them? What is their "reference group"?)

Appropriate (as in suitable or fitting); inappropriate (by what or whose standard?)

Bolster confidence (Confidence in what?) *It can help or hurt*

Breaching market discipline

Bubble, bubble-prone, index of bubbleness

Buoyant markets

Business¹

Business (What business?)

Business, The business community, Small business

Capital gain

Capitalism

Capitalization

Chaos

Coase Theorem

Collapse

Communist, -ism

Computer-generated (Oh, well, we can't argue with that; cf. GIGO))

Concern (as in a business organization) (cf. "firm")

Confiscatory

Conservative

Consume, consumption, the consumer

Consumptive use (vs. preempting a time-slot, or dissipating potential energy)

Cooling

Coursing through the global economy

Credit crunch

Crippling financial freeze-up

Damp (to lower the amplitude of a cycle); cf. dampen; cf. period

Dampen (to damp, mistaken usage)

Demand-sider

Depreciation, tax depreciation, multiple depreciation

Deteriorating jobs market (as seen by employer or employee?)

Downturn

Earn, earnings (applied to property income, may deceptively include Unearned income)

Economic activity (How measured?)

Economic brakes; rescue measures (depends on your macro framework, usually unrevealed)

Economy has turned down

Efficiency (output divided by what? – labor, land, capital, all factors?)

Expand (spatially, numerically, or what?)

¹What kind of business? Big, small; productive, predatory; upstream, downstream; new, old; etc. Some businesses are busy producing value; others give us the business.

Expensing (cf. tax-depreciation)
Fascist, socialist, etc. (such labeling is often just name-calling, unless carefully specified)
Favorable balance of trade (Does this mean an export balance or an import balance?)
Financial constriction (this can mean banks are calling in loans and not renewing them, which is clear)
Firm (n)
Firm footing (in whose opinion? Needs specifying.)
Fiscal stimulus (where is the money to come from?)
Flat tax
Fleeing investors are bringing about a watershed (mixed metaphors usually betray a hurried journalist)
Fragile economy
Freedom
Fund values (aka stock values)
GIGO (Garbage-in, garbage-out, said of computer programs using bad data)
Glittering Generality (look out for them – they usually lack specifics)
Graduated tax (tax whose rate rises as the base rises)
Government intervention (this presumes a preexisting market economy untouched by government)
Growth (of what?)
Havoc
Headwinds, tailwinds
Healthy economy
Heat up, cool off
Heroic measures (heroism is bad?)
If our economy expands while Europe flounders ... (journalistic license)
Incentive (to do what? Some incentives are destructive, like racing for privileges.)
Income
Index points (what index?)
Invest, investment (to create new capital, or buy up old?)
Investment (noun, a point value, or verb, a flow value?)
Jump start ; kick start (journalistic phrases aimed at motorists, but do the analogies fit?)
Keynesian (Keynes was complex, and fickle, too, so this could mean several things)
Knock the \$ off its perch
Labor shortage (in your dreams, new college grads! This term is from employers' viewpoint.)
Laffer Curve (it curves, all right, but the wrong way)
Liberal (domestically it means interventionist; overseas it means the opposite)
Liberty
Life, economic (term of years between birth and retirement of a discrete capital good)
Market correction
Meltdown
Meltdown threatens to slingshot us into a recession (mixed metaphor covering ignorance)
Middle class
Momentum
National defense (euphemism for world hegemony)
New Dealer (there were three or more "New Deals")
Official (routinely said of the NBER, which is anything but)
Overdevelopment
Overfull employment (as seen by employers)
Overheated economy
Paper gains and losses (a term used to trivialize and conceal unrecognized capital gains and losses)

Period (the term of a cycle, from peak to peak or trough to trough; cf. amplitude)
 Period of investment (term of years between investing and recovering a unit of capital)
 Period of production (an oversimplified approach to period of investment. Cf. Economic Life)
 Phillips Curve
 Populist
 Portfolio
 Poverty
 Problem, as in "the housing problem" (low prices are a problem for sellers but a solution for buyers)
 Productivity (Output/worker?; marginal, average, or total? Output/acre? Or what?)
 Progressive (the Progressive Movement was a wide tent with several sideshows)
 Progressive tax (w.r.t. what? Cf. graduated tax)
 Property
 Prosperity
 Pump-priming (cf. jump start)
 Rate
 Rate of growth
 Recession, Recovery, Depression
 Respected (by whom? For what?)
 Responsible
 Rich (should not be used for flow values, but only point values)
 Sanctity of contract
 Savings; saving rate
 Scientific
 Slump
 Spending is vital
 Spiral (vicious, benign)
 Stabilize the market (what market? At what level?)
 Stall speed
 Straitjacket for the economy
 Strong economy
 Supply-sider
 Tamp down the market
 Tax burden
 The American Dream
 The consumer ran out of gas
 The economy
 The economy (How measured? How related to human welfare?)
 The economy revs up
 The economy shrinks
 The economy's vital signs
 The odds of a recession
 The purpose of this paper is to gain greater understanding of ...
 The situation
 The situation deteriorated²
 Tighten their belts

² for a while, stabilized, then went into a downward spiral when the economy cooled off.

Underconsumption

Underdevelopment

Unrealized gains (cf. unrecognized gains)

Vicious downward spiral

Wall Street is on edge

Wealth

Wealthy

When things get rough

Working class

12-4A
8
Measures of Inequality, and comparisons of inequality of different distributions

Note: this is almost the same as the sheet distributed in Ec 132 class on Monday Dec 1 2008. I have typed in the items inked in originally, and in the process expanded the thoughts slightly, to explain them better.

1. "Bell" curves (aka Frequency Distribution Curves) skewed to the right
 - a. Skew means asymmetry
 - b. Symmetrical bell curves are called "normal"
 - c. This "normality" is found in biology, not in economics
 - d. Biological differences among humans are very slight, compared to economic differences
 - e. Recent writers who ignore this are Herrnstein and Murray, *The Bell Curve*. There is always a market for this point of view, which led in the extreme to the "eugenics" movement, 1900-41. Professor Greg Clark, U.C. Davis, leans this way in his recent *A Farewell to Alms*.
 - f. In biology, acquired characteristics are not inherited, so each generation starts fresh
 - g. In economics, one important acquired characteristic, wealth, is inherited, so it piles up over generations. So, to a lesser extent, are culture and the work and saving ethic.
 - h. A measure of skew is the mean/median ratio
 - i. Mean and median are both to the right of the mode
 - j. Skew is so extreme that economists prefer other measures of unequal distribution (e.g. of income, wealth, land, consumption, etc.)
2. In a "Pen Parade" we first rank all units (persons, families, adults, for example) by, say, income per unit. Graph the units on the abscissa; their incomes on the ordinate
 - a. Divide them into groups of 10% each. Each group is a "decile", starting from the poorest
 - b. Divide their wealth into percentages of the total, starting from the poorest in the lower left hand corner
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$i(S+L)$ is the marginal cost of time -- the foregone gain of tying up the Stumpage and the Land for another year. Each of these has an opportunity cost. The Stumpage could be liquidated for cash and reinvested. The Land could be sold to another investor and the cash reinvested. From a social viewpoint the land could not be liquidated, but it still has an opportunity cost: it could be cleared and put to use growing the next crop. Its annual rent would be $\underline{a}$, and $a=Si$.

F. Key proposals made

1. Raise tax on social security income for retired couples earning over 32,000/year. Now, 50% of soc. security is included in taxable income, as of last year. He would raise it to 85% inclusion.

That is triple taxation. Workers were originally taxed on income they never received, were told it was not a tax but a contribution for their old age. Now they are to be taxed again when they get the money back. Pretty raw.

Bad demonstration effect on current payors. They will now see clearly it is a tax.

Bad effect on incentives of elderly who want to continue working. A steep rise in taxes when you breach the trigger value.

"Lead ... or Leave," a political youth group, is behind this. They have their eye on the wrong ball.

To help youth, and other upwardly mobile people, need to tax wealth, not the already twiced-taxed social security payments.

2. Energy tax, BTU basis. Not thought through.

✓ 3. Mild return toward progressive rate structure.

✓ 4. Higher earned income credit at bottom.

5. Cut several porkbarrel programs.

✓ 6. Cut deficit. Pull the loans not made to govt. into private sector. Activate them by raising RRAT, and lowering i.r. (obviously he refers to long term rate).

