

KINDS OF POSITIVE FEEDBACK IN ECONOMICS

Working paper, M. Gaffney

Markets work because of many equilibrating mechanisms, or "economic thermostats," like price equating supply and demand for an individual product. The generic term for equilibrating thermostatic action is "negative feedback." If all feedback were negative the economic mechanism would be "glitchless" and Utopian, as painted in some micro texts and libertarian tracts.

Centuries of business cycles, and problems with "market failure," tell us that markets are not always "glitchless." There are elements of "positive feedback," or non-equilibrating movement.¹ These are deviations from optimal equilibrium that feed on themselves rather than correcting themselves. (Other names for positive feedback are spiraling, snowballing, and cumulating.)

A familiar example of positive feedback is the noise level in a crowded room with separate conversations. Each speaker, maximizing his own welfare, raises his voice, forcing others to do the same. The equilibrium noise level finally reached is the limit of human endurance. The quality of conversation drops to a low level; people seeking real conversation leave; sensitive persons leave, or never arrive. It would be a "fallacy of composition" to assume that the group is optimizing its noise level, just because each conversing couple is doing so.

Another example is gun purchase. When Citizen A buys a gun "to protect himself," Citizen B may feel threatened, and buy a gun to protect himself against Citizen A. We know what that leads to. Likewise, when A buys a fast car he poses a menace to B, who has been cycling happily using foot power, thus inducing B to buy a car, and so on.

Positive feedback, if undetected and uncorrected, can seize up markets or a whole economy in chronic distress and episodic crises. What follows is a partial list of positive feedbacks. The idea is not to condemn markets, but to identify and analyze factors making them sometimes go wrong, the better to live with real markets, and to remove or control their defects. There are three lists: A) land and resource markets; B) capital markets; and C) generic factors and metaphors.

A. Positive Feedback in Land and Resource Markets

1. Vertical integration feeds on itself; e.g., the urban industrial land market.

a. Racing for prior rights to limited resources, e.g., western waters under the doctrine of prior appropriation. (This involves rent-seeking to establish tenure itself, above and beyond acquiring title to lands already tenured.)

¹"Equilibrium" itself is a parlous concept. In our progressive, evolving economy there is obviously no *static* equilibrium. In these notes we finesse that issue, and assume that a meaningful concept of "dynamic equilibrium" could be framed and articulated.

b. Speculator holding land, waiting for more certainty. Thus he generates uncertainty for others. One of those things that, in the aggregate, necessitates itself. To justify land speculation this way is a fallacy of composition.

2. Speculating on the opinions of others—a Keynes effect. Psyching the crowd, seeking the "greater fool."

A variation is a group of local land appraisers who use "comparables" in lieu of fundamentals, set their watches by each other's.

This kind of mass speculative movement is most severe in markets for non-reproducibles, because there is no cost of production for an anchor. Forecasts and expectations are all there is to go by.

3. External pecuniary economies (kin to secondary benefits, in project analysis).

New improvements to land generate reciprocating spillovers in land use, as each improvement raises the renewal value of adjoining sites. The result is composite increasing returns. The converse dominates deteriorating neighborhoods, leading to total decay and abandonment. These externalities, positive and negative, are not internalized by atomistic landowners, unless through enlightened city policy or civic organizations.

4. Automobile dependency feeds on itself because autos are the main user of urban space. Their parking, turning, street, freeway, and other space requirements raise distances between destinations, forcing more auto use, etc. They interfere with and slow down mass transit. They take patrons from mass transit, forcing up unit costs and fares because transit is a decreasing cost operation. We end up with a city no one wants, even though created by individual optimizing. Sometimes called "the tyranny of small decisions."

5. When M is backed by loans on real estate, and real estate value falls, lenders fail, M supply falls. Less M means lower real estate value, etc.

(There is no question that this happens during and after upper turning points. The mooted issue is what triggers it off: falling land prices or bank contraction? Historically, the real estate downturn leads, and thus presumably causes, the bank collapse.)

6. Great circle of Chicago land boom, 1836. (Described in notes on Hoyt, q.v.)

7. Overpricing land forces down the rate of return on real investing, lowering cap rates, raising land prices yet more.

8. When average-cost pricing is used for decreasing-cost operations (utility distribution, mass transit), individual customers joining the system create gains for all others, by lowering unit costs. Conversely when they leave. (This is correctable by using marginal-cost pricing cum flat charges on benefited lands.)

