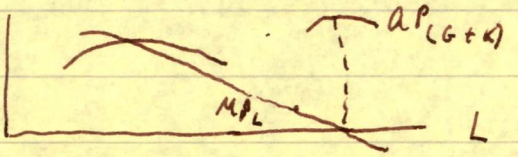
Grad. Macro, W 92

Wed. Jan. 22
Grad. Course

1. "Efficiency" not same as max. AP of labor.
Micro analysis, max AP of labor by adding "property" (G+K) until their MP = 0

a. 

b. $P = k L^{\alpha} B^{(\alpha-1)}$ (over)
Exponents are elasticities of prod. $= \frac{MP}{AP}$

If $\alpha = 1$, $\alpha - 1 = 0$

c. Normalized tree model
Max AP of labor by holding trees until net new growth = 0.

2. New push on to put K into p.w. infrastructure.
Spurred by undeniable decay of much old infrastructure.
But, in practice, is a K-intensive solution.
a. W/o drastic, painful reform of pub. spending, K will go into term: expansion

b. Even renewal of old p.w. is K-using, bcs. of past patterns of sprawl. We need an implosion — will get an explosion.

If $y = x^2$

$y' = 2x$

$\frac{y'}{y} = \frac{2x}{x^2} = \frac{2}{x}$

$x' = 1$

$\frac{x'}{x} = \frac{1}{x}$

$\epsilon = \frac{2/x}{1/x} = 2$

3. Push for "energy-effic." might have saved us, bcs. K is energy-using, e.g. large farm machines, fertilizer, pesticides, drying.

But instead, main push was to sub. K for energy – e.g. new air conds., sold by "payback time." Solar panels. Nuclear indy.

4. Low water-eff.

Large farms sub. wtr. for labor.

Bigger is better? No, Wetter is better.

5. Rising cap/labor ratios (Kendrick; USDC.) Indy.

Housing

Retail, e.g. ~~sup~~ explosion of golf, replmt. of caddies by golf carts; canoes by powerboats.

Merchandising, replmt. of clerks + delivery by inventories + parking – rise of theft.

Underpricing energy + its products: cement, aluminum

6. "Labor produces K." Switch to vertically integ. model

a. 

$$\frac{1 - I^{-m}}{i\,m}, \quad \text{when } i = .08$$

m	PV/m	cont. int.
1	.93	.96
2	.89	
4	.83	
8	.72	
16	.55	
32	.36	
64	.19	.20

Another approach. For unity $ up front

$$\text{pmt} = \frac{i}{1 - I^{-m}}$$

$$\Sigma \text{ pmts} = \frac{m i}{1 - I^{-m}}$$

$$\frac{\text{Int}}{\Sigma \text{ pmts}} = \frac{\Sigma \text{ pmts} - 1}{\Sigma \text{ pmts}} = 1 - \frac{1 - I^{-m}}{m i} = \text{complement of } \frac{P_0}{\Sigma \text{ pmts}}$$

Onsite labor is ca. 20% of constru. cost. Lumber is a big chunk – see trees.

b. Trees

$$\frac{P_0}{P_0 I^m} = I^{-m}$$

If $i = .072$

m	I^{-m}
10	.5
20	.25
~~30~~	.125
40	.0625
50	.03125
60	.0156
70	.0078
80	.0039

Capl. combines w. & activates labor each time it is recouped & reinvested actively. In trees, no. They also preempt land.

c. Full salvage – skip.

7. Fallacy of fixed ratios
Hamond & Bowman, e.g.
a) Ignored limits of Earth
b) Overvalued role of K

8. Can grow w. fixed land & K: change ratios.
Modify:

processes
products
cons.

New techniques w. each turnover. E.g. electronics.
Retooling in 1942 & 1946 as precedents.

Final Exam, W92

1. Give the title, thesis, and an outline of a paper you would like to write for publication.

2. Indicate how materials covered in this course will contribute to the paper.

3. Summarize and critique the thesis of "Toward Full Employment with Limited Land and Capital."

    a. For the time it was written.

    b. What updating is needed.

4. Summarize and critique any other reading you have done for this course. This may include reading you have chosen individually.

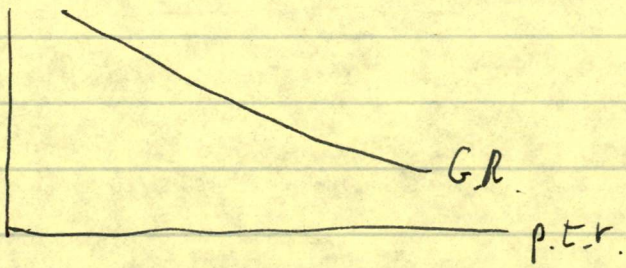
5. If you had power in Washington, what fiscal measures would you adopt to promote economic well-being in the nation? Itemize your measures, briefly explain each, and show how they fit together.

Grad. Seminar
Wed., Jan. 8, '92

1. Link current events w. deep thinking of the past.
E.g. Blinder vs. Ricardo.
To Blinder, only effect on the deficit has any impact; effect on factor substn. not important.

E.g. Vickrey vs. corp. inc. tax
Only the effect of corp. inc. tax on corp. incntv. to invest has any impact. The kind of inst not a factor.

2. Learn enough about basics of taxn. to see its structural impact on ec.
E.g.



3. Learn enough about math to feel at home w. cap. thy:
Min. needs:
a) reconcile sequential & coexistential views of the ec.
b) trace effects of complex tax provisions.

man's recurring nightmare that machines will take over the world.

There may be labor-using forms of capital, too, but it is easier to think of labor-saving forms. Whatever else capital may be and do, it is not unambiguously clear that more capital means more jobs.

Hall and Taylor generally skirt this issue. About all they tell us is that capital formation may increase "growth" They don't say who gains from growth. Other macro writers go farther and allege that labor gains when capital grows. They use a device that you will often see in economic reasoning, the "Cobb-Douglas function", a mathematical artifice that sneaks in an implicit assumption that more capital always means more jobs for labor. Since Hall and Taylor leave this out, we will too, other than mentioning it here.

B. We may also view the relations of labor and capital in sequence. Labor works to produce capital. Here, capital serves to spread labor over more time. For example, say labor works to build a house. We invest an extra 20% in stouter materials and better workmanship in order to make the house last 100% longer: the house gives no more service/year, but more years of service before we need labor to build a new house. Thus capital lets us apply labor less often.

Of course the first year we use 20% more labor. But over time we do so only half as often, so the number of jobs drops to .5 x 1.2, which is 60%, of the original amount.

Or again, let's compare growing bamboo, which matures in a year, and Douglas-fir, which may take 80 years. Planting and harvesting bamboo makes jobs every year; Douglas-fir every 80 years. When we get to the end of the 80-year cycle, most of the value of the timber has been added by capital, in the form of what is called "capitalized interest", i.e. accumulated compound interest on the planting cost. I'll show you how to figure that quickly. Financing timber while you wait for it to mature is a way of substituting capital for labor.

Besides that, with bamboo we get a building material that requires much labor to assemble and maintain; with Douglas-fir, highest-quality structural lumber. Both in the production of the material and the use of it, bamboo is labor-using and Douglas-fir is capital-using.

To analyze this sequential relationship of labor and capital we need more input, which follows in §5.

TMJ all

1. 1974 stagflation: New Dismal Sci. - scolds
   Was timely, ~~but~~ had a brief run, but eclipsed:
   a) ~~the~~ Reactionary views. - anti-labor, ~~anti-growth~~ anti-growth, pro-property.

   b) Ascendancy of Chicago

   c) Perversion of Austrianism.

2. Factor propns. are variable

3. Bankruptcy of demand mgmt.

4. New problems left out of macro.
   a) Resource constraints.
      "Growth" a major good.
      Waste acceptable.
      Surplus disposal a major problem (still guides farm export policy)
      Sav's capacity excessive
      Falling popn. causes stagnation.

   b) "Falling rate of profit" built in.
      Urban & global spacial good:
      i) Env. outlets, direct & induced
      ii) Endless new supplies of land & raw materials.

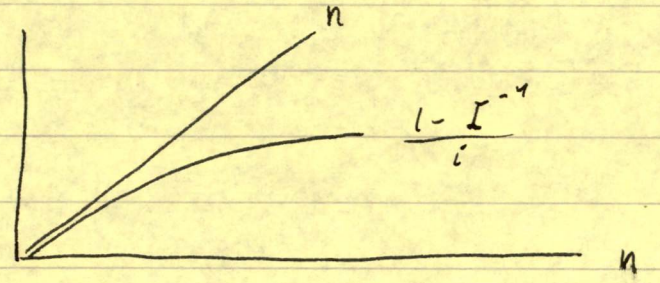
c) Result: sub. K for labor

Narrow def. of effic = MP of labor.

Ignore low MP of land, water, feed-grain, energy.

5. Macro defense: switch to vert. integ. model: labor produces K; integ. employs labor.

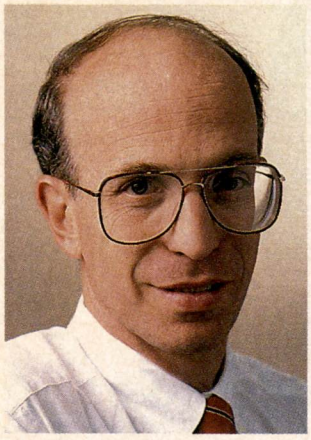
a.



n	i = .05	.08	.11	.14
10			.59	
20			.40	
30			.29	
40			.22	

A TAX CUT MAY QUICKEN PULSES, BUT IT WON'T HELP THE ECONOMY

BY ALAN S. BLINDER



Breaking the 1990 budget agreement might well send the bond market into a tizzy, thus canceling whatever benefits lower taxes would bring

ALAN S. BLINDER IS THE GORDON S. RENTSCHLER MEMORIAL PROFESSOR OF ECONOMICS AT PRINCETON AND THE AUTHOR OF *GROWING TOGETHER*

JOHN S. ABBOTT

Should taxes be cut to revive the comatose recovery? In a weak economy such as the one we have today, fiscal action would normally be appropriate. But not here and not now. Congress is best advised to close the Pandora's box of tax-cutting plans quickly, before too many undesirables get out. This is a conclusion I come to reluctantly. It would certainly not have been my view a decade ago in a similarly stalled recovery, and I hope it will not be my view a decade from now. But after the unseemly budget spectacles of the past 10 years, it seems best to keep the fiscal arm tied tightly behind our backs for now.