✓ 7. "Targeting." He used it a lot. Presages dirigisme. Stiglitz likes it.

8. ITC, targeted on small business.

✓ 9. Lowering i.r., long-term.

Background. Long-term rates are now below levels of last 20 years, but are high cf. to s.r. rates.

This is more nominal than real: long-term rates reflect long-term inflationary expectations. With a huge nat. debt, many expect inflation.

✓ 10. Small business access to technology, credit. Community Development Banks. Enterprise Zones. P.w. Environmental cleanup (but Superfund is being cut).

✓ 11. Negotiated trade agreements, not unilateral free trade. Harder-nosed bargaining -- Laura Tyson.

12. Target growth industries, aid them: Japanese model.

- ✓ 13. Public health
- ✓ 14. College loans, repaid by community service.

G. More details, from news, after speech

1. Lower FTC for oil. (Typically, Clinton does not move 100% on a thing, but shaves off part of it.)
2. ITC to be at 7% for 2 years,
 - a. For all firms, only for "increased equipment purchases." How defined?
 - b. For small firms, sales < \$5m, ITC for every piece of equipment they buy. 7% for 2 years; then 5% permanently.
3. Cap gains 28% max remains fixed, in general.

50% exclusion is renewed for one buying a new issue of stock, holds for 5 years. This is supposed to help new firms in high-risk technology fields. Maybe it will, but any other new firm would seem to qualify, e.g. a new shell corp. to hold lands.
4. May restore passive losses on r.e.
- 5.

Clinton's Program as it Evolves

1. 31 March 93, TPE A3. Clinton backs away from raising fees on use of public domain. Pressure from Western Senators.

Furious are: George Miller;
Michael Francis, Director, Nat. Forest Program, The
Wilderness Society.

Leon Panetta, OMB

Bruce Babbitt, Sec of Int.

2. 10 Apr 93, TPE, A8. ITC has little support. Moynihan and Rostenkowski both oppose it. NAM opposes it: Jasinowski is now President of NAM! He says "it will simply shift investment from the future forward."

3.

Clinton Tax Proposals, 2/93
As Viewed after he spoke to Congress, 17 Feb

*Means change from the before notes

A. Items conspicuously omitted.

1. Payroll tax relief.

He did speak of "honoring work," but only w.r.t. a crumb thrown to lowest income tax bracket where he would raise earned income credit a little. *Morgan head of Sen. Finance Comm.*

He said a jobless recovery is no recovery worth having. But that led to ITC, with no regard to substituting capital for labor. George Will (of all people) jumped on that.

*2. "Stimulus." Instead, he spoke of crowding-out. Commentators are wedded, still, to saying "stimulus" w.r.t. any spending program. They didn't get it.

3. Homeowners' deductions and exemptions. E.g., equity withdrawal

4. Angel of death provision. High revenue potential.

5. Death duties. (Nearest thing we have to a national wealth tax. Taking a small % of national wealth would pay off the national debt.)

6. Intergenerational equity. He proposed only taxing social security, ^{thru} is double taxation. It would be more progressive to tax gains at death, estates, and property.

If granny-bashing is in, bash the rich grannies.

7. Significant restoration of corporate income tax. Proposed rise from 34% to 36% is a token.

10. How to cut soaring medical costs. This is a touchy one, because it involves challenging the overriding goal of prolonging life at all costs. The Governor of Colorado tried it once, and suffered for it.

On this, we are "waiting for Hillary." May she prove to be a genius. *(Will this be like Maloney turning over Crows. Party to Kim Campbell?)*

11. Distinguishing earned and unearned income.

12. Plugging loopholes that serve no useful incentive effect.

Examples:

repeated write-off of old buildings.
depreciation of land
preferential treatment of gains from land value

increments

13. Imposing a surtax, earmarking proceeds for reducing debt.

14. The S&L bailout, bank bailout, etc. How to stop the bleeding. Recouping from beneficiaries.

B. Background

Ship { 1. Tax rates on high incomes are historically low. From 1941-81 they were much higher, both corporate income and personal income. In addition, rate structures were much more progressive. During those high-tax years, jobs grew, real wage rates grew. It has not been demonstrated that lower tax rates, following 1981, have made jobs or raised wage rates. Neither has it been demonstrated that abandoning the previous progressive rate structure has stimulated productive incentives. The major forms of enterprise apparently stimulated were Mergers and Acquisitions, and land speculation.

2. 1981, "Revolt of the Haves," presaged by Prop. 13, 1978. It was also a revolt of the aged, a generation war.

a) It breached the social compact, relieved property of its traditional obligations.

b) It triggered off a bubble economy. Benefits were captured in soaring land and stock prices. Speculation and "frenzied finance" led to overpricing of land, followed by the present reaction and banking debacle.

3. The payroll tax is historically high. It has replaced the corporate income tax as #2 source of Fed. revenue.

The two income taxes were originally seen as taxes almost entirely on unearned income. Now they are mainly taxes on true earnings as opposed to takings.

4. Peace Dividend should make it possible to pay off national debt. Instead, the Federal Government declared a new Gilded Age (the original was 1868-73, except in former Confederate states), a "grand barbecue," cutting melons for the wealthiest among us. We went from "tax and spend" to "borrow and spend." Spending per se took few hits.

It is described by Kevin Phillips as a "capitalist blowout." However, it is not clear that capitalists proper - i.e. the owners of real capital - are the major beneficiaries, for the yield on new investing is not very high. Rather, it is the owners of old assets like land and common stocks who have gained by rising values.

5. Gasoline taxes are historically low, because they are per gallon rather than ad valorem.

6. Clinton promised not to raise taxes, except on "the rich." Now he is reneging. It is not unusual or unexpected for

candidates to promise more than they can deliver, and Clinton hedged his promises carefully. So the embarrassment, while real, is probably not fatal.

Depends on how extreme he gets. Raising taxes on everyone with \$30,000 or more income is too extreme. Makes it seem that candidate Clinton conned the voters.

(Bush's "read my lips" pledge had been much more firm and absolute, so reneging did get him into trouble, especially because he reneged not so much to gain revenue as to win a tax break on capital gains. Also, he depended on a different constituency, more vehemently anti-tax.)

C. Fudge words and concepts.

Failing to hit the nail on the head, these fudge words confuse issues.

1. "Stimulus." Actually, it is not clear that Federal borrowing and spending is a net "stimulus," if it just causes money to be spent one way instead of another.

In the short run, to the extent that taxes depress activity, anything that lowers taxes is a stimulus. However, as interest on the debt forces higher taxes, that quickly loses its conviction.

Anyway, that is not what those who say "stimulus" mostly have in mind. Rather, they are thinking in traditional Keynesian demand-side terms, where spending drives real activity. This thinking lost favor during the 1965-81 years of rapid, occasionally double-digit inflation, and therefore is approached only gingerly and indirectly today.

Therefore, the economics profession has no consensus on the relevant macro model. My own opinion is that borrowing tends to abort domestic private capital formation, and should be avoided. Our public debts, at all levels, are dangerously close to "treadmill" levels, where we borrow to pay interest on old debt.

2. "The Middle Class." This term means almost whatever any speaker wants.

3. Describing the personal income tax as a tax on "the rich," or "the wealthy." Wealth is not income; income is not wealth.

a) Wealth is a fund; income is a flow. Income and wealth are positively related, but far from identical. Their differences are important for tax policy.

b) Income derives from human effort, not just the yields from stocks. The human effort devoted by many physicians, for example, is very high; burnout and early retirement are common. To achieve the desired economy in Medicare, etc., we need to get

physicians to work for less. Taxing their effort will not foster that end.

c) Wealth accumulates over time

i) Over the life cycle, so older people are higher on wealth, younger people on wage and salary and entrepreneurial income

ii) Over generations, so people begin life with unequal endowments, and wealth is much more concentrated than income.

Exemplifying the point, the income/wealth ratio of blacks is much higher than the mean. That is not because of high income, but very low wealth.

d) Much wealth is consumer capital and land, yielding no taxed or measured income - indeed, used as a tax shelter.

4. Metaphors:

"Jump-start the economy" (This has replaced "pump-priming.")

"Overheating the economy"

"Earnings" used as synonym for income from whatever source.

E.g., proposed surtax on those "earning" > \$1m/year. Some incomes are "takings," without earning, e.g. rise in home prices.

