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By Dr. Mason Gaffney

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Macroeconomic Chokes

Notes by Mason Gaffney

For use in Economics 103B, W91

One industry cannot expand without limit unless other industries do also. The demand for one product is limited, when the supply of all other products remains constant. That is the microeconomic choke.

But it would be a "fallacy of composition" to transfer the micro choke to the macroeconomy: there is no obvious demand limit for the whole economy when the supply of all products rises together. Markets basically exchange goods for goods. In terms of money and spending, that means each industry generates incomes which form the demand for other industries' products.

Some demands, like that for potatoes, may not keep pace with rising incomes; but others, called "superior goods," rise faster than incomes: such are travel, golf, medical care, legal services, and art, for example. Conventional living standards tend to rise with productive power, so that yesterday's luxury becomes today's necessity. And some people choose to enjoy affluence in the form of voluntary leisure, which produces no goods to choke any market.

And yet we face the paradox of hungry people, poorly housed, looking for work, unable to find jobs. Hunger is demand; work capacity is supply; but they cannot meet and satisfy each other. Why not? What is the choke?

Macroeconomics is a search for the answer. We present here 17 possible macro chokes (or bottlenecks), with annotations on each. At the end they are to be ranked in likely order of importance.

The chokes are shortages or inadequacies of the following:

- 1, Natural Resources;
- 2, Money;
- 3, Spending;
- 4, Capital;
- 5, The flow of capital, or gross investment;
- 6, Infrastructure (social overhead capital);
- 7, Knowledge of industrial arts, or technology;
- 8, Leadership and management skills in private and public administration;
- 9, Productivity;
- 10, Positive response of labor to incentives.

Additional chokes are too much of the following:

- 11, Monopoly;
- 12, Labor unions;
- 13, Taxes that vary with and therefore inhibit employment and production;
- 14, Dirigisme, regulation, paternalism, licensing, protection, etc., with the attendant suffocating bureaucracy;
- 15, Concentration of land, capital, economic power, and income;
- 16, Institutions that penalize functional productive activity, and reward parasitic, purely acquisitive and possessive behavior;
- 17, Corruption, mutual back-scratching, conflicts of interest, invasion and capture of governments by special private interests.

That is quite a list, which gives you an idea of how big a question we are asking, and how small a piece of what is important in life we have time to treat in 10 weeks. Ordinary texts, and most modern writers on macro, narrow the topic to items 2, Money; 3, Spending; 4, Capital; 9, Productivity; and perhaps 5, The flow of capital, or gross investment. It's a world that rewards specialization, so most economists, like others, become overspecialized. Having done so, with foolish pride and presumption they attach too much importance to the particular narrow slice of truth they perceive.¹

Let's keep things in perspective by surveying all 17 chokes. Then we'll follow an ordinary text's emphasis about halfway, because to function in this field you need to learn the rudiments of what is conventionally (if foolishly) called "macro-economics" today. But we'll also point you to some other matters which are equally or more important.

I. Scarcity of land and natural resources

A. Malthus the ultimate pessimist and misanthrope. Limits of the Earth; diminishing returns to labor and capital; iron law of wages, disappearing investment opportunities; etc. Malthus' gloom and doom made economics the "dismal science," when one of his followers recommended letting most Irish starve during the Great Hunger of 1845, as the only way known to "the science

¹Worse yet, many of them attach even more importance to the particular intellectual methods they use to perceive their truth, and lose themselves in developing and defending their methods, and attacking others, to the neglect of the truth and of the human problems these methods are supposedly developed to solve.

of political economy" to improve the lot of the average. Charles Dickens is said to have used Malthus as the model for Scrooge.

American neo-Malthusianism with the "closing of the frontier" from 1890. Integrated with early Keynesianism by Alvin Hansen, Keynes' apostle to America, with dismal doctrine of "economic maturity" and stagnation, fashionable ca. 1936-52. Revived again on the coat-tails of environmentalism, ca. 1968-80.

B. Artificial scarcity caused by engrossment, absentee ownership, speculation, underuse of land, lockouts, etc.

1. Jewish prophets: Amos, Jeremiah, Isaiah. We hear echoes of this from Pope John Paul II; the Catholic Bishops under Rembert Weakland; the National Catholic Rural Life Council; The Jewish National Fund in Israel; and numerous Protestant and ecumenical groups such as the Land Stewardship Council of North Carolina. It seems to be edited out of the Bibles of the TV evangelists, however.

2. Greek lawgivers: Lycurgus, Solon

3. Roman reformers: The Gracchi

4. Everywhere that fee simple title has spread. Major barrier to prosperity in most LDCs today is land monopoly, according to most outside economists (who can afford to be more objective when away from home). Somoza in Nicaragua; Las Catorce in El Salvador; Cory and her kind in the Philippines; etc.

5. Quesnay, Du Pont, T. Jefferson.

6. Adam Smith. Enclosures or "land monopoly" reduced demand for labor. Smith compares English and Spanish colonies, attributes greater prosperity of former to more equal distribution of land. Russia expanded like Spain, without much gain for any but a few great landholders who locked up the new lands. In Russia the state itself held much of the land.

7. Henry George and Thorstein Veblen, American economists, attributed much unemployment to concentrated ownership and withholding of land.

8. Data from today:

a. New jobs come from small, new firms. Traditional giants fire workers, hold onto lands.

b. Large firms use fewer workers per \$ of property value. Singer Sewing Machine and Mattel Toys have about \$5,000/worker; Chevron/GULF has about \$1,000,000 -- 200 times as

much.

c. Agriculture Census shows that the larger the farm, the fewer workers per acre. "Class I Farms" have 22% of the land with 7% of the labor. Texaco got 77,000 acres of California farmland with Getty Oil Co; Boswell has 150,000 or more acres; etc., etc., etc.

d. Jon Udell on the merger movement in Wisconsin. Wisconsin firms that got merged into national and multinational firms reduced their payrolls and their output.

e. Writings of Polly Roberts, on reserve. In chemical terms, land when concentrated in strong hands has a low "valence" for labor.