In thinking through the merits and demerits of the myriad tax-cut proposals currently elevating political pulses, we must distinguish between tax cuts that are balanced by equal tax increases and those that are not.

A plan in the first category is permissible under the 1990 budget agreement. But it would not provide a wake-up call for the economy and so should not be marketed as Geritol for an anemic recovery. In a balanced-budget package, the tax-cut component would be a stimulant, but the tax hike would be a depressant of roughly equal magnitude. Recent history provides a case for raising taxes on the rich in order to lower them on the poor and middle class. But that case rests squarely on grounds of social justice, not fiscal stimulus.

HISTORY LESSON. Then why not support a simple redistributive tax package right now? I answer with another question: Who in America believes that our current President and Congress can, in an election year, craft a finely balanced bill that will deftly redistribute the tax burden without disturbing the fiscal balance? At other times and other places, I would be in favor of such a proposal. But not here and not now.

But what about unbalanced tax cuts that, while they bust the 1990 budget agreement, can at least be expected to give the economy a boost? Should we enact one? My answer, once again, is not here and not now.

First, we should not ignore the possibility that the recovery will pick up steam of its own accord, rendering any new fiscal stimulus not just unnecessary but counterproductive. This scenario looked far more likely a few months ago than it does today. But history teaches that recoveries sometimes pause before resuming their upward climb.

Second, tax cuts might not even work in the current environment, in which fiscal pronouncements are routinely disbelieved. Suppose a relatively small tax reduction—and the huge budget deficit precludes more—induces a relatively large adverse reaction in the bond market. Then, rising interest rates might cancel out any stimulus from the tax cut, leaving the deficit larger and the economy no better off. This "Wall Street view" of fiscal stimulus is one I have often denigrated in the past: The historical evidence is certainly against it. But it sounds eerily plausible today.

As part of the sorry legacy of the 1980s, the bond market seems to have contracted a chronic case of the federal-budget jitters. This ailment was not cured by the five-year budget agreement of October, 1990, which, despite its bad press, was a big improvement over its predecessors. By remaining intact for a full 14 months, the agreement has already outlived the life expectancy predicted by the skeptics. Abrogating it now would destroy whatever meager fiscal credibility remains—and might even send the bond market into a tizzy.

MORE SPUTTERING? Third, in deciding what to do today, we must not lose sight of tomorrow. America's long-run problem is too little investment, not too much. A fiscal expansion that raises the deficit and interest rates is hostile to investment and therefore exacerbates the long-run problem. By contrast, a pick up in monetary expansion that lowers interest rates and promotes investment takes a step in the right long-run direction.

As we know, there has been a long-running debate within the Federal Reserve Bank over how hard to push the economy. So far, the Fed's performance has been good, if a bit timid. But if fiscal policy assumes the burden of supporting the recovery, the pressure will be taken off the Fed. I think we should keep it on. Central bankers perform better when they are sweating.

Some economists would push this last argument even further. Many believe that the Fed tries to use its control over short-term interest rates to steer the economy along a target growth path for gross national product. If this view is correct, then any additional forward momentum from fiscal policy will be automatically and fully offset by a throttling back of monetary policy. Such a shift of the policy mix toward bigger deficits and tighter money is precisely what Reaganomics gave us in the early 1980s. We do not need another dose now.

One question remains: If fiscal stimulus is not applied and the recovery continues to sputter, then what? The answer is implicit in what I have already said. Chairman Greenspan & Co., the country is relying on you. Please do your duty. We have a long way to go before the federal funds rate hits zero.



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When w.r. rises, K rises, but that does not change share of labor vs. K in final product. Bcs. more K needed up front. (but less to hire land: that has an effect, w. trees.)

Only 2 things lower share of K:

a) Lower u

b) " i.

I. Tree

Higher w.r. raises K, lowers rent (b), length hens cycles. This actually raises share of KE^n.

Higher i lowers DMP of work up front. Thus, lower i is good for empl., in s.r. (In long run, it ties up K longer, but less longer than Fisher solu. says, bcs. of counter-effect on rent.)

II. Bldg. $h = -K\frac{i}{1-E^{-n}} + a$

Higher w.r. raises K. More K needed — more subsistence must be advanced.

Lower h leads to longer u — less pressure to salvage site.

Higher i leads to:

a) Shorter u, at least one case.

b) Lower K

Asymmetry: ~~cost~~ higher cost of carrying $K(i)$ causes reduced use of labor.

When you raise W.r. & empl., requires more investing (a flow).

But lower rents slow cycles. This lowers flow-fund ratio.

Higher i.r. needed, to offset.

Ec. 252: Mon., Jan 27, '92

I. Featherbedding by K

A. Timber in NF

CMAE. - or longer.

$$\text{Max } G = i\frac{F - KI^n}{I^n - 1} \quad \text{when } i = 0$$

$$\frac{i}{I^n - 1} \to \frac{1}{n}$$

B. Wtr. projects

1. Non-reimbursables
2. Low i.r., where any is charged
3. Rent-seeking motive

C. Use of risk free fed. bond rate as standard.

1. Effect on annual debt service of low i.r.

At $i = 0$, $DS = \frac{P}{n}$, e.g. $\frac{100}{40} = 2.5$

$= 100 \times .025 = 2.5$

At $i = .15$, $DS = P\frac{.15}{1 - 1.15^{-40}}$

~~$= 100 \times \$6.64 = \$664$~~.

$= 100 \times$ ~~.1505~~ $.151 = \$15.1$

2. Credit backed by tax power - lenders ignore specific risks.

D. B.C. Hydro use of teachers pension fund.

E. Internalizing profits

1. Corps
2. Public agencies.

F. Partial Funding $\frac{I^n - 1}{in} = \frac{2.49}{3.06}$ when $i = .12$, $n = 15$

G. X-subsidy
Used to grab territory

H. Tax pref. $n = 50$

1) $(1 + .09 \cdot \frac{1}{2})^n = 9.03$

$(1 + .09)^n \times \frac{1}{2} = 37.2$, + likely step up at death.

Encourages "passive investment," internally funded. Autogenic.

2) O-occ. res. 60 yrs, 10%
$DS = P \times IPF$
Σ pmts $= P \cdot IPF \cdot n = P \frac{ni}{1 - I^{-n}}$

$$\frac{\Sigma \text{ Int}}{\Sigma \text{ Pmts}} = \frac{\Sigma \text{ Pmts} - P}{\Sigma \text{ Pmts}} = 1 - \frac{i(1 - I^{-n})}{ni}$$

$$= 1 - \frac{9.97}{60} = .83$$

Cf $i = .05$

$$1 - \frac{PVF}{60} = .68$$

$i = .025$, share $= .48$; $i = .001$, share $= .03$
$i = .01$, " $= .25$ $i = .002$, " $= .059$

$$PV = \frac{1 - I^{-n}}{i}$$

n \ i	.04	.08	.12	.16
1	.962	.926	.893	.862
2	1.89	1.78	1.69	1.61
4	3.63	3.31	3.04	2.80
8	6.73	5.75	4.97	4.34
16	11.65	8.85	6.97	5.67
32	17.87	11.43	8.11	6.20
64	22.97	12.41	8.33	6.25

A. Doubling n does not double PV, esp. at high i. Most of PV comes from first 16 years, except at 4%.

B. at low n, PV is insensitive to i
" high " " " sensitive " "

$$PV = \frac{1}{i - .03}$$

n \ i	.04	.08	.12	.16
∞	100	20	11.1	7.7

A. Speculative land prices are supersensitive to i.

Periodic Puts as affected by Δi.

"Carrying Costs" = $P \times IPF$

$$IPF = \frac{i}{1 - I^{-n}}$$

n	i = .04	.08	.12	.16
1	1.04	1.08	1.12	1.16
2				
4	.28	.30	.33	.36
8				
16	.09	.11	.14	.18
32				
64	.044	.081	.120	.160

If $P\# = a \frac{1}{i - .03}$; $Pi - .03P = a$; $CC = Pi = a + .03P$

Better: $Pi = \frac{ai}{i - .03} = \frac{a}{1 - \frac{.03}{i}}$ $(i > .03)$

~~Let a = 1~~. Then $Pi = \cdots$

i =	.04	.08	.12	.16
$\frac{Pi}{a}$ =	4	1.6	1.33	1.23

Thus, low i.r. do not make housing cheaper!

I. Fallacy of Fixed Proportions (+ comply)

1. Harrod + Domar

2. GNP as fixed multiple of energy costs.

3. Wicksell, pp. 172-78. Normalized model.

$$K = \frac{I^{\frac{1}{n}} - 1}{i}$$

K is short, so shortened to 4. $i = .10$

Reduce K from 6.10 to 4.64 — (a 20% drop in $\underline{n}$ causes a $\left(-\frac{4.64}{6.10} = 24\%\right.$ drop in K.)

J. Fallacy of Universal Complementarity

1. Inherent in 2 factor models

2. Built into Cobb-Douglas

3. Overlooks preemptive side of MP: an input can have an MP not by ΔP, but lowering other costs. E.g.

a. Wtr. used for less int. crops, as in Tulare + Fresno cties, after 1950. Wtr. subs. for labor, & lowers output.

b. Sheep. 16th cent. enclosures.