D. An Energy Tax

1. We had one before, briefly, under Carter. He called it a Windfall Profits Tax (WPT), in response to the jump in energy prices. It was more of an excise tax, however, than a true profits tax.

As the name indicates, he advanced it on grounds of equity - striking back at unjust enrichment - more than on grounds of efficiency. This is in contrast to today's tendency to describe it as regressive.

2. It fills a vacuum. It offsets a number of subsidies, enumerated below. It would make more sense to withdraw the subsidies. The energy tax is quicker, but desubsidizing is a better long-run goal.

Energy production and consumption are subsidized in many ways. (For more, see NTA paper on interjurisdictional competition for tax revenues.)

Subsidies to energy production

a) Preferential income tax treatment of energy exploration and production.

b) Major avoidance of property tax by lands bearing hydrocarbons.

c) Exemption of nuclear plants from public liability.

d) Utilities allowed to go into energy exploration and production, and meld high costs into rate bases.

- e) Massive, premature sales of Federal OCS tracts, upon nomination by industry. Likewise, coal in Powder River Basin.
- f) Preferential freight rates on bulky raw materials like coal. "Value of service" rather than "cost of service" rule of rate-making.
- g) The nation pays for military umbrella over producing regions.

Subsidies to energy consumption

- a) City streets, county roads, paid for by others than drivers.
- b) Field price controls on oil and gas (until lifted)
- c) Two-price system, old and new gas. Consumer price held down by price controls on old gas, thus inflating demand. New gas allowed much higher field price, thus stimulating supply. Cost of new gas not passed through to consumers, but melded with cheap old gas.
- d) Failure to charge for pollution.
- e) Subsidized highway construction, operation, and maintenance.

Highway Trust Fund, gas tax money earmarked for building new highways, for years. Other funds pay for repairing, replacing old highways. Bias toward extending the system, responding to land speculators in areas like old Rancho California (Temecula).

Policing the streets and highways, a major cost, paid from other sources.

- f) Insurance cost is only weakly related to miles driven.
3. It should have more of the character of an effluent charge. However, in almost any form, it will combat pollution.
 4. It should work toward conservation. To this end, it should be near the source, or upstream in the flow of production. Taxing energy downstream is a tax on refining, improving the product, storing it, converting it to more usable forms (electricity, gas under pressure), moving it to consumers, and other human work.

5. An exception to the above is a gasoline tax levied as a surrogate for highway use pricing, to alleviate congestion, and/or to finance mandatory insurance.

6. Energy taxes are probably not regressive. Almost any tax may be made to appear regressive by looking at it as a share of income of the lowest group of income receivers. That, however, is because this lowest "group" - which is different each year - consumes much more than its income. It is a technical statistical phenomenon, widely misinterpreted.

Regressivity is also shown by wrongly assuming the energy tax is all shifted to consumers.

Another error is to omit all but a few ways in which energy is consumed.

*7. BTU basis of energy tax seems arbitrary. It is certainly new, uncharted territory. It calls for new data and analysis. Nature of the tax is in the details, yet to be worked out.

\$1 worth of coal has more BTU than \$1 worth of gasoline, seems to be the idea. Gasoline is the more convenient fuel. Thus, the less convenient fuel pays more. Lignite and Peat fuel, if included, would pay even more per dollar; oil shale and tar sands, too. The dream of developing these sources would end.

Wood fuel, if taxed, would pay the most. It is commonly used in the northwest: hog fuel in lumber mills, sawdust to heat homes, etc.

Such fuels are more labor-intensive. It takes labor to overcome the inconvenience. Thus, maple syrup, for example, is the most energy-intensive product there is, in BTU per \$ of value. A BTU tax, applied consistently, would wipe out this industry.

How about hydro? Not clear how or whether that would be taxed. Some new kind of cross-measure, or rate of exchange, would have to be developed.

How about uranium? I surmise that \$1 worth of uranium has more BTU than other fuels.

How about imports?

A BTU tax has no locational element. Thus, oil from The Beaufort Sea, worth little at the source, would pay as much as oil from the Wilmington Basin.

Likewise, it has no cost of production deduction. Deepwell oil pays same as easy oil. Sweet pays same as sour.

8. Thus, a BTU tax will wipe out a lot of marginal production. That means it will be shifted forward to consumers: supply and demand. A tax based on value would spare marginal production, because it has no net value.

Another way to avoid forward shifting is to suppress demand, instead of supply.

9. Air travel is energy-using. Aluminum + jet fuel.

E. Miscellaneous

1. "There aren't enough rich people around to pay much."

It's not the number of people, it's how rich they are.

There are some 5.3% of families making over \$100,000/year (reported). But they make 27% of taxable income.

2.

A friend of mine named Carter tried a short-cut to (21,B) which sounds reasonable, but lost him a lot of money -- and he never even knew it! He reasoned that the YTM is the sum of a/P + appreciation, so why not just figure each one separately and add them together? Here is what Carter figured:

$$i = a/P + [D/P]^{1/n} - 1 \quad (25)$$

Carter's Cut just adds together Equations (2) and (1,C). It works out pretty well if D/P is close to one. Otherwise it leads you gently towards poverty.

It led Carter to invest heavily in "deep-discount" bonds -- bonds with $P \ll D$. He would compare his figures from (25) with those published in the Wall Street Journal, which uses (21,A), and notice that his figures were higher than theirs. He thought they were understating the true YTM, and he had figured out how to beat the market. He died (may he rest in peace) thinking he did it, but he'd have lived easier if he had invested wiser.

I'll say this for my friend, he had self-confidence: never occurred to him maybe they were right, and he was wrong. I couldn't talk him out of it. But in fact, (25) is wrong. It overstates the true yield on discount bonds. The reason, in words, is that it credits the bond with a current yield of a/P for every one of n years. But in fact P rises every year, to reach its terminal level of D . So:

the current yield on a discounted bond is less than a/P in every year after the first; and,

the current yield on a premium bond is more than a/P in every year after the first.

If the last three sentences above make your head swim, that is why mankind invented math, to put such ideas in systematic and irrefutable form, and that is why these notes contain so many equations. They are a lot better than working it out in your head every time.

To satisfy yourself, make a little table with one value for n , and a wide range of values of D/P . In column 1 put YTM according to (21,B); in column 2, YTM according to Carter. You'll see the difference.

Then go back to the equations and try to understand what is happening. If you really want to understand what finance is all about -- really understand, down deep inside -- you want to keep rolling it over in your mind like that, until something comes together inside your own head, in your own way, that makes sense to you.¹

¹Most people never have time for that, or never think they have. So they follow trends and authorities and spend their lives as wage-slaves. But if you can make that time, and break through the mental blocks that hold most people down, who knows, maybe you will figure out how to beat the market. Better yet, you may contribute something to the improvement of human understanding,

Getting back to Carter, and repeating, (25) overstates the YTM on discounted bonds; and understates the YTM on bonds selling "at a premium," i.e. with $P > D$. So it leads you away from good deals with premium bonds, and into bad deals with discount bonds (aka junk bonds). Mike Milken made a bundle, (and got a jail term), selling to people with Carter's mindset.

It might seem that no real macro-economic issues hang on what kinds of bonds people buy, but they do. Because the kinds of real investing borrowers do depends a lot on what kinds of bonds they can sell. If a lot of bond buyers make Carter's mistake it would lead borrowers to finance more things that yield deferred cash, as opposed to fast cash. That slows down the turnover of real capital.

Turning from bonds to direct investments, a lot of direct investments resemble redeemable bonds in this way: they show a mediocre current yield, followed by a "pot of gold at the end of the rainbow," a hoped-for resale to some rich investor after a few years. There is a strong tendency to overvalue that future pot of gold, especially when the herd psychology is running that way, and a lot of bad investments occur as a result. Carter's mistake is just one example of a large genus.

Investments that are bad for the investor are also bad for society, especially if the capital gets frozen or destroyed. As Churchill said, "Capitalism is not a social evil because investors make profits, but because they fail to." So this is both a selfish concern and a public one, too.

Tax policy is biased in favor of discount bonds anyway. The "capital gain" on bonds, and many real investments, is partly exempt from income tax. Presidential Candidates Bush (R), Clinton (D) and Tsongas (D) (March, 1982) all want to exempt even more of it, back to the way it was before the reform of 1986. Capital gains are the source of most campaign contributions, so some politicians sacrifice many other issues to show favor to capital gains.