9. Failure and cooption of the intellectuals, a sad and sordid story of human weakness. All the above gets buried because of the influence of wealth on social thought. Wealth founds and patronizes universities and churches and think tanks and granting foundations. Today there must be at least 50 right wing think tanks granting money for economic research -- one for each state and Canadian province. Even little Montana has one or more; Vancouver has The Fraser Institute; California has several, some of them in the University System, taxpayer-supported.²

Wealth also determines who can run for office. Wm. Jennings Bryan set the course of "liberalism" long ago: abandon structural reform, run with the inflationary panacea (he got his money from silver mine owners).

10. Keynes revived the inflationary panacea in 1936, and founded what passes for modern macroeconomics. Like Bryan, Keynes offered inflation in lieu of structural reforms, but he was the man for his times because he was not a cornfed bible-belt rube but a British rouee with an effete sneer.

C. Studies of terms of trade.

Many economists have addressed the question of resource scarcity by studying the "terms of trade" between primary products and highly processed or manufactured products, the formerly presumably having more resource content, and the latter more labor content. Raul Prebisch (an Argentine) and other LDC economists have been grinding an obvious ex parte axe, trying to get preferential treatment for their countries; Resources for the Future (RFF), a Washington think-tank, is presumably more objective, to the extent that any organization can be which

²It is an eye-opener, 68 years later, to read Upton Sinclair, 1923, The Goose Step: A Study of Education in America.

depends for its existence on attracting grants and contracts from federal agencies and wealthy resource-holding industries and foundations.

Both have found that primary products have not risen in price relative to manufactured products, over 100 years. They have both badly overstated this finding, but the fact that they could maintain it at all, in the face of heavy criticism, shows at least that we are far from the Malthusian doom scenario.

The reason can be simply expressed. Malthusian pessimists see technology and capital as purely land-using and labor-saving, which a lot of it is. But as land gets dearer, more capital is land-saving, land-enhancing, and land-linking. Thus market forces stave off the Malthusian apocalypse.

RFF studies were pre-OPEC. Unfortunately, they developed a vested interest in their findings, which became the official organization viewpoint and could not be questioned. How do I know that? I worked there, 1969-73, and learned the hard way, they did not want to hear about biases in their methods.

They left out all subsidies; all transportation costs; and all costs of military protection, for example. They were in conservative hands that carefully steered away from studies of concentration of control over resource lands, and cartelization of the industry. They got their kicks out of taking easy shots at Dennis Meadows and Jay Forrester who had published a popular but vulnerable book called Limits to Growth, which forecast more resource scarcity.

The inevitable result? RFF was taken totally by surprise by OPEC. They never dreamed oil was scarce enough to let a small group control it. Oil jumped to \$30/bbl in the U.S. RFF would have looked better had they looked for the truth in Limits to Growth, rather than laughing at its mistakes.

The fashion today is to attribute high oil prices entirely to the OPEC cartel. But that is to miss the main point, which you should please get: it is natural scarcity that makes a cartel possible. Sure, the cartel takes a monopoly profit, but its very existence also warns us that there is a looming problem of natural scarcity. That is the bottom line for us.

D. Environmentalists vs. the GNP.

Barry Commoner takes on Walter Heller, accuses him of committing idolatry on the GNP (which Commoner calls "Gross National Pollution"). Heller proves him right by falling back on raising GNP as the only way to improve the environment, missing Commoner's point entirely. California elects a Governor who calls this the "Age of Limits" and appoints environmentalists. Ecology,

fish and game, endangered species, outdoor recreation, anti-pollution, anti-poison, and environment are the new priorities. That Governor is gone, but The Greens are rising, and the Sierra Club, Friends of the Earth, Audubon Society, Environmental Defense Fund, etc. etc. are everywhere. Ordinary texts do not speak to these concerns at all, although some other macro texts do. The object of policy should not be to maximize GNP as measured. That is why I emphasize employment: we can be sure that involuntary unemployment is bad, but not so sure that higher GNP is good.

"The Gross National Product is pretty gross," the saying goes. So is National Income, which at least nets out depreciation. But nothing is deducted for depletion, soil exhaustion and erosion, destruction of aquifers, removal of forests, etc.

We don't really consume goods, in a physical sense, we just turn them into garbage. Garbage pollutes, but nothing is deducted from GNP for that, not even when something like Stringfellow Acid Pits destroys a whole aquifer.

Cancer caused by pollution from oil refineries raises GNP when the victim buys gasoline, and again some more when he pays for medical care and hospitalization. Heroin and cocaine raise GNP, as does alcohol, and when one goes alcoholic and loses his liver that raises GNP some more, through death (pay the undertaker) or sickness (pay the doctor). Overweight people raise GNP as they eat, and again when they go to the fat farm to lose it. Advertising raises GNP, and so does the "blab-off" mouse we buy to tune it out.

Johnson bicycles to work very happily until Anderson gets a car and the streets get too crowded and dangerous for biking. So Johnson gets a car, gets flabby, is hospitalized with back pains and degenerative heart disease -- up goes GNP. The cars require parking lots which separate the stores so far apart that Mildred needs a car to shop, instead of the bus. And would you believe that grocery stores used to deliver! You just called in your order. (You think I'm making this up? --- ask your grandmother.) But folks scatter out to the suburbs, stores stop delivering, and granny has to move to the old folks' home -- up goes GNP. Postmen have to travel further to deliver mail, postage rises, up goes GNP. Etc., etc.