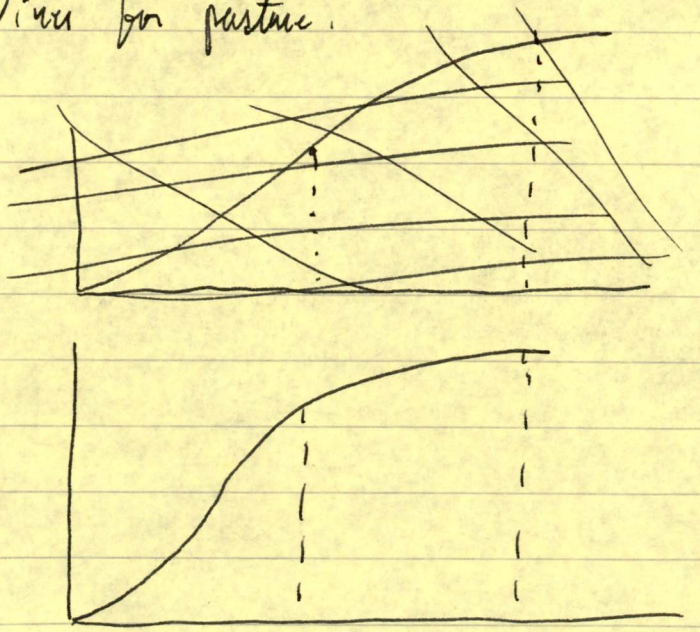
c. Cattle, esp. when on better land.

d. Timber

e. Satellite imaging for explm.
f. Indl. robots.
~~f. Power boats for recrn.~~

K. "Growth" – a false issue.
No need to stop growth, but change its character.
Embody tech. advance more often.

L. No need to lower output.
a. Vines for pasture.
b.



2 fast growth curves produce more than one slow one.

M. Bias during 60s to untax K, uptax labor. Prior reformers fell right into that.

N. Raise the $\frac{\text{Flow}}{\text{Fund}}$ ratio, means raising $\frac{\text{Inc}}{K}$ ratio.

(Now, is ca. ~~2~~ $\frac{1}{3}$, if land is counted in K, & pub. K ignored.)

O. K/O ratio has fallen, ~~which~~ but W/O fell faster, so K/W " " risen ⅔ (ref. p. 110, 116)

This seems to mean more land input.

P. p. 108, 4 major pts.

A. Factor mix vary. are sensitive to factor prices.

B. Tax bias is vs. labor.

C. To make jobs, ↓ demand for labor, not K

D. Δ Turnover.

A. Factor mix sens. to factor prices: p. 110

1. Mix already varies widely, bcs. internal costs differ. "Urban sprawl" as e.g. Intl. efforts (ugly Am. is one who imposes (U.S. propns. in India)

2. Large cos. K-intensity, layoffs, hi debt service, failure. Sep. cos. are smaller. (Cities work better. Larger cities, smaller firms.)

3. Need to develop intensive margin. E.g., use Sta. Cruz R. better.

E.g. energy cons., as per Lovins. "NegaWatts."

Wed., Feb. 5

4. K-intensive nature of urban sprawl + continental, & world
Hydro-imperialism as e.g. FRI for S.C.
Neglect of toxic plumes.

5. Crops, & Side – p. 112
Results v. irrd. pasture. (also uses more wtr.)

6. Intensity: 40% to 93%.
Leverage. Frustration of C. Chavez.

Downstream & upstream, intensive use makes more jobs.

7. Size of firm – p. 114.
(Great res. project.)
Effect of mergers – Udell (another great research project. Cf. Goldschmidt, Ballard, Olmstead, Wischemann.)
8. Gore.

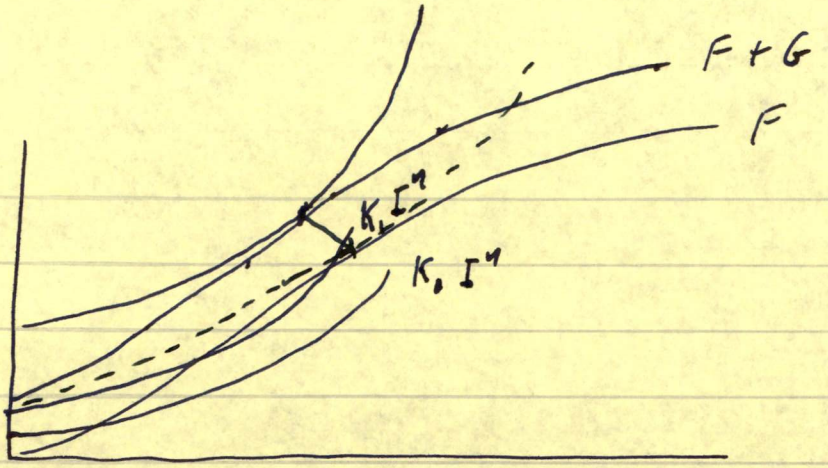
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9. 119 Guide to K-intensity
10. 121 Anon. p. 123, effect of higher wages.
Ricardo Effect.

11. 122-3. Not a gr. U.S. gut issue. Tax bias.

12. Bias vs. fast replmt. Answers, p. 123

B. Tuk bites - p. 124 ff.
One of the black holes



If K goes up, G comes down. This raises % growth rate of F+G, which is $\frac{F'}{F+G}$ at each point.

This defers cutting.

(Marginally, it lowers MC of time = i(F+G).)

Otherwise put, it makes it ec. to apply labor less often.

It raises share of wages in TP. TP is still F. Move to higher F, offsetting this — share of K rises even more! Bcs. i is same, F rises. G loses to both!

~~St~~ Coexistentially, is plain that if wages are high share of TC, then d.w.r. ~~acquires~~ takes big cut from rent and int. Thus it screens out labor-using products + processes. It requires more K, ~~but~~ (and land?) but rewards them less.

Why "more land"? If w.r. is higher, use land less

intensively, but ~~[illegible]~~ let unpol. land go, so use less overall. or min. wage law.

Ask what happens if land is fixed, and w.r. rise. ~~[illegible]~~ (e.g., due to higher pref. for leisure,) Screens out labor using land uses: a) all margins; b) Ext. margin c) Whole intensive uses, e.g. truck crops. Sub. K for labor. - use more K per worker.

If i.r. fixed, ~~K~~ r is pushed up, all comes from rent.

~~[illegible]~~ Does labor share of TP rise? ~~[illegible]~~ Rent falls, but there is now more K/W, and more G/W.

Effect of Δi on annual costs. for home, etc.

Put ~~[illegible]~~ $= K \cdot CRF$ ~~[illegible]~~ $= Ki + CCA$.

Put ~~[illegible]~~ $> Ki$

$$\text{Service Flow (SF)} = Ki + CCA = \text{Put}$$

$$SF - CCA = Ki$$

$$K = \frac{SF - CCA}{i}$$

cf. Ground. $$G = \frac{SF + gG}{i}$$

$$SF + gG = Gi$$

$$SF = Gi - gG$$

With ~~Ground~~ Ground,

$$P_{mt} = Gi = SF + qG$$

Here, $P_{mt} = CC > SF$

With K, $P_{mt} > CC = Ki$

?

---

1. W. short cycles, Labor is hi share of gross. Hi ~~wage~~ w.r. screens them out.
   a. By driving K to other uses (Arrow diagram)
   b. " " G " " " " (tree model)
   c. " " customers to other products.

2. Hi i.r. screens out long cycles - same 3 ways.

3. Common perception of this is thru monthly pmts., e.g. for a home.

   $P_{mt} = K \cdot CRF = Ki + CCa$

   If $n = 1$, $CCa = K$, Δi has little effect. Credit Cards
   If $n \Rightarrow \infty$, $CCa \to 0$, Δi has same " as ΔK.

4. Case of land w. rising rents — (effect something like $n > \infty$!)

CCA < 0

"Rent" = Gi − GGA (GGA = Ground Growth Allowance)

a. Here, "rent" means SF

b. Durable K requires land, so land cost is big factor. (Land-years is the measure.)

c. G itself is affected by i, so lower i may raise Rent.

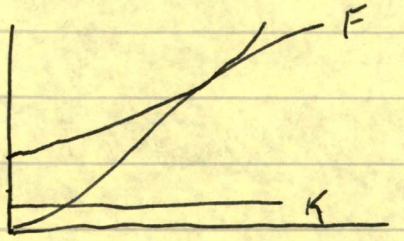
d. Cap. may be best way to show this.

5. ~~At $n \to \infty$~~ With $n \to \infty$, K has min. effect, but this min. is equal to i.

a. With monthly home rents,
Rent ⇒ Ki. K remains input.

b. With trees,
Cost = KI^n. But see (6)

6.



$$Gi = \left[-K + F I^{-n}\right] CRF$$

a. If $K << F I^{-n}$, a large % Δ of K ~~requires a small~~ takes a small cut of i ~~or G~~ (if n is high).

Solve for i:

$$G(1 - I^{-n}) = -K + F I^{-n}$$

$$G I^{n} - G = F - K I^{n}$$

$$I^{n}(G + K) = F + G$$

$$i = \left(\frac{F+G}{K+G}\right)^{\frac{1}{n}} - 1$$

Case A: $F = 100$

$G = 30$

$K = 5$, rises to 10

$n = 60$

i_0 is $\left(\frac{130}{35}\right)^{\frac{1}{60}} - 1 = 2.211\%$

i_1 is $\left(\frac{130}{40}\right)^{\frac{1}{60}} - 1 = 1.984\%$, a drop of 10%

(G remaining fixed)

~~Case A~~: If i remains fixed at 3%

$$G_0 = [-5 + 100 \times .170] \frac{1}{1-.170} = (-5+17) \times 1.204$$

$$= 12 \times 1.204 = 14.45$$

$$G_1 = 7 \times 1.204 = 8.428, \text{ a drop of } 41.7\%.$$

Case B: K is 10, rises to 20
Much bigger effects on i and G.

b. If n is high, the same % Δi wipes out G
E.g.: double i from 3% to 6%.

$$G_0 = (-5 + 17) \frac{1}{1-.170} = 12 \times 1.204 = 14.45$$

$$G_1 = (-5 + 3.03) \frac{1}{1-.030} = (-1.97) \times 1.03 = -2.03$$

(notice dual effect on G)

7. Same with Δ's: $\Delta G = [-K + a \frac{1 - I^{-n}}{i}] \cdot CRF$

$$= -K \cdot CRF + a$$

That makes it look as though K has ~~more~~ as much or more leverage than i. But rewrite:

$$Gi = -[Ki + cca] + a$$

$$cca = K\left(\frac{i}{1-I^{-n}} - i\right) = K\left(\frac{i - i + iI^{-n}}{1 - I^{-n}}\right)$$

$$= K\,\frac{i}{I^n - 1}\,, \text{ varies from } K \text{ to } \to 0$$

as n lengthens. As i rises, falls very fast.

$$Gi = -\left[Ki + \frac{Ki}{I^n - 1}\right] + a$$

$$= -Ki\left[1 + \frac{i}{I^n - 1}\right] + a$$

$$= -\left[Ki + \frac{Ki^2}{I^n - 1}\right] + a$$

To show: $-\Delta i$ may lower demand for labor, by favoring slower uses of land. Higher K favors slower uses of land.