In Bush's case, he deemed it so important that in 1990 he broke his magic "read my lips, no new taxes" pledge in order to secure another break for capital gains. (This was a deal with Democrats in the House: Bush accepted a tax increase in order to get a break for capital gains.) Can you believe that anything as theatrical as who wins the next election hangs on something else as dull and abstract as Eqn. 25? Believe it! You'll read and hear volumes on this subject between now and November.

the bottom races far ahead and the ratio falls swiftly.

The trouble with these elasticities (and the log derivatives, too) is that they are true only at one point. If the changes are large, e.g. if you double n from 15 to 30, these point elasticities understate the response. They are accurate for small changes, however; and always useful to put you in the right ballpark.

7. Land and Capital together.

Notation:

K is capital (from the German Kapital). It has a finite life, either through consumption of the corpus, or through gradual depreciation and obsolescence.

G is land (from Ground. L usually stands for labor, so is not used for land. You often see S , for Site, Soil, or the Spanish Suelo; T , from the French Terre, Spanish Tierra, and Latin Terra; B , from the German Boden; E , for Earth; etc.). Land has infinite life, except for exhaustible resources, which are not treated here (but you can try my book, Extractive Resources and Taxation, 1967).

Both K and G are measured in value terms. Subscripts refer to dates. Lacking a subscript, time zero is meant.

What we have previously called P , for Present Value, is now divided into two parts, K and G .

A. PIPO cases, with G constant.

G is assumed constant over time in order to develop the basic math in simplest form. Having done so, you can have fun playing with various scenarios about rising and falling G .

PIPO cases generally deal with growing capital like a tree, or livestock, which yields its value at one point of future time. " F " is used to denote that Future Value, just as in (1,A). But remember that P is now gone, replaced by its two components, G and K .

1. Compounding

$$F + G = [K + G]I^n \quad (21,A)$$

You put in G at the beginning of the cycle, and take it out at the end. It is a kind of "dead weight", but it changes the necessary relationships among F, K, I, and n.

2. Discounting

$$K + G = [F + G]I^{-n} \quad (21,B)$$

Solving for K, if G is given:

$$K = FI^{-n} - G[1 - I^{-n}] \quad (21,B)$$

3. Rate of Return

$$i = \left[\frac{F + G}{K + G} \right]^{1/n} - 1 \quad (21,C)$$

(21,C) shows how the presence of the deadweight cost of G acts to reduce i, the ROR. The higher the value of G, the closer the ratio in [] approaches one.

If you want to get a quick fix on how rising G affects the ROR, (21,C) is the place to start. If G_n (which is the G on top) is expected to rise above G on the bottom, that offsets part of the deadweight effect and pushes up ROR toward what it would be if G were zero. If G_n/G gets up as high as F/K , then the rise of G completely offsets the deadweight effect, and ROR is the same as if G were zero.

Now watch carefully. If G_n/G gets greater than F/K , that would seem to raise the ROR. But it will never happen. Why? Because then investors would just buy more G, rather than put any K on what they have, and sit back and maximize their ROR without using the land at all. They would become pure land speculators, since the ROR on just holding land is higher than on using land.

That in turn will push up G until the ROR on holding land falls. This gets tricky, however, because: a) A rise of G may generate expectations of equal or greater rises of G_n ; b) A higher value for G will lower the ROR on using land, as in (21,C), which tends to turn investors back towards pure land speculation again. We cannot begin to unravel all the possible scenarios here, but we will look at some history of speculative bubbles which gives us an idea of the range of documented human behavior in the past.

4. Period of time.

$$n \ln I = \ln[F+G] - \ln[K+G]$$

$$n = \frac{\ln[F+G] - \ln[K+G]}{\ln I} \quad (21,D)$$

The effect of G is to bring the two logarithms on the right side closer together, thus reducing the n required to achieve a given ROR from given values of F/P.

5. Value of G.

$$G = \frac{F - KI^n}{I^n - 1} \quad (21,E)$$

(21,E) is named the Faustmann Formula, after a German forester who discovered it in 1849. I will refer to it as Faustmann (that will be easier to remember than (21,E)).

Faustmann is premised on there being many cycles of investment and recovery after the first one. In fact, that is how Faustmann first derived (21,E), which we have reached by a different route.

The PV form of Faustmann.

It is generally useful to put Faustmann in the PV form. G is already a PV, and this change won't affect G. But we multiply both top and bottom of Faustmann by the discount factor, I^{-n} . This makes Faustmann more directly comparable with other valuation equations, as we will see.

$$G = \frac{-K + FI^{-n}}{1 - I^{-n}} \quad (21,F)$$

The top of (21,F) is the PV of the first cycle of land use. The bottom is a divisor that converts the PV of cycle one into a land value derived from all future cycles. Rather than divide it is more convenient to take the reciprocal and multiply, calling it the "Land Value Multiplier", or LVM.

Here are some LVM values, to give you a feel for it, when $i=.05$.

Table 4: Land Value Multipliers when $i=.05$.

n:	1	2	4	8	16	32	64
LVM:	21.0	10.8	5.6	3.1	1.8	1.3	1.05

For example, when $n=16$, cycles following the first one add 80% to the value of cycle one.

Value and Rent

Multiplying G by i we get annual rent (cf. (2), p.4). We need a notation for rent:

b = annual rent (from German Bodenrente. German nouns begin with upper case, but lower case is used here to hew to my convention that flows are denoted by lower case letters, and upper case letters are reserved for point values.)

Note that in the top of (21,F) all values are present values. Multiplying by i , the rest of it becomes the IPF, so we have:

$$b = [-K + FI^{-n}] \times IPF \quad (22)$$

What (22) does is to take the irregular stream of investments and revenues that we actually get, and convert them to a level annual amount, b , which is the annual value of land, or rent.

Optimal life, and replacement timing.

A most important by-product of Faustmann is determining the optimal value of n , which is the length of the cycle of investment and recovery. Optimal n is the value of n that maximizes G .

The condition for maximizing G is that the log derivative of the numerator equal that of the denominator. That means, recall, that their % rates of change are equal, so that the ratio doesn't change. Let's see where that leads us. Let $F' = dF/dn$. Then:

$$\frac{F' - KiI^n}{F - KI^n} = \frac{iI^n}{I^n - 1} = \frac{i}{1 - I^{-n}}$$

$$F'[1 - I^{-n}] + Ki = Fi$$

$$\frac{F'}{F - K} = \frac{i}{1 - I^{-n}} = IPF \quad (23)$$

(23) says that you harvest a tree when the % growth rate of the harvest value, net of restocking costs, is a little higher than the interest rate, i .

That "little higher" can be shown to be equal to the annual value of G , so what (22) is saying is that a growing tree has to grow fast enough to pay interest on its own value, plus the ground rent, or else you harvest it.

To show that, let x be the excess of the required growth over Fi , and solve for x .

$$F' = (F-K) \frac{i}{1 - I^{-n}} = Fi + x$$

$$x = (F-K) \frac{i}{1 - I^{-n}} - Fi = \frac{Fi - Ki - Fi + Fi I^{-n}}{1 - I^{-n}} =$$

$$(Fi I^{-n} - K) \cdot IPF \equiv b \text{ (recall that } b \text{ means rent)}$$

$$\text{Therefore, } F' = Fi + b \quad (23,B)$$

(23,B) says that a growing tree or other capital has to grow in value fast enough to pay interest on its own value, and pay rent on the land it preempts from alternative uses. The left side is the marginal product of time, and the right side is the marginal cost of time.

" b ", of course, = Gi : they are generally interchangeable. So you can find optimal n by maximizing annual ground rent, b , just as you can by maximizing ground value, G .

B. Annuity case (again with G constant).

This applies to more of the world's capital than the PIP0 case. Perhaps 20% of capital is in growing forms that resemble the tree model; 80% is in forms like buildings and machines that yield a flow of cash or service over life, and

then have no salvage value worth much note (except for the land they occupy).

1. Redeemable bond.

This case is clean and classic, and serves here as an introduction to the basic math needed.

Most ^{bonds} pay out cash interest, (called the "coupon"), over a finite life, and then are redeemable, meaning you get back a lump sum at the end. Usually that is the original par value paid in, but not always, and in either case the bond has a current market price that fluctuates daily, depending mainly on current interest rates available on alternative investments. Once the bond is issued and traded, the current price is cut loose from the original cost, and depends entirely on discounting future expectation.