Charging admission at Yosemite Park raises GNP -- (when it was free it had no value, don't you see?). Polluting water upstream raises GNP, and treating it downstream raises GNP some more. The man who marries the housemaid lowers the GNP -- (now she works for love). Jones and Smith can raise GNP simply by trading houses so that each now lives farther from his work. Destroying mass transit raises GNP because commuting by car costs

more. Traffic jams raise GNP even more, by using up gasoline.

You get the picture. GNP is a measure designed by materialistic Philistines which leaves out many of the best things in life, and includes some of the worst. Environmentalists remind us of more than Nature, they point up the dangers of rampant materialism.

20 years ago Americans used half as much energy/capita as now. Were we only half as happy then? Most of us were just as happy 50 years ago, but don't take my word for it, look at the soaring suicide rate. Listen to the old-time music with its peaceful, sentimental themes and compare what you hear today, what is it telling you about the serenity of life? Have we elevated culture by evolving from Verdi and Emerson to Bruce Springsteen and Oral Roberts? Have we enhanced national security by evolving from the Minutemen to Star Wars?

No one says this is your fault. Even though it's happening to your generation, this is a world you never made. The point is just that GNP is not and never was a measure of welfare, it is just an accounting concept that got an early start and is now graven in stone.

So what do we do? We take full employment -- meaning voluntary employment, of course -- as a more meaningful goal. When we take materials from nature and add value to them by work the result is less "materialistic" than when natural material accounts for most of the value. Thus labor in secondary and tertiary occupations is an avenue for infinite economic growth without looting and spoiling The Earth's treasures.

E. Expansion into new lands.

Another deferral of Malthusian doom was expansion onto new lands. The "Anglos" (a loose term that includes most northwest Europeans) took Canada, the U.S., Australia-New Zealand, and parts of Africa and Asia; the Hispanics and Portuguese took Latin America; the Russians took northern Asia. Crowded people moved nearer to resources, thus bringing more land into the economy without adding too much transportation cost.

As noted, engrossment of land by a few limited the gains to a few, except in the Anglo settlements, where engrossment was partially offset by more egalitarian traditions. The Anglo frontier developed another problem, that of boom and bust. The frontiering tradition fostered wasteful habits toward land, and a cultural subconscious that still responds to insane rhetoric about colonizing outer space as though it were a continuation of the frontier. The challenge today is to modify the cowboy ideology in light of the hard fact that the world is round and limited; the military cost of holding more than our share is

ridiculously high.

At the same time, the economic alternative of devoting technology and capital to land-saving purposes is ridiculously easy. It entails a host of simple things like substituting jogging for golf; swimming for powerboating; hiking for ATVs; intensive margins for extensive margins; downstream processing and recycling for upstream extracting; husbandry for rape of the earth and its people.

II. Scarcity of money

This seems pretty tame and controllable compared to the limits of Earth itself. Money is cheap to print. Failing that, prices can fall so that any amount of nominal money, however small, can finance all the transactions in the world. A penny used to buy what takes a dollar today, and it could again if 99% of the money were destroyed.

So why is money a problem?

A. Past hyperinflations have left a legacy of suspicion, so that most advanced countries have strict controls on issuing money. Some of these had experiences were: France, 1720, under the Scotch adventurer John Law; the American colonies, 1776-81 ("not worth a Continental"); France again after the Revolution, the assignat and mandat currencies supposedly backed by confiscated lands; America again 1825-36, the era of "wildcat" banking; the Confederate States of America, 1860-65, with their "shinplasters" ("save your Confederate money, the South will rise again"); the German mark, 1923; the Chinese yuan under the Kuomintang; and today, the Israeli shekel and various pesos down south.

B. But these controls, once in place, can prevent monetary expansion ("dM", for short) when needed. Examples: U.S.A., 1893; England, the 1920s; U.S.A., 1929-33.

C. Why was dM needed? U.S.A. needed it in 1933 because half the banks in the country had failed, taking 1/3 of the M with them (bank deposits serve as M, as we will see).

D. Why did the banks fail? Because banks lend on the security of collateral, and collateral values collapsed. Collateral values collapsed for reasons of their own, just as farm land values and oil patch values and Texas urban values have collapsed in the last few years, taking hundreds of banks with them. Once the banks started collapsing in 1929 a snowball got started wherein every -dM caused a further decline of land values which caused a further -dM, etc.

Monetarists today, who dominate discourse in the field, are staunchly myopic and single-minded about this, as you will see from reading ordinary texts. They only see the collapse of banks, which they attribute to some minor cause like the personality or ideology of a leading banker. If they look at the fall of collateral values at all it is only as an effect. They shut their eyes to the historical fact that collateral values initiated the collapse then, even as they are doing now before our very eyes. Cycles in land values occur independently of cycles in banking ("systemic" and "endogenous" are the scholarly buzz-words for that).

After every bust, if it is bad enough to change the government, laws are passed forbidding banks to lend on real estate; in every ensuing boom banks break down those laws and do it again. They say we learn from history that most people never learn from history, and this is a splendid case in point: it's been going on for centuries.

E. Have we solved the problem? Only in part, and for a while. Following the Great Collapse we revived the banks by issuing floods of Federal bonds for banks to buy, and securing those bonds with a combination of Federal revenues and a new Federal willingness to print money if need be. This is really what Keynes was all about, although he and his expositors are so circumlocutious you'd never guess which word is really the bottom line.

The B of A, for example, had foreclosed on 20,000 farms in California, but liquidated these holdings and substituted government bonds. For a while we had an uncollapsible money supply.