I. Low intensity uses can survive higher w.r. to i.

II. Hi int. uses may be hi on labor or K.

III. Problem: K-int. use is sensitive to hi w.r., bcs. non-land input = K · IPF

A. If n is hi, IPF is
   i) Lower – so CF can be lower.
   ii) Can absorb ΔK by a small % drop.
   iii) CF/K is lower; K/CF is higher

IV. Let $a = -K \cdot IPF + CF$
Let $-K \cdot IPF = .9\ CF$
Then $a = .1\ CF$
If K rises 1%, $a = 0$
If IPF rises 1%, $a = 0$
If $n = 1$, a huge rise of i is needed to make IPF rise by 1%
If $n \to \infty$ a small " " " " " "

The problem is, in either case, an 1% rise of K makes K · IPF rise by 1%.

We are bombarded with claims that lower $\underline{i}$ helps employment.

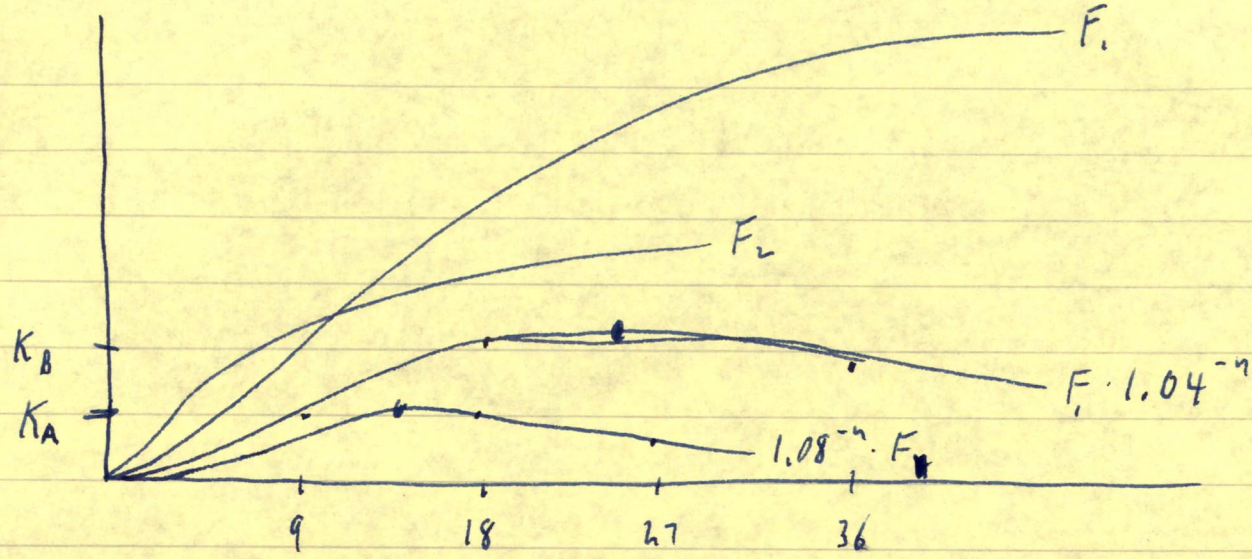
Rather, it helps use K to displace labor.

Is cost of a durable more sensitive to $\underline{i}$ than K? The wrong answer comes from defining cost as $K \cdot IPF$.

Rather, look at compn. for land.

$$a = [-K \cdot IPF + CF] *$$

If $n = 1$, $\underline{a}$ is ~~to~~ insensitive to $\underline{i}$, but very sensitive to K. $\underline{K}$ now will be high relative to $\underline{CF}$, so



Δi

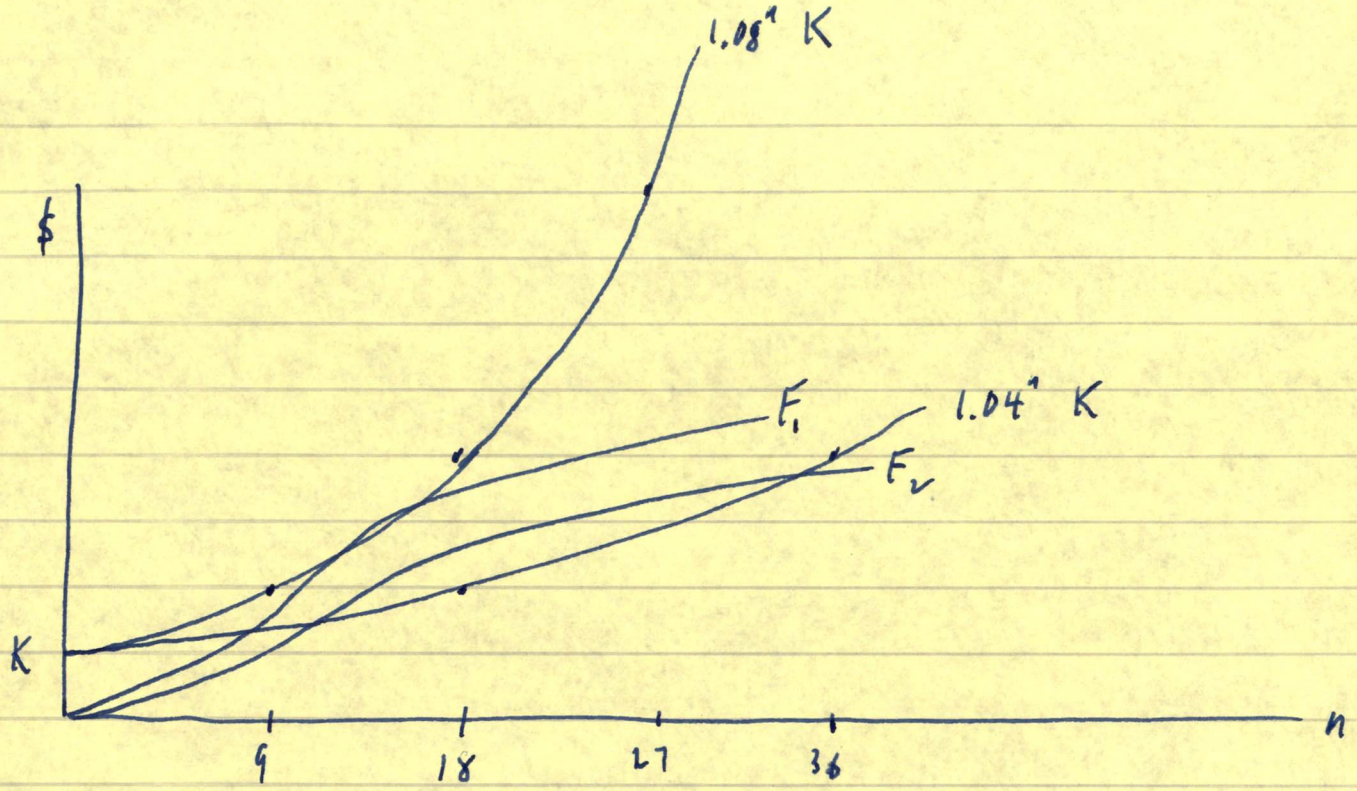
1. Max moves to left.
2. Slow-decay F_1 cycle is penalized relative to fast F_2 cycle.

ΔK Opposite effects.

1. Max moves to right (bcs. of lower G)
2. F_2 screened out; F_1 stays in.

Use London paper.

A.



Effects of Δi

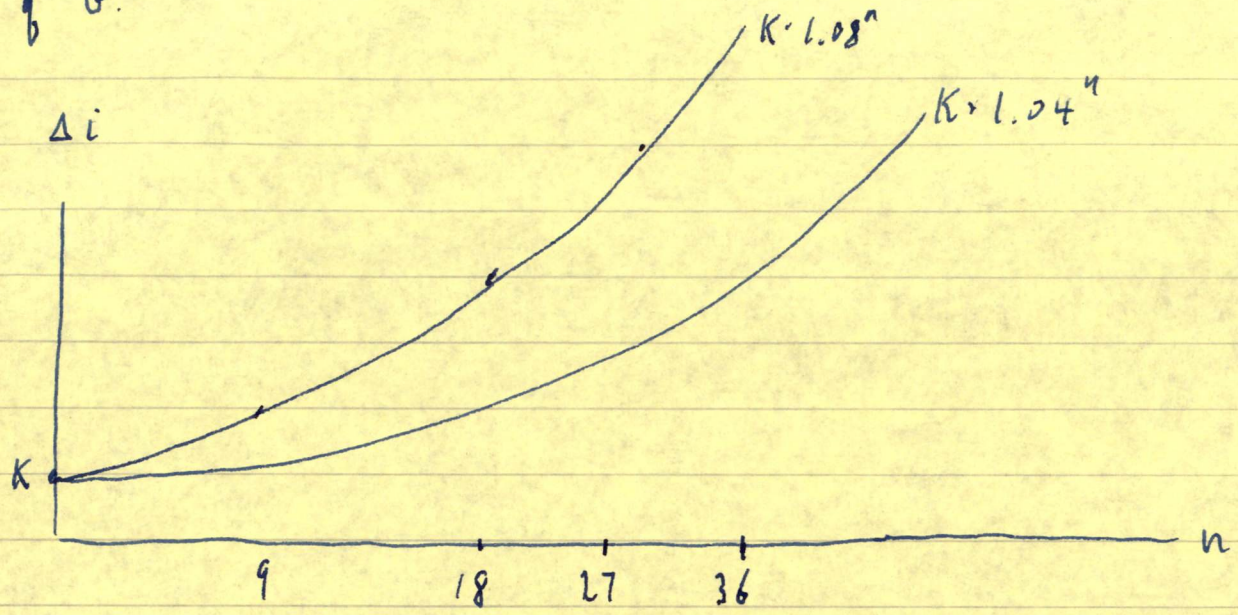
1. G falls. $\quad G = \dfrac{-K + F_n I^{-n}}{1 - I^{-n}}$