Notation:

D = Redemption value after n years. (Usually R is used for this, but in these notes R has another use, so I picked the next consonant, D).

P = Price, or Present Value of bond.

a = annual cash flow from bond, the "coupon".

Present Value of Bond.

$$P = a \frac{1 - I^{-n}}{I} + DI^{-n} \quad (24,A)$$

(24,A) combines the annuity case and the PIP0 case in one equation. This gives you, when you master it, a more comprehensive analytical power and grasp than either case taken alone. The Force will be with you! But you have to concentrate, young Skywalker, or you will never be a Jedi master.

Rate of Return on Bond.

This is also called the "yield to maturity" (YTM). It combines two yields: the "current yield", a/P ; and the bond appreciation from now to year n. You find it by solving for i.

$$1 = a \frac{1 - I^{-n}}{P - DI^{-n}} \quad (24,B)$$

Like (3,D), pp. 9-10, this equation is solved using Newton's method of systematic trial and error. It is marginally more complex than (3,D), but if your calculator has to labor another second or two, you'll not notice.

YTM's on bonds are published daily in the Wall St. Journal. Lots of people are interested. Most papers just publish the current yields, a/P. Anyone who invests based purely on current yield is cruising for a losing. He may luck out for a while because for many bonds the appreciation element is minor. But for others it is major, and then you need (24,B).

Carter's Cut: How to Lose Money.

A friend of mine named Carter tried a short-cut to (24,B) which sounds reasonable, but lost him a lot of money -- and he never even knew it! He reasoned that the YTM is the sum of a/P + appreciation, so why not just figure each one separately and add them together? Here is what Carter figured:

$$i = a/P + [D/P]^{1/n} - 1 \quad (25)$$

Carter's Cut just adds together Equations (2) and (1,C). It works out pretty well if D/P is close to one, and/or if n is large. Otherwise it leads you astray. When D = 0, for example, compare the results from (25) and (24,A), and you'll never take Carter's Cut again. But if you really want to understand what finance is all about -- I mean really understand, as opposed to feeding formulas and grinding out rote solutions -- give some deep thought to just why those results are different.

Meantime, back to (24,A), note that if P = D, the equation devolves into (2). Getting back exactly what you put in is the same as having a perpetual income stream.

If a = 0 (24,B) looks like big trouble, but you can step around the trouble by going back to (24,A), which just devolves into (1,B), from which you go to (1,C).

2. Land and Capital.

The analysis of most direct investments involves the same math as (24,A), which is why I started you out with (24,A). Most direct investments consist of capital occupying and preempting land. When the capital is terminated, the land is released for another use. The land, therefore, is analogous to the Redemption Value, D, of the redeemable bond. The notation for land is G, remember -- for Ground, or if you like Greek prefixes, for Geo.

The other difference is that the original investment, P, is separated into two elements, K and G, for capital and land.

$$G + K = a \frac{1 - I^{-n}}{i} + GI^{-n} \quad (26,A)$$

(26,A) shows how the parts are tied together. Like all equations it can be solved for any element, so you can reason from what you know to what you want to find out.

Value of Land.

$$G = [-K + a \frac{1 - I^{-n}}{i}] \frac{1}{1 - I^{-n}} \quad (26,B)$$

The expression in brackets is the PV of Cycle One (C_1). To its right is the Land Value Multiplier (see pp. 16-17). What we have here is similar to Faustmann in its PV form (21,F). The difference is that Faustmann applies to PIP0, and (26,B) applies to flows.

Unlike Faustmann, (26,B) does not give us a way to solve for optimal life, n. The terminal n is just assumed. "a" goes along at a level value and suddenly self-destructs. This is therefore known as the "One-hoss Shay" model (from a classic poem The Deacon's Masterpiece by Oliver Wendell Holmes about a wonderful vehicle that ran perfectly for years until it suddenly fell all apart.)

(26,B) can be adjusted (with added complexity) to show "a" declining, as is generally true. I have done so in a separate set of notes, "Declining Cash Flow Models", and it is not pursued here.

Rate of Return.

If G is exogenous (fixed, given), solve for i :

$$i = a \frac{1 - I^{-n}}{K - G(1 - I^{-n})} \quad (26,C)$$

(26,C) shows how the present of G depresses i , the ROR. Compare this to (21,C), p.15. Everything said there applies here.

To explore scenarios about the effect of rising and falling G on ROR, just note that G_0 is multiplied by 1 in the denominator; G_n is the G multiplied by I^{-n} . I have done so in another ms, "Land Gains, Fast Write-off, and Incentives to Build," and do not pursue it here.

Those are the basic tools. The applications and variations are endless. If the tools seem hard to learn, remember poor Mr. Carter. You can learn the easy way from me, or the hard way by losing money.

Minimizing total cost (TC) of a fund of cash (or anything else)

Notes by Mason Gaffney, for Econ 100B, 17 May 87

Notation taken from Hall and Taylor, pp. 296-98

W = monthly cash receipt (W is evidently from "wage")

M = mean amount of money held during month

x = number of transfers into cash holding during month (this is not explicit in H&T, but making it explicit makes things clearer)

k = cost per transfer

R = opportunity interest rate (I omit their subscript "o")

T = amount of money per deposit

$$T = W/x$$

$$M = T/2 = W/2x$$

$$\text{Deposit Cost (DC)} = kx = (kW)/(2M)$$

$$\text{Carrying Cost (CC)} = RM$$

$$\text{Total Cost (TC)} = DC + CC = (kW)/(2M) + RM \quad (1)$$

(NOTE TERRIBLE TYPO IN H&T, p. 298, where they use a "-" instead of a "+". They continue the error in the top line of the footnote; then correct it in the 2nd line, which however makes their algebra wrong. This gives you an idea of how carelessly some textbooks are edited. You have to be alert.)

Rather than follow their algebraic footnote, I assume you understand something about calculus, and will differentiate (1), and set its derivative equal to zero.

$$d(TC)/dM = \frac{kW(-M^{-2})}{2} + R = 0 \quad (2)$$

$$R = kW/(2M^2)$$

$$M = \left(\frac{kW}{2R} \right)^{\frac{1}{2}} \quad (3)$$

(3) is called the "square root rule", which may be giving too much emphasis to the square root aspect, which is an artifact of

the particular assumptions here, which could be different. The important thing is the sensitivity of optimal M to k and R . M is an increasing function of k , and a decreasing function of R ; and is equally sensitive to each of them.

Figure 1 shows graphically how this works. M is the independent variable here. As M rises, CC rise directly with it, and DC fall. You add these together to get the top curve, TC , which first falls and then rises, giving us a minimum.

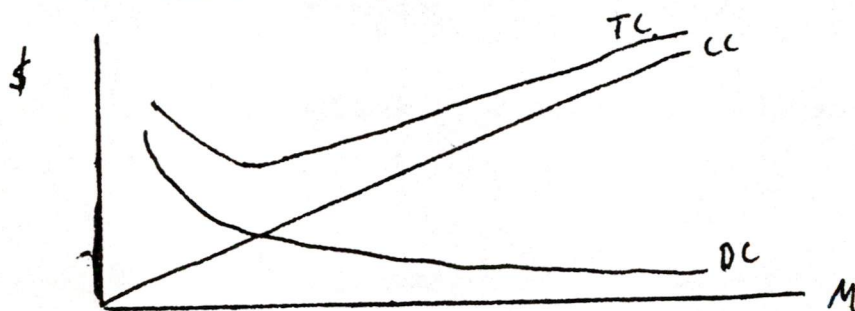


Figure 1: Minimizing TC by adding rising CC and falling DC

TC is minimized where and because the slopes of CC and DC are equal and opposite. It is of incidental interest that their ordinates are equal at this point -- i.e., it is where they cross. Let's see if $CC = DC$ when M has its cost-minimizing value.

$$CC = DC$$

$$RM = kW/2M$$

$$M^2 = kW/2R$$

$$M = \sqrt{kW/2R} \quad [\text{as in (3)}]$$

That is handy to remember, but also dangerous because you could easily get careless and think that the curves' crossing is a cause of minimizing TC . Beware of this mistake; but otherwise use the information that the crossing is also the minimum TC .

Now use Figure 1 to observe the effect of R on the optimal holding of cash. Higher R means the CC curve is steeper, moving the crossover to the left, reducing the optimal cash holding.

Eqn. (3) tells you the same thing algebraically: the stock of M which minimizes TC falls as R rises.