F. Where are we now? The banks have gone back to their old ways. Most debt today is "defaultable," meaning it is not Federal debt. Banks have expanded wildly into several shakey fields, the worst of which now are farms, oil, commercial real estate in collapsible cities like Houston, and of course LDCs like Brazil and Peru and Mexico. We will be looking more closely at this matter.

III. Spending

It is not just money, but spending that moves goods. Spending is the product of money and its turnover, called "velocity" (V). There is a widespread fear of hoarding, i.e. that misers progressively take money out of circulation by saving too much. This fear is etched deep in the cultural subconscious. In its crudest form it is called "underconsumptionism." In more complex and obscure forms it is at the core of Marx's economic models. In more elegant forms it has been formalized in the

Keynesian model called a "consumption function" which is central to orthodox macro-economics.

A. Determination of V is more systemic or endogenous than determination of M. "Monetarists" who want to avoid all tinkering with economic institutions therefore like to believe that V is well-behaved, maybe even a constant, and hardly worth discussing. "Monetarism" is an ideology which says let government regulate M in some temperate way and leave everything else strictly alone.

B. Early Keynesians (who were much more radical than today) wanted to justify Federal spending and deficits, so they assumed that V is always tending to decline and has to be charged up by Federal borrowing and spending.

C. Velocity, meantime, pays little heed to either ideology and goes its own way. It dropped severely during the great crash, arousing the hoarding anxiety and supporting Keynesianism. Since then it has been rising, supporting neither Keynesians who think it likes to fall, nor Monetarists who think it should stay constant. It has contributed a lot to inflation.

D. There are a lot of factors affecting V, most of which we can see with obvious commonsense. We will have a whole session on this. The following factors act to raise V:

- 1, More M;
- 2, Low prices;
- 3, Anticipated higher prices;
- 4, High interest rates;
- 5, Anticipated lower interest rates;
- 6, Technical advances in transferring money (like using paper instead of gold; deposits instead of paper; electronics instead of the mails; etc.);
- 7, Steadier flows of revenues and spending;
- 8, Money substitutes (using plastic instead of cash);
- 9, Getting richer (thus improving your credit);
- 10, Increasing trust and confidence;
- 11, Fewer transactions;
- 12, More vertical integration;
- 13, Probably others -- can you think of some more?

E. The miser anxiety is probably a surrogate for something else which really is a problem, that is the decline of real turnover. Take bank loans. If a bank lends out all its funds on 40-year terms, soon it is all tapped out and cannot make any new loans for a long time. The turnover of money is not affected, that goes on its way. The turnover of bank loans is affected, however, and also the turnover of real capital built with those

loans. Short loans finance short capital with quick payouts; long loans finance long capital with slow payouts.

We will carefully distinguish Velocity, the turnover of money, from loan turnover, and the corresponding turnover of real capital. Velocity is a superficial phenomenon, the froth on the brew; capital turnover is the important action.

IV. Capital

A. It is a common belief that capital is needed to make jobs, and the more the better. The moral is always "be nice to capitalists," and usually landholders sneak in with them, although land is not formed, as capital is, by human saving or investing. In Section V we will see that investment makes jobs, and investment is capital in motion. But capital-in-motion is an economic flow. Here the question is about capital as an economic fund, a static quantity of stored-up wealth. It is about a relationship of co-existence, not of sequence; a relationship in parallel, not in series.

Much capital substitutes for and displaces labor. Cattle and sheep are good examples. In British history sheep have a long record of displacing the rural population, in a movement called the "enclosure" movement in England, and "the clearances" in Scotland and Ireland: the people were cleared away to make place for the sheep. Clearances and enclosures brought many of our ancestors over here from over there.

Range cattle in the U.S.A. have preempted large areas, and their owners have fought the settlers in a thousand horse operas for young viewers. Range cattle today are one of the least labor-using of farm enterprises.

Trees are another kind of capital that crowds out labor. Most American farming goes back to clearing off trees. On tree farms labor may plant the trees, and 80 years later go back to harvest them. In between the capital in the trees needs little help from labor, it just ties up the land.

Farm machinery has done more than anything to depopulate rural America in our times. Machines displace workers in many other industries, too: automation, cybernation, robots, spray painters, office machines, pool sweeps, computers, word processors, modern presses and a thousand other things do the jobs of human workers. The ambition of many industrial engineers is a plant to turn out a product "untouched by human hands."

The prospect that a machine may take my job, too, is enough to send shivers through most of us. Ned Ludd (he smashed

machinery), John Henry (he was a steel-driving man), and Karel Capek (he wrote a play, R.U.R., which stands for "Rossum's Universal Robots") are names all associated with 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.

Ordinary texts generally skirt this issue. About all they tell us is that capital formation may increase "growth." They don't say who gains from growth, and are often vague on specifying growth of what?. 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 ordinary macro texts 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 $.5 \times 1.2$, 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 Section V.

V. Investment, or the flow of capital.

A. The wages-fund theory

You may get the impression from ordinary texts that macroeconomics originated in 1936, but that is wrong: it was rather revived from a long nap of 40 years. 18th and 19th-century political economists (the "classical" economists) had a macroeconomics which they called the "Wages-fund theory." Adam Smith, David Ricardo, John Stuart Mill, Stanley Jevons and many lesser lights all espoused it. The "Austrian School" economists like Gustav Spiethoff and Eugen von Bohm-Bawerk and Friedrich von Hayek rephrased it without abandoning it, and Knut Wicksell, arguably the smartest economist of all time, improved on it and reaffirmed it strongly.

But Francois Quesnay, protege of Madame Pompadour, Royal Physician to Louis XV, and house intellectual at Versailles, scooped us all in 1758. Production, he says, requires "advances" of capital -- today we say "front money" or "investment." According to A.R.J. Turgot, Quesnay's disciple, "Richesse mobiliere amasse d'avance est un prealable indispensable pour toute la production" (liquid capital stored up ahead is a prior necessity for all production). (Turgot was Finance Minister for a time under Louis XVI until the local greed lobbies got him sacked when he tried to reform the tax system.)