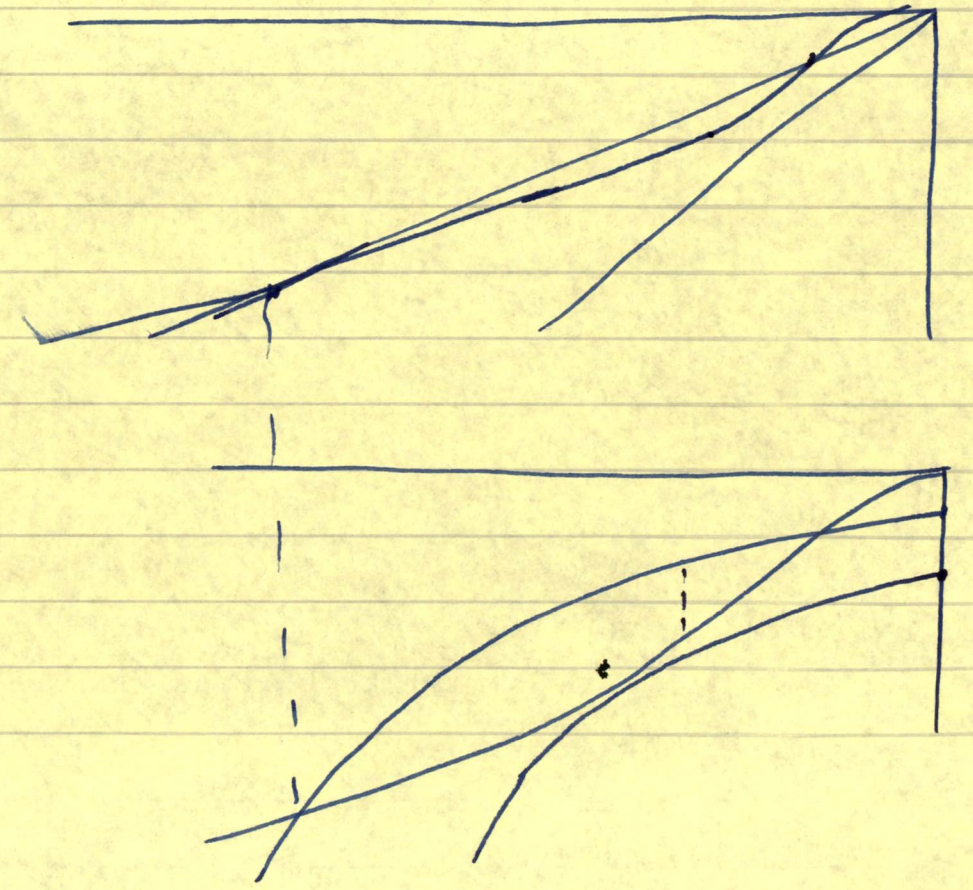
Triple impact:

a. Increase in num.

Effects of Δi and ΔK on G. Showing sensitivity of G.

A. Δi





THE BUDGET

FEBRUARY 10, 1992

GRAB-BAG ECONOMICS

BUSH'S FISCAL TRINKETS WON'T FUEL GROWTH

In his State of the Union address on Jan. 28 and again in his budget proposal for fiscal year 1993 issued the next day, President Bush stayed the course. The President's growth agenda creates little short-run fiscal stimulus, raises the deficit modestly, and recognizes—but does not really address—the nation's long-term economic problems. The President's men said all along that Bush was suffering from a communications problem, not an economic one. So in the speech, Bush made it plain that he sympathizes with victims of what Democrats are happy to call the Bush recession. "I know we're in hard times," he declared. "But I know something else: This will not stand."

Just the same, neither the speech nor the massive $1.5 trillion budget offers much to spur near-term growth. Instead, Bush seemed intent on buffing his image without derailing a recovery that his closest aides think is already near. "Although the economy is sluggish," says one Bush adviser, "it is on the way back. Even if there were a silver bullet, there's no need for one now."

STOCKING-STUFFERS. The much-vaunted middle-class tax break turns out to be a $500-per-child rise in the personal exemption and a tweaking of withholding rates to give taxpayers more now, in exchange for smaller refunds next spring—after the election. The stimulus was kept small to avoid spooking financial markets. But they didn't seem impressed, dropping sharply the day after the speech. The Bush package doesn't figure to spur growth much, but it's loaded with stocking-stuffers for taxpayers (table). Says William A. Niskanen, a former economic adviser in the Reagan Administration: "This is not serious. It's not the sort of tax package you would want for the long run."

STATE OF THE UNION

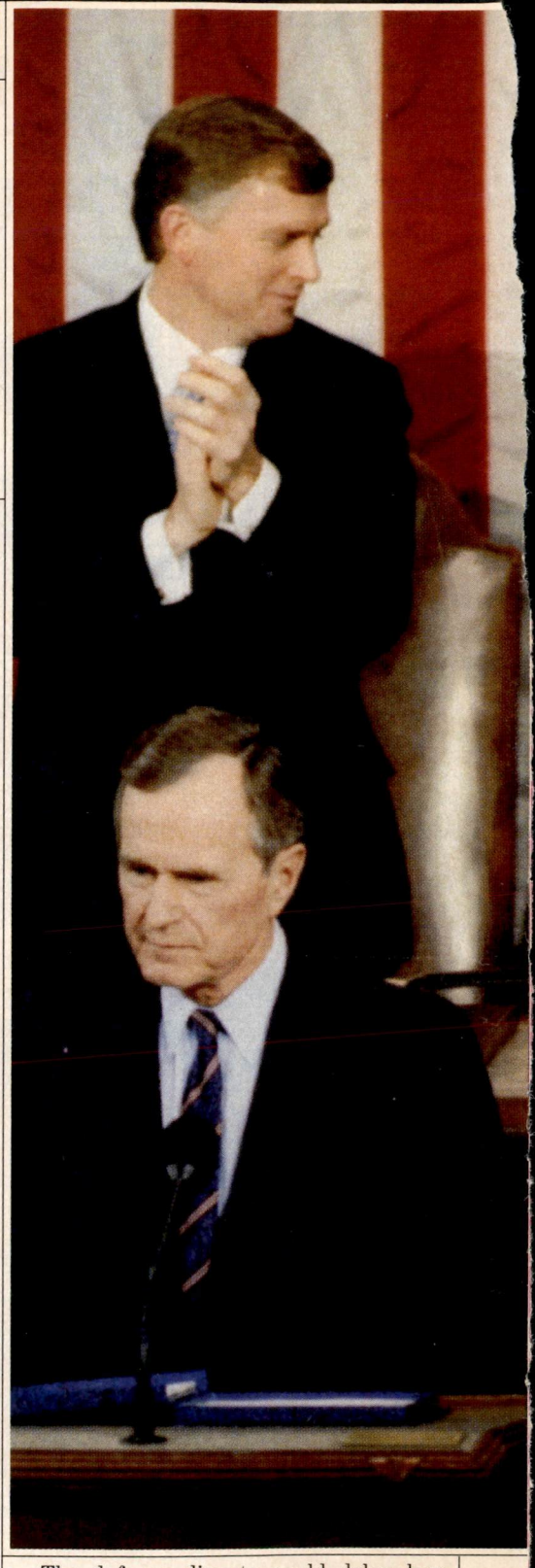
'I know we're in hard times. But I know something else: This will not stand'

The big winners: first-time home buyers and real estate developers. Investors would get a tax break on capital gains. Business, which had hoped for relief on capital spending, gets little. Bush's longer-range proposals recognize, finally, the need for dramatic changes in defense and health care policy. But the specifics offer little more than a down payment on both.

While congressional Democrats are grumbling loudly about the package, most believe that its proposals are a good starting point. They should. Many of the provisions have been in the Democratic playbook for years. "We can do business with this," says one top Senate Democratic aide.

Since there will, of course, be much haggling over the details, can Congress pass this package by Mar. 20, Bush's deadline? That's a long shot, but a bill may well be finished by late spring.

The real debate will be over defense: how much to cut spending and what to do with the money (page 27). Bush has proposed cutting anticipated military spending by $50 billion over the next five years. Democrats want to cut twice that much, but they're divided over how to spend the peace dividend. Some would use the money to pay for middle-class tax cuts. Others prefer to reduce the deficit. A third group wants to fund domestic programs. Bush wants deficit reduction, but Budget Director Richard G. Darman hints the Administration would agree to use the savings to pay for tax cuts.



The defense dispute could delay key tax decisions. In the meantime, business will keep a close eye on Capitol Hill to see how the Bush plan fares. Here's a closer look at some details and a preview of how Congress will receive each one:

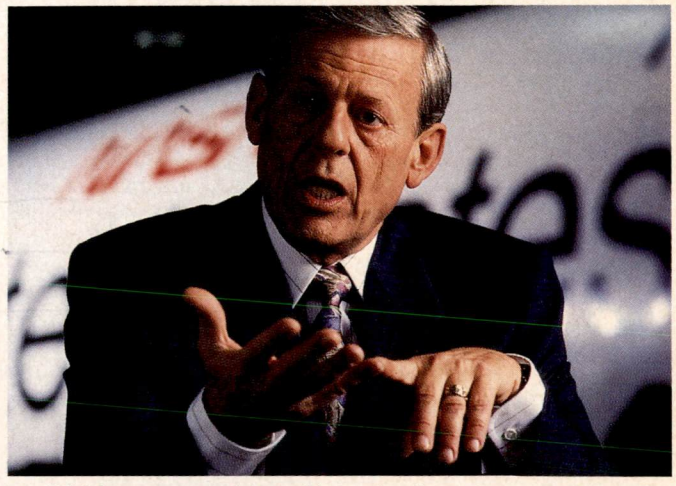
■ **Capital investment.** Bush would allow companies to take an additional 15% deduction for the cost of equipment they purchase between now and the end of

PHOTOGRAPH BY AP/WIDE WORLD; ILLUSTRATION BY LAUREL DAUNIS/BW

Windows opens up a new universe for McDonnell Douglas.



"Windows allows that ease of learning, that graphic function, that engineers appreciate."



"I'd have to add 20% to the head count to go back to character-based functions."