Use Fig. 1 to observe the effect of k on the optimal holding of cash. Higher k moves the entire DC curve farther away from the origin (up and to the right), moving the crossover to the right, increasing the optimal cash holding.

Eqn. (3) tells you the same thing algebraically: the stock of M which minimizes TC rises as k rises.

What, finally, have we shown? If your opportunity cost of money is low, and the value of your time is high, you keep a large cash balance on hand.

SUPPLEMENTAL KNOWLEDGE

Having found optimal M , you can also find optimal x and T , just by substituting the value of optimal M for M . Do this as an exercise. (Where a square root sign covers several terms, just raise each one instead to the $\frac{1}{2}$ power, then combine terms by adding exponents, watching your signs of course as you go.)

You'll find that optimal x is an increasing function of R and a decreasing function of k . This of course is because x , the frequency of trips to the bank, is inversely related to M , the mean stock of money on hand. Learn this well: it has much wider applications, as we will see.

$1/x$ is the period of time between trips. Does that ring a bell? We've seen an analogous principle before, when finding the amount of capital in a pipeline. The frequency and the period of anything are always reciprocals.

You'll find that optimal T rises as k rises, and falls as R rises. That is, when you want to economize on your time you do things in large slugs rather than small dribbles; and let the results sit for a long time ($1/x$) before acting again.

WIDER APPLICATIONS OF THIS MODEL

If we were only interested in determining an optimal stock of cash we wouldn't lean so heavily on this model. But, as H&T mention, this is also a way to determine an optimal inventory of real capital. Just let M stand for the mean stock of goods in the store; and k for the cost of ordering, delivering and receiving a

batch of goods.

But it's more general than that: much more general. Let M stand for the mean life of an item of durable capital; and k stand for the cost of producing same. Now we are moving toward a model of the turnover of all the capital in the nation, not just the inventories. We'll use this in the last third of the course.

For now, just note that the incentive to substitute capital (M) for labor (k , in this model) rises as labor costs more. But this does not take the form of a rise in the flow of investment, but the reverse, because x falls as k rises.

4 copies to RBR

Nov. 6 '88

Effect of land values on rates of return to investment
Notes by M. Gaffney, 2-20-85

A. Stable land values: $L_0 = L_n$

1. PIP0 case

$$ROR = \left(\frac{F + L}{P + L} \right)^{1/n} - 1 \quad (1)$$

Table 1: ROR on PIP0 investment

Let $n=15$; let $P=1$; let $L_n=L_0=L$

F/P	ROR from (1)	L	$\frac{F+L}{P+L}$	ROR from (4)	ROR_1/ROR_4
(1)	(2)	(3)	(4)	(5)	(5)/(2)
1	0	1	1	0	--
2	4.73	1	1.5	2.74	.58
4	9.68	1	2.5	6.3	.65
8	14.87	1	4.5	10.55	.71
"	"	2	3.33	8.36	.56
"	"	4	2.40	6.01	.40
"	"	8	1.78	3.91	.26

Morals:

a. The inclusion of land value in the base lowers the ROR substantially, even though the land is recovered fully at the end of the investment cycle.

b. ROR is ambiguous. You must know how the analyst is treating the land input. He can overstate ROR by omitting land, or by undervaluing it.

2. Combination case: cash flow ended by salvage or redemption at end of investment cycle.

$$ROR = \frac{a(1-I^{-n})}{P-FI^{-n}} \quad (2)$$

(2) deals explicitly with redeemable bonds. The present value of F is included in P, thus raising it. To adapt (2) to the case of direct investments we break P into two parts, L (land) and B (building).

$$ROR = \frac{a(1-I^{-n})}{(L_0+B) - L_n I^{-n}} \quad (3)$$

Table 2: ROR on cash flow followed by sale of land

Let $n=10$; $a=.15$; $B=1$; $L_n=L_0$

<u>L</u>	<u>L+B</u>	<u>ROR</u>
		%
0.0	1.0	8.14
.25	1.25	5.90
.5	1.5	4.60
1.0	2.0	3.17
4.0	5.0	1.10

Moral: the need to carry land at a high value over a normal investment cycle lowers the ROR, and not just a little but a lot. It lowers ROR by adding to the base of total assets on which a is the return. This reduction is only partly compensated for by recovering land after n years -- 10 years in Table 2 above.

You might do better by renting the land. In that case annual rent is simply a regular expense, deducted before arriving at a, a simple calculation. But you might do worse, too. It all depends on whether land is overpriced relative to its rent, something that varies with circumstances. Your financial success depends in part on your judgment call, whether to rent or buy. Your judgment call in turn depends in part on your technical ability to reckon ROR correctly.

But wait, there may be another plus for buying. Maybe the land will rise while in your possession. That would improve your ROR. Let's see how much.

B. Changing land values, effect on ROR.

1. PIPO case

You can figure this out now with no further coaching from me. If $L_n/L_0 = F/P$ then the presence of L in the investment base will not change the ROR at all. If the land gains a higher ratio than the PIPO investment, it will actually raise the ROR.

(Reader: before continuing, satisfy yourself that that is true, using either algebra or some numerical examples. A ratio rises when the fractional gain in the top exceeds that in the bottom.)

This gain in land value -- to be denoted here as L' -- is a peculiar animal in economics. It is "gratuitous" in that it is determined by forces almost completely outside the control of the individual landholder, and will occur whether or not he improves the land. He could go to bed for 10 years and the land would rise by virtue of what others do. Some landholders, indeed, do approximately that. But most prefer to combine two kinds of gain.

The question then arises whether L' that occurs during an investment cycle is part of the return on the investment? There is probably a conflict here between what is true for society and what appears true to the individual investor. To society the return on an investment is just that incremental cash flow which is caused by the productive activity of the investor. This is represented by "a" in our equations.

But to the individual investor, life is like a tie-in sale. The individual who intends to build generally has to speculate in the land required, willy-nilly. It is not impossible to lease the land under a building or a tree, but it is clumsy and institutionally difficult and more the exception than the rule. So to the individual, L' becomes part of the return on the investment.

This undoubtedly distorts the pattern of investment from what is socially most efficient and desirable, drawing too much

capital onto lands of rising value and repelling investors from lands of stable or falling values. It also contributes to the instability of business cycles, as land prices move up and down in long, giant swings. But this is another topic for another day (about May 1, actually, in Econ. 100B). Here, our interest is in learning how L' affects the ROR of the individual investor.

Land price gains are routinely expected over the course of many PIP0 investments. Timber is notable, because of the very long investment cycle. The Weyerhaeuser Corporation, for example, a firm whose primary business is holding timber on the stump, has been the main beneficiary of the expansion of Seattle, around which they held and hold much of the land. After the timber is cut, the land is urbanized. U.S. Steel similarly holds timberlands around Birmingham, Alabama, lands originally acquired most likely for the mineral rights in iron ore or coal; Macmillan-Bloedel holds such lands around Vancouver, B.C.; and so on.

Note, it is the ratio of L' to L that affects the ROR, not just the absolute value of L' . Thus, if $F/P = 4$, the ROR will rise if $L_n/L_0 = .5/.1$; but fall if the ratio is 20/10.

L' can sometimes work against you, too. The gratuity may be negative. Economic history is littered with the bleaching bones of investors who plunged on some investment as an incident to speculating in land, only to see the land value drop like a stone (have you talked to any farmers lately?) The gain is not only gratuitous, it is capricious as well. Luck is a Lady not to take for granted.

2. Combination case

This is where we need some math to overcome the complexities, but let's begin with a simple case that almost explains itself.

a) Simple example: L' offsets depreciation

Here, the appreciation of land value is just enough to offset the depreciation of the building that yields a cash flow for n years. Your salvage value thus equals your initial investment, so your ROR is simply the cash flow divided by the initial cost of $L+B$. Look at (2) and see how much cancels out when you let $F=P$. You are left with:

$$\text{ROR} = a/P$$

(4)

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(4) is like the case of a redeemable bond which you can buy for its redemption value of \$1,000. This makes $YTM = \text{current yield} = a/P$. In the bond market such a condition is not unusual, and would in fact seem "normal" and expected. In the case of a direct investment it is a coincidence caused when $L' = B$. To see this, go now to (3) and let $L_n = L_0 + B$. Collect terms and cancel out the terms in the parenthesis, as you just did with (2), and you end up with $ROR = a/(L_0 + B)$

That simple finding is a handy landmark to keep in view as you sail around in these strange new seas. You need a stable point for orientation. It is not in the nature of man to trust mathematical formulae until we have worked with them long enough to develop understanding and confidence. Nor is it easy to keep in mind highly generalized formulae, or to adapt them quickly to changing particulars, even though they are designed for such adaptation. But here is something you can understand and accept readily. Use it as a rule of thumb for situations that approximate it. Use it as a benchmark to check the credibility of your answers for situations that are obviously better or worse.

b) L doubles, from various base values of L_0

(4) makes it clear that you get a higher ROR when L_0 is low -- i.e. you buy in cheap. If you are really lucky you could start from a base with L_0 at zero. Then, $ROR = a/B$. Life is kind to those who get in on the ground floor.