In American folklore one spoke of "priming the pump" -- you had to pour water into the top of an old fashioned water pump before it would draw. The Kingston Trio (pop songsters in the '50s) put it memorably in The Ballad of Desert Pete. A thirsty traveller in the desert spies an old water pump with a note on it.

"Yeah, you've got to prime the pump,
Work that handle like there's a fire.
Under that rock you'll find some water
I left in a bitters jar.

Now there's just enough to prime it with
So don't you go drinkin' first.
Just pour in the water and pump like mad:
Buddy, you'll quench your thirst."

The traveller hesitates, but ---

The note went on "Have faith, my friend
There's water down below.
You've got to give until you get:
I'm the one that ought to know.

You've got to prime the pump,

You must have faith and belief
 You've got to give of yourself
 'fore you're worthy to receive

Drink all the water you can hold
 Wash your face to your feet.
 Leave the bottle full for others.
 Thank you kindly." -- Desert Pete

P.S. The pump worked.

Returning to Quesnay, he broke it down into four kinds of advances which, being French, he called avances (f.). Avances souveraines build public works or infrastructure; avances foncieres clear land, fence it, and improve it with buildings; avances primitives take care of movable capital like farm machines and animals; and avances annuelles carry current expenses that are recouped within less than a year.

We still call the cash flow of a firm its "revenue," which is French for "come back." "Receipt" means "take back," and "return" means "turn back," which are all the same idea: you've got to be forthcoming, to make advances, to give until you get.³

Some other names for liquid capital are circulating capital, ready capital, working capital, accounts receivable, realizable capital, disposable capital, mobile capital, "putty" (as opposed to clay) capital, consumer goods, and ripe goods. The concept refers simultaneously to money held by the investor, and ripe goods held by retailers to validate and give value to the money.

B. How glitches develop

A shortage of ready capital can make the economic machine seize up or freeze or stall, like a car that runs out of gas. The macro-economy is not "glitchless" like the hypothetical micro-economy postulated in Econ. 100A. Capital is freely and quickly convertible from the circulating to the fixed state, but not so easily converted back again. Fixing capital in highways, office towers, drilling rigs, monumental water projects, or ocean vessels is irreversible over long periods. Thus, there can be a shortage of liquid capital at the same time there is a surplus of

³"Recoup" comes from "cut back" (in modern French it means "cut again"). I surmise this alludes to recovering capital without replacing it, thus cutting back your commitment or exposure. It could also refer to redeeming coupons, although in the modern practice one clips coupons only to collect interest, not capital.

fixed capital, causing a "glitch."⁴

The problem may even become self-aggravating when liquid capital is required as a solvent to activate and recover value from the fixed capital. That is always true of "Construction Work in Progress" (CWIP), like a bridge that is 99% complete. Unfinished structures are totally useless until they finally go "on line." Feedstock is needed for a refinery; spare parts to repair vehicles and machines; goods to stock a store; hay to feed the cows; materials to flow through a factory; seed corn for the farm; and fuel to move a tractor. Liquid capital is also needed to meet the payroll while materials move through a business and value is added. A business that runs out of working capital is called "insolvent" and shuts down, even though its fixed capital may exceed its debts.

A single business in trouble may be saved by others. But a whole economy that runs short of liquid capital has a hard time recovering any value from its fixed capital, and has to start all over again with new savings. There you can have a big, big glitch. In the 19th century it was clear to contemporaries that the several severe depressions in America resulted from freezing most of the nation's capital, plus more borrowed from Europe, into premature public works like canals, railroads, and roadways. Brazil has done the same thing in the last 20 years, and our own behavior is only marginally improved over the debauches of the past.

Nowadays, with world capital markets, a nation in trouble can borrow abroad - if there is something to borrow. In 1929 Austria wanted its capital to stay home, and imposed exchange controls, triggering off a wave of same in other nations. Of course, such foolishness could never happen again -- could it? What happens if Japan dries up, if West Germany turns all its capital exports to East Germany, if the Soviet Union soaks up world capital, etc. etc.? Something to worry about.

C. The new dismal scientists

Ordinary models, both Keynesian and Monetarist, bypass all this. They deal mainly with money and its circulation. They presuppose, in effect, that real supply responds

⁴As brilliant an economist as the much-decorated Paul Samuelson missed this point completely when, during the capital shortage of the 1980s, he denied there was one. He supported his point by citing excess capacity in the form of fixed capital. The problem, rather, was shortage of liquid capital. Freezing capital is irreversible in the short run, so fixed capital is not on tap to meet a shortage of liquid capital.

automatically to the touch of spending and may be taken for granted. Real supply refers both to the supply of factors of production, and also to the supply of ripe goods ready to consume.

Faced with roaring inflation in the 1970s the best-known economists and government advisers threw up their hands and said "Tsk, tsk, too bad, we have to choose between inflation and unemployment. You ordinary people need a scolding: you must face the facts, tighten your belts and make sacrifices." Experts with that attitude rise to the top because they take the pressure off public officials to do something effective. But, alas, they made modern economics a new "dismal science", a science of choice where all the choices are bad.

People got sick of that, so in the 1980s we had a run at "supply-side economics." The good idea in it is that we have plenty of demand, even too much, it is time to unleash the forces of production. This was to be done by untaxing production. The problem is, the actions did not match the rhetoric. Payroll taxes actually rose. Taxes were lowered on the income of land and old capital, but incentives to invest in new capital were actually lowered by repealing provisions like fast write-off and the investment tax credit.