"Windows removed the drudgery and added fun to it. And why shouldn't you have fun?"



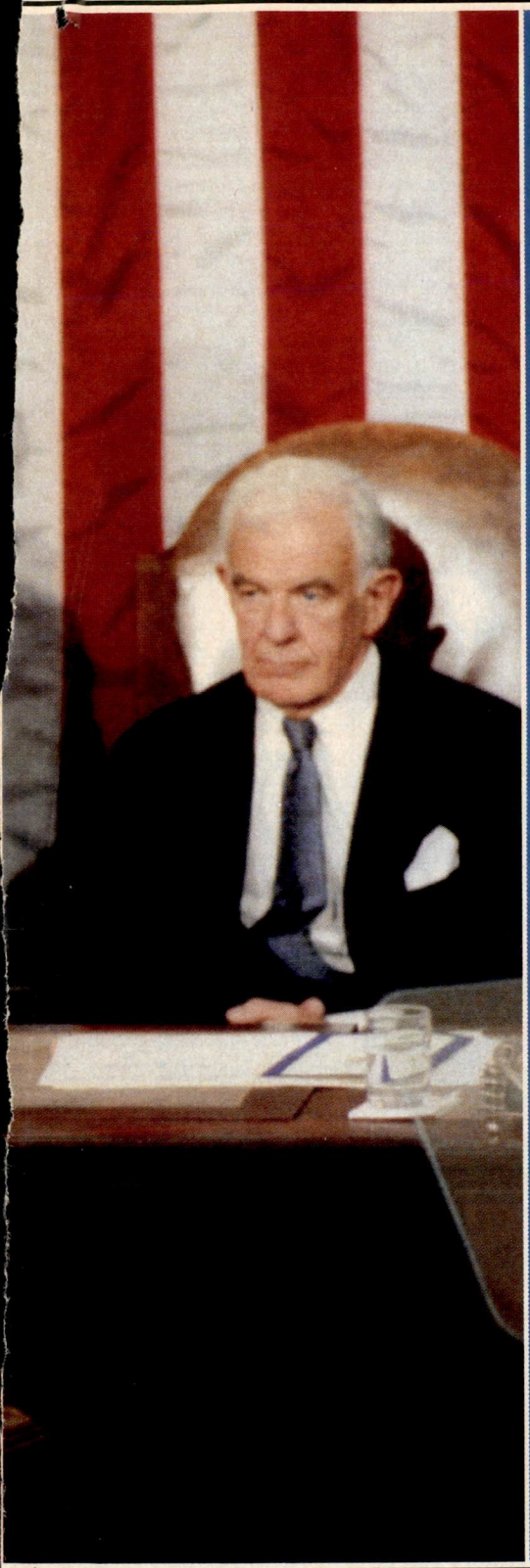
"The type of software that was available to me was greater and did the job I needed done."

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THE BUSH AGENDA: WHAT FLIES, WHAT DIES

CAPITAL GAINS

PROPOSALS: Bush wants to cut the tax on capital gains to 15.4% for assets held at least 3 years. Democrats will probably go along, for a price

LIKELY FATE: *Pretty much a done deal if Bush agrees to hike taxes on the rich. Look for a Democratic alternative that shifts benefits to the middle class*

MIDDLE-CLASS TAX RELIEF

The White House would raise the personal exemption by $500 per child. Democrats prefer a credit for lower incomes

Who's going to oppose a middle-class tax cut in an election year?

INVESTMENT INCENTIVES

Bush would allow a 15% deduction for equipment purchased in 1992. Democrats and some Republicans prefer an investment tax credit

Some version sure to pass

TAX HIKE ON THE RICH

Bush rejects it as antigrowth. Democrats, sensing a good issue, will demand it

It's a winner for Democrats

NEW REAL ESTATE TAX BREAKS

Bush would restore a passive loss deduction for developers, give first-time homebuyers a $5,000 credit, and allow penalty-free IRA withdrawals to buy a house

Bet the house: Most of this will be adopted

DEFENSE CUTS

Bush would slice $50 billion from planned defense spending over the next five years. Democrats want to cut twice that much

Near-term cuts will be close to Bush proposal, long-range cuts closer to Democratic view. Real fight will be over what to do with the peace dividend

BUDGET DISCIPLINE

The President and top House Dems would keep the framework of the 1990 budget deal. Senators want to scrap key elements

Look for a carefully crafted compromise that no one really understands

DATA: BW

the year. This would speed up tax write-offs for equipment but do little to reduce the cost of capital for most businesses. Emil Sunley, a senior tax economist at Deloitte & Touche, estimates that the Bush plan is roughly equivalent to a 1% investment tax credit. Adds Pamela J. Pecharich, director of tax policy at Coopers & Lybrand: "It's going to be a big disappointment to business." Nonetheless, a revised version of the Bush plan—possibly a restored investment tax credit—could well pass.

■ **Capital Gains.** The President wants to cut the top capital-gains rate from 28% to 15.4% for assets held at least three years. Despite the rhetorical confrontation over this issue for the past several years, the majority of congressional Democrats will back a cut in the capital-gains tax—under certain conditions.

First, they may try to tailor the plan to the middle class. House Ways & Means Committee Chairman Dan Rostenkowski (D-Ill.) may offer a counterproposal similar to a measure that passed the House in 1990. That plan would exempt from tax the first $1,000 in gains taken each year and provide a onetime $200,000 exemption for gains from the sale of a home or business. Likewise, the Senate Finance Committee will pass some sort of gains tax cut.

But Democrats in both houses will exact a price: a tax hike on the wealthiest individuals. The increase is not so much to pay for capital-gains relief as it is an attempt to prevent a windfall for the rich. Democrats believe they have a powerful issue in "fairness," and they'll invoke it freely in the coming debate.

■ **Soak the rich.** Bush may actually propose a tax hike for high-income individuals in the health insurance plan he'll offer soon. While he will resist a rise in the top income-tax rate, the wealthy can be hit in other ways, such as a further phase-out of deductions.

■ **Savings incentives.** As proposed by Bush, who has adopted a plan offered last year by Senate Finance Committee Chairman Lloyd Bentsen (D-Tex.) and Senator William Roth (R-Del.), individual retirement accounts would no longer have much to do with retirement. Unlike the current IRA, the new version offers no tax break when contributions are made but allows tax-free withdrawals for any purpose after seven years. This kind of tax-free savings plan is hugely popular on Capitol Hill. But Rostenkowski and other Democrats may insist that Bush find a way to pay for big future revenue losses.

■ **Real Estate.** The President is proposing a cornucopia of new tax breaks for real estate developers and home buyers. First-time home buyers would be able to use their IRAs for a down payment and would enjoy a $5,000 tax credit as well. Developers could use losses to offset profits from unrelated projects. The proposal enjoys wide support on Capitol Hill, where most lawmakers back a somewhat broader measure.

The tax debate won't be pretty, and a budget deficit that could hit $400 billion this year will keep a final measure modest. But by springtime, Congress should pass a tax cut that business will like. It may not hasten the recovery much, but it won't hurt much, either. If the economy breaks his way, that may be just enough for George Bush.

By Howard Gleckman, with Susan B. Garland and Brian Bremner, in Washington

POLITICS



KERREY VIEWS THE COMPETITION: HIS MEANDERINGS ARE BRUISING HIM IN THE POLLS

BRIAN SMITH

A WINTER OF DISCONTENT IN NEW HAMPSHIRE

Bush is taking plenty of flak, but that doesn't make anyone else popular

George Bush couldn't have asked for a better audience. On Jan. 28, 800 members of New Hampshire's business elite gathered in a Manchester hotel to toast their survival in a tough year and watch the President unveil his economic program. On a screen that towered over the ballroom, they saw Bush adopt the martial rhetoric of Operation Desert Storm as he vowed to vanquish the recession with laser-guided tax cuts.

But judging by the muted reaction to his remarks, Bush, in his new role as economic field general, still has a way to go to convince voters that his policies can halt the state's economic malaise. That's why New Hampshire, whose Feb. 18 primary marks the real start of the Presidential campaign, remains a political mine field for the President—and a tempting opportunity for his critics on the left and the right.

BROKEN PROMISE. For Bush partisans, the can-do spirit of the speech struck a responsive chord. "Bush had his Presidential face on," says Franne Ciriello, a Manchester ad exec. "That's something we haven't seen much of lately."

Voters elsewhere in the state echoed that thought. "Bush's ideas are good," says Sheila Mansur, 33, a pharmaceutical technician from Nashua. "I may vote for him again." Adds Concord lawyer Thomas Rath, a prominent Republican: "Bush wasn't whiny. And his attacks on the credit crunch will go over well here."

STATE OF THE UNION

But the President still has fences to mend. Kevin Prescott, an electrician with Public Service of New Hampshire, hasn't forgiven him for breaking his no-tax pledge. The speech moved the 36-year-old Pembroke resident from the "no way" column to "maybe." But no further. "The long-term plan had no specifics," says Prescott. "It's almost another campaign promise—and he kicked us last time." Republican Pete Lamson, co-owner of PB Circuits, a small high-tech concern in Hudson, says the President's prescription "is a start. But even if he can get it through Congress, it won't turn around the economy overnight."

Although the State of the Union may firm up the President's New Hampshire base, some onetime Bush backers are shopping for alternatives. Declares Marcia Zahr, assistant to the president of PowerHouse Programs Inc., a family-run telecommunications consulting outfit in Bedford: "I'm not going to vote for Bush again. We're a classic startup, and we're hanging by a thread. Bush just doesn't seem to care." Instead, Zahr is supporting right-wing insurgent Pat Buchanan. It's embittered voters like her who make Governor Judd Gregg fret: "Buchanan could get 30% of the vote."

Other Republicans, though, can't stomach Buchanan's "America First" pitch. So they're flirting with the Democrats. Mike Danielian, 61, a former contractor from Hampton, turned up at a coffee klatch for Nebraska Senator Bob Kerrey the other day—and pronounced himself impressed. "The Bush Administration has driven me pretty close to bankruptcy," says Danielian.