They may do even better when L' is more than B , obviously, and we will be seeing how much better. But the enjoyment of L' by one investor makes it tougher on the next one, and a cumulative rise of L makes it progressively tougher on succeeding generations of investments and investors. Life is less kind to those who get in above the ground floor.

The gratuitous gain enjoyed by Groundfloor O'Grady is to be an added burden to his successor Tardy Tess who had the bad business judgment to be born 30 years later. O'Grady's L_n is Tess's L_0 . Tess gets on where O'Grady got off. Even though the elevator may keep going up, Tess's ROR is to be based on a higher ante -- a number, remember, that you both subtract and divide by in figuring ROR. The higher L_0 will offset much of, all, or more than the gain, (varying with particulars).

So the same L' that stimulated the investments of one

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generation may serve to depress those of the next. Here we have the makings of a business cycle, a point not pursued further here, but worth more than a thought to people venturing into the future world of finance.

There are two opposing forces at work here on the ROR. The burden of carrying L lowers the ROR; the promise of L' acts to raise ROR.

Table 3 illustrates the relative weight of forces acting on the ROR. In the Table, L doubles over an investment cycle of 10 years. The higher the base (L_0), the higher is the absolute value of L' . But there is a loss from having a higher base, of the kind shown in (4). In this case the loss offsets the gain, resulting in a (very slight) decline in ROR as L_0 and L' are both higher.

Note: read the "Morals" under the Table carefully in order to interpret the findings correctly.

Table 3: ROR when L doubles in 10 years

$$n=10; B=1; a=.15; L_n=2L_0$$

	(1)	(2)	(3)	(4)	(5)	(6)
1. L_0	0	.25	.50	1.0	2	5
2. L_0+B	1	1.25	1.5	2.0	3	6
3. L_n	0	.5	1.0	2.0	4.0	10.0
4. $a/(L_0+B)$	.15	.12	.10	.075	.05	.025
5. $L_0/(L_0+B)$	0	.20	.33	.50	.67	.83
6. ROR_1 (%)	8.14	5.90	4.60	3.17	1.95	0.90
7. $L_n/(L_0+B)$	0	.40	.67	1.00	1.33	1.67
8. ROR_2 (%)	8.14	7.82	7.66	7.50	7.37	7.27
9. ROR_2/ROR_1	1.00	1.32	1.67	2.37	3.78	8.08

Morals:

a. Rows 5 and 6 are there to show the effect of L_0 on ROR when $L'=0$. Row 6 is the ROR figured from a constant value of L . Moving from left to right, L rises and depresses ROR down close to zero.

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b. Rows 7 and 8 show how a positive L' acts to compensate, and offset the tendency of L to depress ROR. In Row 8, ROR is held nearly steady. If we showed the effect of tripling L , ROR would rise slightly instead of falling slightly as it does in Row 8.

c. Row 9 is the ratio of Row 8 to Row 6. It shows how much the apparent ROR is boosted up over the actual ROR by the factor of L' . The boost is, as you might expect, greater where Row 1 is greater. Row 1 is L_0 , and since $B=1$ it is also the ratio to B . In a rising land market, investors will favor land-using investments, relative to what they should be doing.

d. The effect of L' is to make ROR insensitive to the amount of land being used, as shown in Row 8. This phenomenon reflects the fact that land appreciation offsets the cost of carrying land over time, making land very cheap to hold during the course of the investment cycle.

c) L rises by various multiples from given base

It is useful to round out our understanding of this matter by adding a third dimension to the table, letting L rise by multiples other than 2, which is the fixed multiplier in Table 3. Accordingly, Table 4 shows the effect on ROR of having L rise by multiples from .5 to 12, over 15 years.

Table 4: ROR when L rises by various multiples over 15 years
 $n=15$; $B=2$; $a=.20$; $L_0=1$; $L_0+B=3$

L_n	ROR on pure L'	ROR, com- bined	$\frac{ROR_2}{ROR_3}$
(1)	(2)	(3)	(4)
.5	-4.52	1.77	-2.55
1.0	0.00	3.11	0.00
2.0	4.73	5.14	0.92
2.25	5.56	5.56	1.00
3.0	7.60	6.67	1.14
6.0	12.69	9.85	1.29
12.0	18.02	13.69	1.32

Morals from Table 4:

a. Column (2) shows the ROR on bare land, assuming there is no B at all, and no a. It is interesting that at the higher values of L_n the investor does better not to use the land at all, even though this entails idling the land and foregoing the positive net cash flow it could yield. This strange effect results because at discount rates higher than 5.56% the present value of the positive cash flow is negative. Putting it another way, the ROR on B alone, at $L=0$, is only 5.56%, so if pure land speculation yields more the individual chooses to buy more land instead of building.

b. The combined ROR in column (3) is much affected by L_n , the resale value of land. With L_0 assumed equal to one, L_n is the multiple of L_n/L_0 . The investor will pay close attention to the likely future of the value of land under the capital he has built.

The condition that bare land speculation yields more than productive building is a disequilibrium condition, i.e. one that tends to work itself out. But life is likely to be a series of journeys between equilibrium conditions which elude us like the rainbow's end, so don't think this never happens: it is all around us all the time, and has been since Columbus landed. Still, let's ask how equilibrium is approached.

Faced with high expected returns from land speculation, the investor seeks to buy more land rather than build on what he has. But this increases the ratio of land to capital in his operation, if the land is capable of integrated use, and this, by the law of variable proportions, raises the marginal return expected from adding capital.

When many people buy more land their bidding raises the price. This reduces L'/L and also reduces a/L . The combination of those two effects with the first one finally may produce a new equilibrium where the positive cash flow from using land is not neglected.

We next see how income taxes affect rates of return. Owing to the preferential tax treatment of land gains, the effect of income taxation is greatly to magnify the relative advantage of adding more land to an investment cycle.

C. The effect of income taxes on rates of return

1. PIP0 case

a. When $L=0$

There is a tax benefit enjoyed simply by virtue of tax deferral. This benefit increases with the length of time of deferral, an effect not shown here; and with the rate of gain. Equation (5) and Table 5 show the second effect.

$$RRAT = \left[\frac{F(1-t) + Pt}{P} \right]^{1/n} - 1 \quad (5)$$

where $RRAT$ = rate of return after taxes
and t = tax rate imposed on $(F-P)$ at time n

Table 5: ROR on PIP0 investment, before and after tax

Let $n=15$; $P=1$; $t=.5$; $L=0$

F	RRBT	RRAT	RRAT/RRBT
	%	%	(3)/(2)
(1)	(2)	(3)	(4)
0.0	-100.0	-4.52	.045
.5	-4.52	-1.90	.420
1.0	0.00	0.00	.500*
2.0	4.73	2.74	.579
4.0	9.68	6.30	.651
6.0	12.69	8.71	.686
8.0	14.87	10.55	.709

*The seemingly "indeterminate" ratio of 0/0 may in this case be determined by invoking l'Hopital's Rule. You may see this on your calculator by letting F be 1.001, and .999, and note how your answers approach .500.

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The moral of Table 5 is that the income tax, based as it is on realization of gains through sale, contains a built-in bias in favor of PIPO gains (as opposed to income that flows in annually). The bias is manifest in RRAT's being higher than 50% of RRBT, even though the tax rate is a nominal 50%. This is the background against which we are to measure the further bias that results from adding land to the investment equation.

b. L greater than zero

As we saw before in ¶A, the effect of adding inert land to the top and bottom of the ratio F/P is to dilute the ratio and lower the ROR. "Inert" here refers to land that remains constant in value over the cycle of investment.