Property taxes on land were lowered by Prop. 13 and its clones, but land is irreproducible: taxes on it are a stimulus to production, not a drag. Governments ran huge deficits to lower current taxes and create the kind of euphoria that wins elections. However, this led mainly to multiple rises in the selling prices of corporate shares and real estate, things that already exist and are in large measure irreproducible. The court economists are reduced to muttering weakly that all would be well if we stop taxing capital gains. No one else believes it, for the excellent reason that it is false.

What to do? The classical wages-fund theory was (and remains) more optimistic. It says you can make jobs without inflation by speeding up the circulation of capital.

D. The genius of David Ricardo

David Ricardo expressed this by dividing capital into two kinds, circulating and fixed. Circulating capital is consumer goods -- he said "subsistence" -- which labor consumes while working to replace it. This came to be known as the "Wages Fund." Fixed capital is plant and equipment which works side-by-side with labor, in parallel. It is useful, but you can't eat it.

What happens, asked Ricardo, if labor produces more inedible fixed capital instead of replacing the Wages Fund? Nothing changes at first, but soon there is a shortage of subsistence.

Workers can't all be paid unless they take a wage cut. Conversely, of course, to make more jobs you need more capital in the wage fund. You do this first by not depleting it; second by new saving. How about reconverting fixed capital to circulating form? Yes, but converting circulating into fixed capital is a one-way street; getting it back again is slow, and sometimes impossible.⁵

Ricardo recognized that the division between fixed and circulating capital is fuzzy. He used the distinction just as a teaching device, to help others get the idea. He was one very smart person -- smart enough so he didn't have to prove it, and could make things simple for others. He knew that most people need something they can feel secure with, as beginning skiers need the snowplow.

He knew that most people can grasp differences of kind quicker than differences of degree. A driving instructor showing a nervous novice how to shift gears on a stick-shift will not say "Now gradually raise the clutch with your left foot as you gradually accelerate with your right." No, he says "Raise the clutch up half-way, then accelerate."

He knows that riding the clutch like that is bad news for clutches; but the novice can learn that later. First he needs a method he can handle.

Ricardo knew that "fixed" capital actually circulates too, it just circulates more slowly. And some "circulating" capital actually circulates more slowly than some "fixed" capital. So when we speak of raising the ratio of circulating to fixed capital, that is shorthand for speeding up the circulation rate of all capital, which involves dozens of different kinds of adjustments.

Speeding up capital turnover makes a higher share of it liquid, that is available for anything, anything at all. It increases the fund of richesses mobilières amasse d'avance which is prerequisite to most production. Note the word mobilières. Liquid wealth is mobile, you can mobilize it. It is 100%

⁵An excellent question to test your resourcefulness is this. List five or more separate ways to recover capital faster from a fixed plant or structure. (Anyone who says salvage it for scrap just doesn't understand the problem; anyone who says torch it for fire insurance is slightly crooked.)

disposable, available, on tap, ready for use right now.⁶ That is what the world lives on from day to day, and when you control that you can do great things.

Frozen capital is available, too, but only in a different sense. It can only be used and recouped slowly, and in its specific designed purpose. It releases its value in the form of service flow. It pays that out only at a fixed rate that is predetermined by its design. A quality building of 80-year life yields back its capital slowly over that period. To extract the service flow faster, and recover the capital faster, one would have suddenly to transform it into many cheap temporary shelters. This is impossible. Most of the capital is trapped in a queue, like a line of escaping prisoners crawling through a narrow tunnel. Again, it is like the cellulose inside a large log of firewood, unable to reach the "action edge" where it burns (cf. Section F,2, *infra*).

One of Quesnay's allies learned this lesson well. He was a smart fellow too, Pierre Samuel Du Pont. Having tried in vain to stave off the French Revolution by showing the way of social justice through economic analysis and constructive reforms he fled to America. Here he found a better pupil in his friend Thomas Jefferson.

He also brought his son Irenee Eleuthere, a chemist who founded America's longest-lasting family company, I.E. Du Pont de Nemours. The family now runs Delaware, General Motors, and a few other little things. They have dropped the social justice, but the family does know how to manage capital and stay solvent. A classic story of American business is how their agent, Donaldson Brown, saved GM from insolvency by introducing financial controls that required every Division to speed up its capital turnover. Old Francois Quesnay and his disciple Pierre S. Du Pont would have approved.

E. Wages-fund in a money economy

Ricardo worked out the theory in barter terms. His readers could relate to that, in 1817, because many English workers took their pay in real goods from the company store, an arrangement called "the truck system." The basic economic relationship was crystal clear: labor works up raw goods and gets back finished goods. Capitalists stand in between and carry the goods over the time needed for finishing.

Today of course workers get paid in money and are

⁶The French for disposable or available is disponible. The Spanish is the same, and also aprovechable. The German is zur Verfugung, or verfugbar.

emancipated from the company store, which is good. But this also drops a veil of money over the real transaction involved, and divides it into two parts, which confuses many people (and not just students, either). Advancing subsistence now involves paying money wages, and also supplying finished goods for the money to buy. And these are done by different individuals at different times so it is not the individual employer, but capitalists collectively who "advance subsistence" to workers.

Conventional macro writers in ordinary texts focus their discourse mainly on the monetary flows, neglecting the real flows that give money its meaning. Modern "supply-side economics" and "neo-Austrian economics" are efforts to bring real goods flows back into the picture, but thus far are, alas, feeble and abortive, twisted and corrupted by the special pleading and political ambitions of their best-known votaries.

F. Allegories

1. Pipelines. A standard metaphor in macroeconomics is to picture the economy as a pipeline filled with goods in process. They go in the receiving end and, after some time, out the delivery end. The goods in the pipeline are capital, and the amount of capital required is the transit time multiplied times the rate of flow. Transit time is the "period," and rate of flow is "throughput" (or input, or output, which in this simple model are all equal).