The use of average-cost pricing guarantees that these external gains and losses are not internalized, even though the firm has a total monopoly.

9. Now consider the market for land titles. This is the relevant market as to building, transferring land between uses, and changing parcel sizes. If the market for land services is slow, the market for land titles is viscous. There is no flow of supply, none at all. The market merely transfers existing titles. (There is a supplemental market in long leases, not addressed here.)

There are not many highly motivated sellers. Median homeowners are motivated, when transferred to another region. Few other land sellers come close to that degree of motivation (and the median home represents more capital than land). Capital depreciates; goods spoil and obsolesce; labor starves; but land silently rises in value.

The aggregate stock changes hands slowly, with 1% or 2% turnover of ownership annually (measuring the stock by value, not number of parcels—smaller, cheaper parcels turn faster). But buyers often need adjacent land, or land in particular districts or with particular qualities, and find little or no land on the market, or land controlled by one seller.

The slow ownership turnover cited above applies to total real estate, i.e., land including any buildings on it. Ownership turnover is even slower for bare land. If the average building lasts fifty years, only 2% of the land is available for reuse in any given year. Only a fraction of that 2% is for sale; the rest is renewed by the same owner. Whoever wants to buy available land in any particular area is unlikely to be faced with the "many sellers" premised by the competitive model.

A common precaution against this is buying excess land for possible future expansion. This behavior is one of those things that necessitates and justifies itself, considered in the aggregate: it is self-aggravating and self-authenticating. When everyone buys and holds for his own future expansion, everyone has to: it is a positive feedback loop of possessiveness run wild.

The composite result of individuals' buying for future contingent need is that the market in raw land is turned to glue. It ceases to serve the median person in time of need. The effect is a species of vertical integration, and, like all vertical integration, it destroys the free market in raw materials and vastly inflates the aggregate need for holding raw materials because there is no pooling effect such as the market provides inherently.

In certain margins of supersession (zones of change of land use) the technical need is to assemble small parcels into larger ones, as where commerce, industry, and high rise are moving into a district of single homes on small lots. This condition maximizes market failure. It normally takes years to assemble an optimal parcel: one holdout can spoil years of negotiating and financing.

Straw buyers and front men are used to keep principals and their intentions secret. Speculators are everywhere, trying to assemble large plots or hold up other buyers. Whole districts are held by anonymous absentees; buildings deteriorate, neighborhoods lose their natural leaders and stabilizers, and communities disintegrate, leaving slums and blight, crime and arson, public charges and vandalism.

The sum of those factors makes for an inefficient market in land titles. Everyone who can tries to acquire land for his own future expansion. Timely subdivision may be foregone in anticipation of future assembly problems, skipping an entire generation of optimal land use. Neighbors adjusting lot lines have only each other to deal with. Aggregate landownership is highly concentrated because of the small numbers who can invest for deferred yields; the number of sellers in one district or for one use is more narrowly limited because of spatial immobility and low turnover and impossibility of new land creation. Financing is especially difficult because the asset is not self-liquidating. Many holders are waiting for the rise, and/or for greater certainty to be provided by the advance commitments of others who are in turn waiting for them. Net result: wasted, underutilized land.

B. Positive Feedback in Capital Markets

1. Ponzi finance. Higher interest rates require more new loans to pay interest, raise demand for loans.

2. Frozen K, liquidity scramble raises the interest rate, stops completion of half-done projects, freezes more K, longer. Cf. #3.

3. A rise of interest rates lowers the market value of unsold inventories. This lowers their capital content, the real value of the K they represent, thus destroying K when most needed. It causes a perverse reaction to higher interest rates. They are supposed to call forth more capital; in this case they destroy some of existing capital.

With durable K, the effect is stronger, because durable values are more sensitive to real interest rates (i.r.s. Liquidity crisis lowers durable values, destroying K just when needed most.