But if L rises in value faster than the capital that is on it, it raises the rate of gain. This advantage is enhanced where land gains are subject to a special low tax rate, "s". Equation (6) and Table 6 put this all together in one package.

$$RRAT = \left[\frac{F(1-t) + Pt + L_n(1-s) + L_0s}{P + L_0} \right]^{1/n} - 1 \quad (6)$$

Table 6: RRAT on PIPO investment, with land gain taxed at lower rate
n=15; P=1; L₀=1; t=.5; s=.2

F	L _n	RRBT %	RRAT %	RRAT/RRBT
(1)	(2)	(3)	(4)	(5)
2	1	2.74	1.50	.547
4	1	6.30	3.80	.603
8	1	10.55	6.98	.661
8	2	11.33	7.95	.702
8	4	12.69	9.59	.756
8	6	13.85	10.95	.790
8	8	14.87	12.10	.814
6	8	13.85	11.40	.823
4	8	12.69	10.63	.838
2	8	11.33	9.77	.863
1	8	10.55	9.31	.883

There are two forces at work shown in Table 6. First, the advantage of tax deferral grows as RRBT grows. This effect is manifest in the top 7 rows, with col. (3) rising from 2.74 to 14.87, and col. (5) rising from .547 to .814. A nominal tax rate of 50% leaves the taxpayer with a RRAT equal to .814 of the RRBT, which amounts to an effective tax rate of less than 19%.

Second, there is the advantage of the lower tax rate on land. This is manifest in the bottom 5 rows where col. (5) continues to rise, even though col. (3) is falling. It is also manifest in the row where $F=8$ and $L_n=6$. Here $RRAT = 10.95\%$, which is higher than what we get in Table (5) when $F = 8$ and $RRAT = 10.55$. In this case the diluting effect of the slower-growing land value is more than offset by the effect of the lower tax rate on land gains.

The gain on some PIP0 investments in fact now also gets the lower "capital gains" rate. Timber is notable, having been awarded this favorable treatment since 1946. Here, however, our interest is in exploring the effects of the application of different rates, so we do not pursue the timber case, which would obviously be simpler and can be explored now by any reader.

2. Combined case

Here we build from our basic Equation (3), and modify it for taxes, and deductions from taxes. Cash flow is taxed at the "ordinary" rate, t ; and depreciation is deductible at the same rate. "Capital gains", which are really mostly land gains, are taxed at a lower rate, s ; and the "basis" of property, which is the part of the historical purchase price which is not depreciated, is deducted from the capital gain. Equation (7) puts that all together.

$$RRAT = \frac{[a(1-t) + (B/n)t](1-I^{-n})}{(L_0+B) - [L_n(1-s) + L_0s]I^{-n}} \quad (7)$$

a = cash flow

t = tax rate on "ordinary" income

B = Building cost, which is depreciable

L_0 = Land cost, not depreciable

n = economic life, here assumed equal to tax life

B/n = annual depreciation allowed as deduction, assuming simple straight line depreciation with no acceleration. This assumption is made for simplicity: actual treatment is often more complex, with faster write-off followed by some recapture.

$(B/n)t$ = annual reduction of tax liability due to deducting B/n
 s = tax rate on land gains.

L_n = Salvage value of land at time n . If it is resold at that time, there is a tax on the gain.

L_0s = reduction of tax liability due to deducting the "basis", L_0 , from the gain in L

(7) shows the logic of how this equation is constructed. Having this in hand, we now modify it to focus attention on the key ratios that determine the outcome, and which will vary in the tables that follow. Make these changes:

$$P = L_0 + B$$

$$lP = L_0 \quad (l \text{ is the fraction of } P \text{ which is land})$$

$$(1-l)P = B$$

$$F = L_n$$

Finally, divide both numerator and denominator by P , to put the equation in standardized form. We now have the very last equation we will need.

$$RRAT = \frac{[(a/P)(1-t) + t(1-l)/n](1-I^{-n})}{1 - [F(1-s)/P + ls]I^{-n}} \quad (7a)$$

Table 7 (next page) shows RRBT and RRAT as F/P rises from 0 to 8. Most of its assumptions are realistic. A few are bent a little in the cause of simplicity:

--- When F is less than L_0 Table 7 allows full deduction of the loss, at the gains rate, s . In practise such deductions cannot all be taken for granted. Some capital losses are never usable, and others require quite a struggle.

--- " l " refers to the share of P that is land for tax purposes, hence is not depreciable as an expense against ordinary income. It is here assumed constant at .4. Actually it is subject to the facts of each case, and to judgment and negotiation with IRS personnel. The relationship between the true value of l and the tax value of l may not be very close. It is believed by some experts that the IRS is more lenient in this matter than it is in most others, letting taxpayers depreciate land in effect. Taxpayers usually want to depreciate as much of P as possible so they can take it off against ordinary income, at an early date.

The undepreciated basis is deducted only from a capital gain, and not until the time of sale. There are many reasons (some of them noted under Table 7) why the time of sale may never come.

I have shortened these notes by sparing you a table showing how RRAT varies with the value assigned to l . It does make quite a difference.

--- taking $t=.5$ is a bit high. But when you combine Federal and California taxes it is closer. As in all these calculations it refers to the marginal rate, not the average.

--- taking $s=.2$ is shorthand for $t = .5 \times .4(P-L_0)$. Here it doesn't matter. Sometimes it does, and, apart from this example, you should think in terms of excluding 60% of gains from taxable income, rather than applying a tax rate 60% below the ordinary rate.

Table 7: ROR, combined case, as affected by income taxes

$n=15$; $a=.10$; $P=1$; $t=.5$; $s=.2$; $l=.4$

F/P	RRBT	RRAT				RRAT/RRBT
		$s=0$	$s=.2$	$s=.5$	$s=1.0$	$s=.2$
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1) 0.0	5.56	.61	1.47	2.56	4.00	.264
2) .5	8.18	4.62	4.50	4.33	4.00	.550
3) 1.0	10.00	7.00	6.50	5.68	4.00	.650
4) 2.0	12.56	10.12	9.27	7.76	4.00	.738
5) 4.0	15.87	13.90	12.76	10.60	4.00	.804
6) 8.0	19.84	18.25	16.87	14.19	4.00	.850
Row 6/1	3.57	29.92	11.48	5.54	1.00	3.22

Table 7 shows the combined effect of land value gains and their preferential tax treatment. The combined effect is at its strongest in Col. (3) where there is no tax at all on the land gain. The RRAT in row 6 is 29.92 times that in row 1, even though the ordinary income remains unchanged at .1P.

Morals:

a) RRAT/RRBT is highly variable: low where there are losses on the speculative land element, and high where there are gains.

b) This variation is a maximum when L' is untaxed, as in Col. (3) where $s=0$.

For most of us a tax rate of zero is a pipe dream. But landholders achieve it routinely, simply by not selling. The best

way in the world to avoid income tax is to buy land in advance of anticipated future needs -- your own needs, that is. This option is of dubious value to most firms and individuals because they lack the deep pockets of "patient money" that are required. It is of no value to those who buy the wrong land at the wrong time and see its value drop. It can be useful to ordinary people who can squeeze some cash flow from land while waiting for it to make them rich in later life.

c) The preferred treatment of land gains is only partly due to the use of a lower tax rate. It is also due to deferral of the tax until the end of the cycle, in year n . This is shown in Col. (5) where $s=t$. Even with a common tax rate there remains a large rise in RRAT as F/P rises.

d) A tax of 100% on gains (Col. (6)) eliminates their effect on RRAT, as you would expect. If there were such a tax it would be avoidable, however, by not selling, resulting in a tax rate of zero.

Do not conclude from Table 7 that the secret of financial success is to seek out those investments showing the highest RRAT in the table. The problem is that others have figured this out before, and gotten there first. That in turn has caused land prices to rise, and anticipated gains to fall, with a tendency to equalize after-tax rates of return. There is reason to believe, in fact, that many people have overemphasized tax matters in their financial strategies, such that "tax shelters" are oversubscribed. One cause of the current distress in agriculture, for example, is certainly excess supply resulting from all the urban capital poured into farm tax shelters in recent decades.

The secret of financial success is harder, with calculations like those in Table 7 being merely a tool to help you judge whether others have overreacted to tax bias before you came along. If it seems tough, cheer up, it is even tougher for others who have not been through this mental discipline, and who will leave loose opportunities lying around from which you may gain.