Say the period is 36 mos. and the flow is \$100/mo., then the capital required is \$3600. The turnover of the capital is $1/36$ per mo., or $1/3$ per year. Turnover is always the reciprocal of the period.

To get more throughput with the same capital, cut the pipeline in half and make two, each half as long but with the same flow. Now the flow is \$200; the period is 18 mos.; and turnover is $1/18$ per mo., or $2/3$ per year; and the capital is the same as before, \$3600. But each month you hire twice as many workers and supply them with twice as much subsistence delivered from the output end of the pipes.

Of course life is not that simple, and the model doesn't show that we lose some productivity by doing this. We'll see later how to handle that trade-off. But we'll also see that when there is a surplus of unemployed labor needing jobs, and a shortage of capital, wages and interest rates (and land rents, too) adjust so as to home in on full employment by shortening pipelines.

2. Paper, kindling, and logs. Wood burns at the surface, so when you light paper or excelsior you get a lot of action, whoosh, because they are all surface; and the flame dies

fast because there is little reserve below the action surface. So you throw on some kindling next, which has a higher ratio of volume/surface, but still not so much but what you have to keep feeding on more. Last you put on a big log with a very high ratio of volume/surface, and it burns a long time while you are unemployed.

The log requires a larger fireplace, and is bulky to store, hard to come by, hard to handle, hard to start, and hard to put out when you've had enough, so why burn logs? To save labor. Comparing logs to kindling, logs are a way of substituting capital for labor.

3. Tires and roads. Tire treads are consumed "where the rubber meets the road," at the surface. The deeper the tread, the more life. So why not make all treads extra deep? Because the extra capital stored in the deeper tread can be used to make another, cheaper tire, and you can run two cars at once on cheap tires rather than one on dear tires.

Of course you have to replace the cheap tires more often, and that takes labor, but that's the point, isn't it? Instead of one set of tires needing replacing every three years, you have two sets needing replacing every two years, and a lot more jobs.

Paving, too, is consumed where the road meets the rubber, at the surface, and thicker paving lasts longer. But it also freezes up a lot of capital idly waiting for years before it reaches the surface and becomes useful. That idle capital could be used instead to build other roads right now. Instead of one road needing little maintenance you can have two roads each needing a lot of maintenance, and making a lot of jobs.

4. Tree farms vs. hamburger joints. The ordinary fast-food joint enjoys little prestige in this world, but it sure makes a lot of jobs, more than most of our "major industries." Say you have just \$100 of capital to run a business, how can you generate enough volume to keep busy? By turning it over fast. If you turn it over once a day, there is a yearly volume of \$36,500 with just \$100 of capital.

Suppose instead you put that into planting Douglas-fir trees, to be harvested in 80 years. Now your annual volume is \$1.25. That is how different things can be. Think about it -- I'll use this example again, and dot the i's and cross the t's.

5. More examples. Once you get the idea, you can think of a hundred examples, for they are all around you and the principle is universal. That is why it is worth mastering. Try making up a few examples from your experience and observation. You can think of things that would never occur to me.

I think of it this way. All capital consists of an "action edge" where it gives service and wears out; and a reservoir of value in storage for future use. Capital makes jobs when it is made, and again, usually, when its action edge gives service. In between it is out of use -- hors de combat, as Quesnay would have said -- and might as well not exist so far as present needs are concerned.

6. Principles and their abuses. The point is that factor proportions are adjustable. If labor is cheap and surplus, and capital is scarce and dear, it makes sense to spread the capital thin by building cheaply and often. But if labor is scarce and dear, and capital abundant, then vice versa makes sense.

Neither option is inherently good or bad, moral or immoral. But both principles get abused, and therefore misunderstood. Abuse of the early replacement principle is called bad names like planned obsolescence, jerry-building, el cheapo, shoddy, and throwaway. Abuse of capital-intensity is called gold-plating, monument-building, padding, ego-tripping, conspicuous consumption, etc. All these epithets can be colorful and expressive of real abuses, but don't let them blind you to the real economic principles at work from day to day in all human affairs.

7. Knut Wicksell and the grape juice. Knut Wicksell, an uncommonly smart Swede, worked this all out pretty well in his Lectures on Political Economy, 1901. He built an excellent little model there of a macro-economy. Like all model-builders he simplified reality to make a point. In his model all the capital consists of grape-juice maturing into wine. (OK, give him a break, there were no computers in 1901, they used their imaginations.)

At the beginning all wine matures over a 5-year cycle. They start a new one each year and drink the one started 5 years earlier, so at any time there are 5 harvests in storage. But the work force grows while no one saves anything (too drunk, probably), and how will they feed and employ the new workers?

Easy, says Wicksell, they just cut the cycle down to 4 years, increasing the throughput by 20% with the same capital. Now there are 4 harvests in storage all the time, and more harvests. The wine isn't as good, but you can't have everything.

Wicksell also considers the effects of compound interest and land rent, which I am leaving out for now. The point is it is easy to change the ratio of labor to capital in order to use all the supply of both in tandem with each other.

G. Glitches on the way to Wicksell's utopia.

But if it is that easy, why is capital-flow ever a macro choke? Because it isn't always that easy. It's easy to tap a vat of wine as fast as you please, that is liquid capital. But here are some examples of frozen capital.

1. WPPSS, the Washington Public Power Supply System, sunk some \$5B into nuclear power plants which, for various reasons, it never completed. That capital is frozen, probably forever: no way you can put a tap on an inoperative plant.

2. Our own fair River City sunk over \$100M into buying a small piece of SONGS, the San Onofre Nuclear Generating Station, using borrowed money. Interest on the debt is over \$1M per month. But the value of power generated at SONGS covers a good deal less than that, so we have to pour in more capital each month to pay the uncovered interest.