ZERO CHANCE. Democrats should be poised to tap this vein of discontent. But joy over Bush's troubles has been muted by a growing awareness that the Democratic field is astonishingly weak. Local favorite Paul Tsongas impresses folks with his probusiness message but is given zero chance of capitalizing on a good New Hampshire showing. Iowa Senator Tom Harkin's New Deal nostalgia hasn't caught fire. And Kerrey's meanderings on the stump are killing him in the polls.

Then there's Arkansas Governor Bill Clinton (page 97). He remains the frontrunner, but the furor over his alleged extramarital affairs has stopped his momentum, and his ability to weather the crisis is in doubt. "People may initially rally around Clinton," says David W. Moore, a political science professor and pollster at the University of New Hampshire. "But the longer the story drags on, the more shifts there will be to candidates perceived as less dangerous."

If Clinton self-destructs, Democratic leaders may begin a frantic search for a late-starting salvation candidate. Already, backrooms are buzzing with talk of a possible entry by Texas Senator Lloyd Bentsen, House Majority Leader Richard A. Gephardt (D-Mo.)—even New York Governor Mario M. Cuomo, whose Presidential musings never cease. "Clinton aside, this is a pathetic field," says Atlanta pollster Claibourne Darden. "If he gets weaker, it'll create a vacuum that must be filled."

Given the Granite State's tepid response to the State of the Union message, New Hampshire remains risky territory for the President. But barring an unforeseen shift in the political winds, Bush may be able to limp away with only a few flesh wounds from the pesky Buchanan—and a growing sense of confidence that however large his troubles loom, the opposition remains in no position to take advantage.

By Lee Walczak in Portsmouth, N. H., Douglas Harbrecht in Manchester, N. H., and Gary McWilliams in Nashua, N. H.

ESSAYS ON ISSUES

THE FEDERAL RESERVE BANK OF CHICAGO

OCTOBER 1987
NUMBER 2

Chicago Fed Letter

David Aschauer

Is the public capital stock too low?

In the *Wealth of Nations*, Adam Smith argues that one of the basic responsibilities of the "sovereign or commonwealth" is to provide an adequate structure of public works to "facilitate the commerce of society." An extensive and well maintained system of roads, bridges, highways, lighthouses, and canals is necessary to meet the needs of a vital, growing economy. The duty of constructing such public works falls to the government because their benefits accrue not just to particular individuals but to the economy at large, or because the cost reductions derived from economies of scale are best captured by direct, centralized, public capital outlays.

This essay argues that current public capital expenditures are too low. The argument begins by examining recent trends in public expenditures, particularly public spending on the infrastructure of the economy, such as roads, sewers, bridges, and the like. It then shows that public sector investment ultimately increases the private capital stock by influencing the rate of return to private investment. Thus, public capital expenditures are a critical determinant of the nation's long-run production potential.

Public expenditure trends

The accompanying table presents data on United States government spending at the federal, state, and local levels during the period from 1953 to 1984. The first column indicates that total public expenditure has trended upward over this period. Government sector expenditures rose from 26.1 percent of gross national product during 1953-59 to 33.9 percent during 1980-84. In 1982 dollars, public sector spending grew from $507 billion in 1953 to $1,174 billion in 1984. Despite the Gramm-Rudman Act and attempts to slash public sector budget deficits on the expenditure side, the rising pattern of government spending continues in the 1980s.

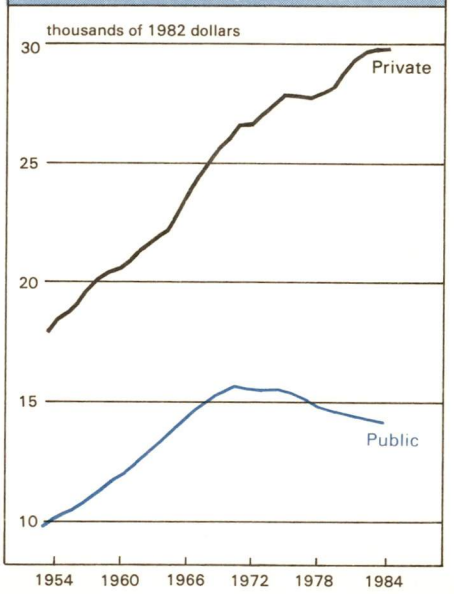
The second column shows the share of total output devoted to expanding the nation's nonmilitary public capital stock. Net public capital formation—the level of investment in roads, bridges, and so forth, after accounting for physical depreciation—tumbled from a high of 2.3 percent of GNP in the latter half of the 1960s to only 0.4 percent during 1980-84. In terms of constant 1982 dollars, public net investment was $11.5 billion in 1984, down from $27.6 billion in 1953 and $62.8 billion in 1964.

Public expenditure and the return to private capital

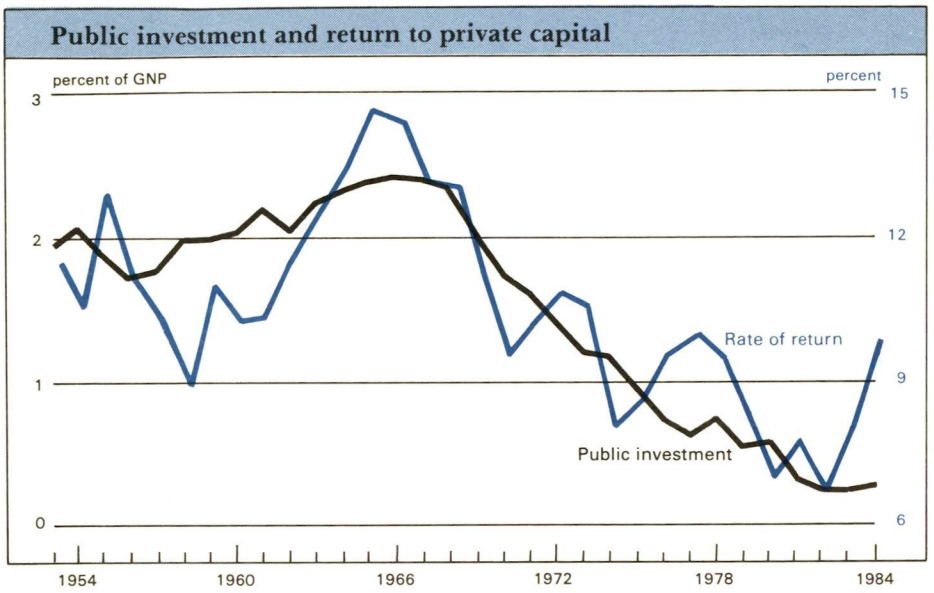
	Total government expenditure (% of GNP)	Public net investment (% of GNP)	Profit rate (%)
1953-59	26.1	1.9	10.8
1960-64	27.6	2.2	11.6
1965-69	29.1	2.3	13.3
1970-74	31.2	1.4	9.8
1975-79	32.1	0.7	9.1
1980-84	33.9	0.4	7.9

Sources: *National Income and Product Accounts*, U.S. Department of Commerce and *Flow of Funds*, Federal Reserve System.

Capital stock per worker



The graph illustrates the different behavior of the private as opposed to the public capital stock during the last three decades. During the earlier period, 1953-71, both the private and public net investment rates exceeded the growth rate of the work force, producing rising private and public capital stocks per worker. However, since 1971 net public investment has lagged behind growth in the labor force and the amount of public capital per worker has contracted from $15,576 in 1971 to $14,224 in 1984. During the same period, the private capital stock per worker has expanded from $26,654 to $29,905. A dynamic, competitive world dictates that those with influence on the nation's economic destiny be forward looking and prepare for the future in the present. Hence, it is now imperative to reassess our public investment policy.



Public investment, private investment, and the rate of return

Changes in public investment can have significant impact on private investment. For the period from 1953 to 1984, net private investment in equipment and structures averaged 3.1 percent of GNP while net public nonmilitary investment averaged 1.5 percent. During this time private and public investment exhibited nearly the same amount of volatility. Net private investment ranged from a high of 4.6 percent of GNP in 1966 to a low of 1.3 percent in 1983, while public investment hit a maximum, 2.4 percent, in 1966 and a minimum, only 0.3 percent, in 1982.

We can think of the impact of public capital accumulation on private investment as falling into two broad categories of effects, depending on whether the public investment "crowds out" or "crowds in" private investment.

Crowding out?

Higher levels of capital accumulation by the public sector arguably crowd out a substantial amount of private investment for several reasons. To the extent that publicly provided capital serves as a substitute for private capital in private production technologies, firms require less private capital to produce the same level of output. In addition, higher public sector demand in the capital goods producing sector raises the price of capital goods, thereby lowering the quantity of goods demanded by the private sector. Finally, the increased government demand creates a general scarcity of current resources, a rise in real interest rates, and a further contraction of capital spending.

In recent empirical work, I find that, holding fixed the rate of return to private capital, an increase in public investment expenditure of $1 billion crowds out anywhere from $1 to $1.5 billion of private investment expenditure.[1] The crowding out appears to occur without the assistance of changes in the cost of capital. That is, firm managers appear to take directly into account the availability of public capital for use in private production.

This result indicates that the level of the public capital stock in the United States indeed may be too low. An efficient level of public capital is attained when the addition of an extra unit of either private or public capital has the same impact on the nation's output. If the aggregate response of private firms to an expansion of public capital is to reduce private capital spending on a greater than one-to-one basis—and my empirical results suggest that this is presently the case—the marginal product of public capital may very well exceed that of private capital in private technologies. Further public capital accumulation is then required to drive down its productivity, on the margin, to equal that of private capital.