A rise of real i.r.s destroys part of the real value of existing capital, in increasing measure of its putative longevity.² This is an economic loss, a loss that is just as real as physical destruction. The cash flow from durable capital will, after a rise of i.r.s, be divided more in favor of interest, less in favor of Capital Consumption Allowances (CCAs).³ The basic mathematics of finance is available, and is quite precise and consistent.⁴

This raises the possibility of a macroeconomic "glitch." This effect, variously described and with varying emphases, has been noted by Ricardo, Jevons, Boehm-Bawerk, Wicksell, Spiethoff, Hayek, and others. Ricardo's Chapter 1, "On Value," and Chapter 31, "On Machinery," are good introductions. They are nominally well-known, and at the same time treated as nonexistent: a feat of compartment-mindedness that seems to characterize much economic writing. As Lionel Robbins points out, micro theory after 1870 became one of acapitalistic production.⁵ Capital theory simply disappears from the picture.⁶

4. K shortage raises the interest rate, lowers collateral value, reduces willingness of lenders to lend through the old channels. Ben Bernanke. Cf. #6.

5. High lenders' risk, owing to weak collateral or other cause, makes lender raise the interest rate, thus increasing risk of default on principal.

6. Cap shortage, lenders cut off even non-defaulters, incentive not to default is lowered.

7. Scramble for liquidity, feeds on itself. General loss of confidence.

²"Longevity" here means economic life, in the full economic sense. It should not be confused with physical carcass life. The "full economic sense" means the duration and time distribution of cash or service flows, properly adjusted for the time value of money.

³The appropriate accounting adjustment on the asset side is called "marking to market value." The loss of value occurs whether or not it is formally recognized on the books.

⁴Conversely, a fall of real i.r.s adds to the real value of existing capital, having the same effect as creating capital. Both those effects are partly muted by countervailing effects on ground rents and land prices. This refinement is not pursued here.

⁵Introduction to the English translation of Wicksell's *Lectures* (p. xiv).

⁶An attempt to reintegrate capital theory with micro and macro theory has been made by the writer, 1976, "Toward Full Employment with Limited Land and Capital." In Arthur Lynn, Jr. (ed.), *Property Taxation, Land Use and Public Policy*, Madison: Univ. of Wisconsin Press, pp. 99-166. Also in "Capital Requirements for Economic Growth." Joint Economic Committee, Congress of the United States, *U.S. Economic Growth from 1976 to 1986: Prospects, Problems and Patterns*, Vol. 8, pp. 56-75. In both works, the effort was to use capital theory as a bridge to unify micro and macro theory.

E.g., liquidation of surplus inventories, as of Montana range cattle, 1886-1887. Capital converted to consumer goods, value fell nearly to zero, providing neither consumer values for buyers nor capital for sellers.

E.g., competitive devaluation and exchange controls, as in early 1930s.

8. Diverting production to investment, starving retail market, maintaining price, inducing more investment based on high price, building up excess capacity. A "corn-hog cycle" effect, except it may occur on a much more massive scale with public works.

Building public works so as to max speculative land area affected with minimal early effect on output. Politics gets into this one.

C. Generic Factors and Metaphors of Positive Feedback

1. Panic, group feedback and reflection of fear, anxiety, distrust.

E.g., runs on banks.

E.g., flight from a currency.

2. Bandwagon effect. "Get on board, join the party." Social scorn heaped on those who buck trend, e.g., "gold bugs" in 1960s. (How those contrarians did cash in, though!)

3. Projecting past trends. Price will rise because it has risen.

4. Mob and herd psychology.

5. Fashion-seeking. The urge to "be there," where the action is, rather than die socially.

6. Leader-seeking and following. A following creates a leader, attracts more followers.

7. Following conventional wisdom.

8. Communicable and epidemic diseases.

9. Gulley formation: once one starts it attracts more falling water, etc.

10. Fire spreading.

11. C.S. Lewis: "Fashions in thought distract men from their real dangers. Satan directs the fashionable outcry of each generation against those vices of which it is least in danger, and fixes its approval on the virtue nearest to that vice which he is making endemic. The game is to have them all running about with fire extinguishers when there is a flood, and all crowding to that side of the boat that is already gunwale under."

12. What stops positive feedback? Something always must or the world would end, but there can be great destruction first, e.g., when a levee, dike, or dam breaks.