Some of that we borrow, and some we take from the ratepayers by raising rates (we have a monopoly and they can't shop across the street), but it's all capital. So instead of recovering capital we keep putting more in, and will continue to until that happy day, which may or may not ever come, when SONGS' output covers interest on all the capital sunk into it.⁷

3. Canada has sunk Billions of dollars seeking oil in the High Arctic Islands. Even at \$30/bbl that was premature, but now the price has dropped way below that, there is no way to get it out without losing even more Billions.

4. Southern Californians have invested more Billions down here in planting avocado trees, quintupling the bearing acreage in 10 years, 1972-81. Result: price collapse, and we were not recovering any of that capital⁸ until prices recovered about 1989. Almonds, grapevines, and several other fruits and nuts using living cellulose for capital are in the

⁷That was written originally about 1984. Since then SONGS has come on line and is doing better on a current basis. It is still difficult or impossible to get a straight accounting of all the capital sunk in it historically. Embarrassed officials and consultants cooked the books. The invisible capital input extracted from ratepayers has never been accounted for. Future waste disposal costs are underfunded, and the effort is to shift costs to Federal taxpayers.

⁸Some individuals recovered capital by fabulous tax write-offs. This does not mean society recovered the capital, however. The cost was simply transferred from certain favored individuals to other taxpayers.

same fix.

5. Texas and other oil patches are littered with costly steel well-casings, drilling rigs, and other idle capital that got halfway through the pipeline and got stuck there, trapped like the prisoners in *The Great Escape* who were behind the fat Major who couldn't squeeze through the venturi.

6. In the 1850s South Carolina wanted a railroad to the west, which involved drilling a tunnel through Stump House Mountain. They got halfway through, ran out of money, and quit. Of course southerners are a little dreamy, but about the same time the penny-pinching Yankee bankers of Massachusetts were doing the same thing with Hoosac Mt. in the Berkshires. There are few investments as plainly unrecoverable as an unfinished tunnel, so remember the futility of those two ratholes, it epitomizes the whole point.

7. Politicians love to spend money, and to help justify big water projects they've developed a little trick of lending them money (our money, that is) without interest. When people got after them for that they learned to charge token interest at about 3% so they could deny they were lending without interest. Thus the Granite Reef Aqueduct, which carries Colorado River water to help enrich the Maricopa County gang⁹ around Phoenix, will yield back a 3% return on the Federal investment if everything goes on schedule (which it never does), and if there are no cost overruns (which there always are), and if the water has no other uses (which it has).

Now if we take out interest charges at current rates -- say 12% -- before paying back any principal (as law and custom require), that capital will never be recovered. It may never be anyway. The same is true of most of the porkbarrel public works projects in the country.

8. Before 1979 most the S&Ls put their funds into 30 and 40-year term loans at fixed interest rates. Suddenly interest rates leaped up to double digits, unheard of! To keep their depositors they had to pay them higher rates than they themselves were collecting. And they were stuck. And so was much of the real capital people had financed with the 40-year low-interest loans, because when people can borrow cheap they build things whose marginal yield is as low as the rate at which they borrow.

But that in turn limits the ability of S&Ls to make new

⁹Charles Keating, Jr., was a prominent member of that gang. He managed to go bankrupt anyway, taking hundreds of millions of the savings of other people with him.

loans, they are all tapped out. The U.S. Government and other lenders have rescued the S&Ls; and foreign lenders are rescuing them, in the short run. What that means down the road is something to worry about.

All those examples have something in common with big logs in the fire: the rate at which they release stored value is limited by their physical structure. Release can be slower than planned, but rarely much faster.

A shortage of liquid capital is signalized by a high interest rate. A high interest rate stops new long investments, but it does not speed recovery of capital already committed to old ones. It often slows or stops it, when it cuts off capital needed to complete unfinished works, or to operate finished ones. You can't burn logs without kindling, and you can't plant without seeds. There is how shortage of liquid capital can choke the macro-economy. It can happen with a bang or a whimper, but it has happened and might happen again.

H. How to summarize it all: the fund/flow ratio

Turn back to the pipeline allegory, pp. 17-18. The fund of capital (K) is the period (P) times the flow (F).

$$K = PF \quad (1)$$

Several relationships are restatements of that. First, the period is the fund/flow ratio:

$$P = K/F \quad (2)$$

Second, the flow is the fund/period ratio:

$$F = K/P \quad (3)$$

Third, turnover is the flow/fund ratio:

$$T = 1/P = F/K \quad (4)$$

Last, flow is the product of the fund and the turnover:

$$F = KT \quad (5)$$

(5) is the bottom line for macro-economics. Business volume is the product of capital times turnover. GNP and employment vary directly with business volume.

What is the value of K in America today? No one knows very accurately because those who measure it get it all mixed up with land values, which are not funds and never turn over. But it is

in the ballpark somewhere near 3 times national income, indicating a mean period of about 3 years. Raising that to 3.5 equals misery; lowering it to 2.5 means full employment.

I ("eye"). Real flows and money flows

Faster turnover increases supply-side volume and spending volume in synch together. More ripe goods come to market, that is supply. But these must be replaced, so investors spend money to replace them, that creates income and therefore demand.

Is that circular? Simultaneous and continuing is more like it, and so is the whole macro-economy. What primes the pump is anticipation. Grocers spend today to replace produce they expect to sell tomorrow, and that spending circulates the cash with which groceries are bought. That's how the system works and has always worked. Tree farm owners don't spend today because they don't expect to sell tomorrow. But make the capital flow and money flows with it.

VI. INFRASTRUCTURE

To be concluded.