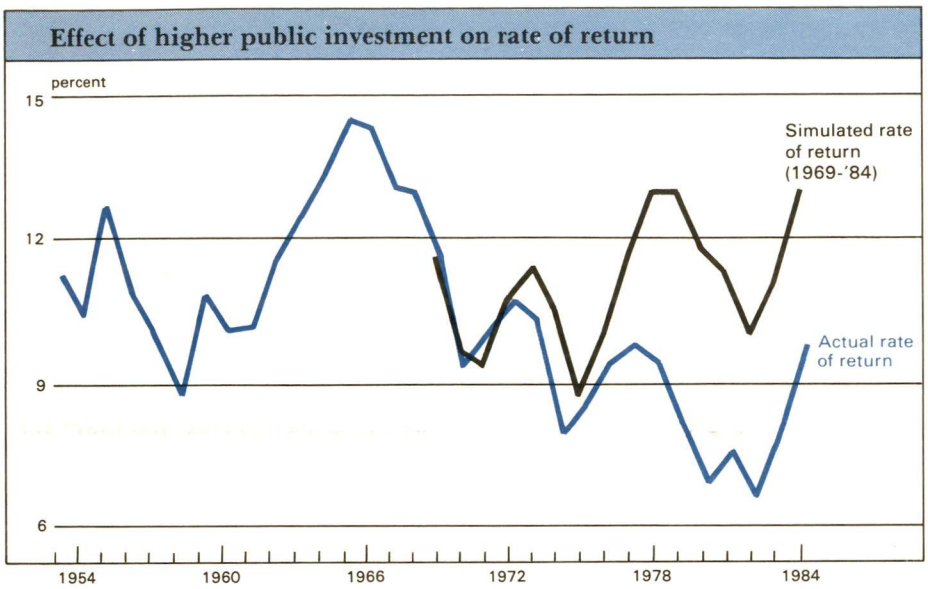
Or crowding in?

The above argument is based on an unchanged rate of return to private capital in the face of higher public capital accumulation. However, public capital devoted to infrastructure purposes is complementary to private capital in the production of goods and services. This implies that a rise in the public capital stock makes private capital more productive. New highways allow faster transportation of goods from factory to market; modern power plants cheapen energy and lower the cost of running machinery. Thus, higher levels of public investment filter into elevated profit rates for the nation's businesses.

The third column of the table contains annual averages of the net profit rate of nonfinancial corporations in the United States.[2] In a competitive marketplace, the net profit rate approximates the marginal productivity of private, nonfinancial corporate capital. As the table and graph illustrate, there is a striking tendency for the economy's rate of profit—the private rate of return on invested capital—to be high when the level of public capital formation is high over the course of several years. In particular, the decade of the 1960s reveals the highest returns on the private sector capital stock as well as the highest rates of public sector capital accumulation.

The disturbing feature of the table, of course, is the evidence from the 1970s and early 1980s. The public investment rate during this time dwindled to less than 1 percent of GNP and the rate of return to private capital shrank to 8.9 percent, more than one and one half percentage points below its post Korean War average of 10.8 percent and three and one half percentage points below the average value of 12.5 percent for the 1960s.

I am not suggesting that deficient public capital formation alone is responsible for the recent low rate of return to the nation's private capital stock and sluggish total investment. Low levels of capacity utilization in the economy's factories, mines, and utilities brought on by oil price increases and real ex-



change rate appreciation helped diminish the net profits obtained per unit of capital. However, statistical analysis indicates that the level of public capital strongly influences the net return to private capital even after accounting for such cyclical effects. The empirical results show that a 10 percent increase in the capacity utilization rate from its 1984 value of 74 percent would have raised the profit rate from 9.9 to 11.4 percent. But, in the same analysis, a 10 percent increase in the public capital stock (five years of extra net public investment of $32.4 billion, or an extra 0.9 percent of GNP) would have increased the rate of return by a still larger amount to 12.6 percent.

What would have been the effect on the rate of return to capital of maintaining a constant level of public investment of 2.1 percent of GNP—its 1953-to-1969 average—throughout the 1970s and early 1980s? The result of this experiment is depicted in the graph above. Evidently, holding public capital accumulation at this level would have eliminated the downward trend in the rate of return to private capital, although the substantial fluctuations resulting from changed currency valuations and capacity utilization still would have remained.

The likely net effect

Given these conflicting influences, what appears to be the overall impact of public investment on private investment? The available estimates imply that a temporary surge of public investment of 1 percent of GNP ($34.9 billion in 1984) would first depress private investment by 1.2 percent of GNP ($41.9 billion). However, as the rate of return to private capital increases with the higher public investment, expenditures on private plant and equipment would be stimulated, ultimately inducing a cumulative rise in the private capital stock of roughly $39 billion over its 1984 level of $3,442.8 billion. The rate of return to private capital would rise from 9.9 percent to 11 percent and gradually fall back to its original level. The national (private plus public) capital stock would have risen from $5063.6 billion to $5137.6 billion, a rise of 1.5 percent. Thus, the net effect of temporarily increasing the public investment rate is a substantial increase in the national capital stock. Clearly, public investment policy has important consequences for the economy's production possibilities.

Taking stock

The public capital stock appears to be too low relative to the private capital stock, thereby depressing the rate of profit to the nation's stock of plant and equipment. Large public sector deficits of recent years have brought attention to the overall scale of government activity. Some argue that the government should spend less and others that it should tax more. Both of these responses to the problems posed by federal budget deficit are reasonable.

However, the evidence discussed here suggests that more attention should be paid to the composition of the government's expenditure, and particularly its effects on the nation's infrastructure needs. While total spending mounts, investment in public works slides. Indeed, the share of total public expenditure dedicated to net public capital formation declined from 8 percent in the 1960-64 period to a meager 1.2 percent between 1980 and 1984. By reorienting our public spending to upgrade and expand the public capital stock, we can heighten the productivity of our workforce and improve the competitive position of the United States in the increasingly open international marketplace.

David Alan Aschauer

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[1] These estimates are contained in David Alan Aschauer, "Net Private Investment and Public Expenditure in the United States 1953-84." Staff Memoranda, Federal Reserve Bank of Chicago, in press.

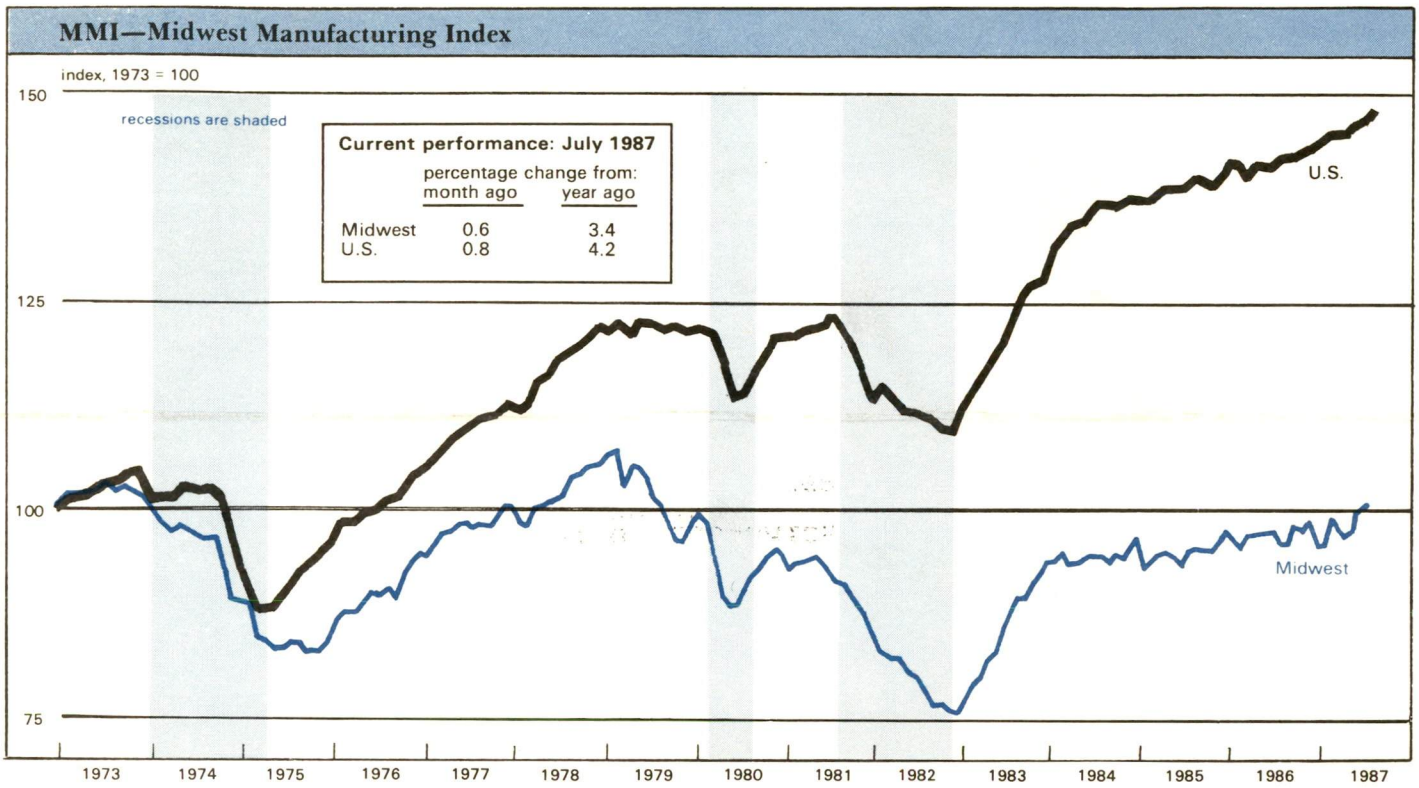
[2] The rate of return to capital is measured as inflation-adjusted corporate income after depreciation plus net interest payments (as a return to debt claims on firms) relative to the current replacement value of the nonfinancial sector's stock of fixed capital, land, and inventories.

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Manufacturing activity in the Midwest (defined here as comprising Illinois, Indiana, Iowa, Michigan, and Wisconsin) rose 0.6 percent in July, following an upwardly revised jump of 3.6 percent in June. The July gains were heavily concentrated in the primary metals industry, but modest improvements were also recorded in other major industries in the Midwest, notably fabricated metals, nonelectrical machinery, and electrical equipment.

Manufacturing activity in the nation (as measured by the Federal Reserve Board's Index of Industrial Production) slightly outpaced the Midwest both in July and year-over-year (see above table). However, in the last two months the MMI has moved to its highest level since September 1979.

NOTE: The MMI is a composite index of 15 manufacturing industries and is constructed from a weighted combination of monthly hours worked, and kilowatt hours data. See "Midwest Manufacturing Index: The Chicago Fed's new regional economic indicator," *Economic Perspectives*, Federal Reserve Bank of Chicago, Vol. XI, No. 5, September/October, 1987. The United States represents the Federal Reserve Board's Index of Industrial Production, Manufacturing.

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