LaRouche-Riemann model

A litmus test for industrial productivity

by Dr. Steven Bardwell

A look back at the two decades of economic history since 1960 shows one of the most dramatic changes in the structure of the world economy in the 400 years of modern capitalism: the U.S. economy, once the overwhelmingly dominant economy in the world, has become a second-tier industrial power. The West Germans have more exports, *in absolute amount,* than the United States; the West Germans produce *almost twice as many* machine tools as the United States; the West Germans and Japanese lead U.S. industry in capital investment and level of implemented technology in almost every industry; the living standards of West German industrial workers in key industries like steel are *higher* than those of their U.S. counterparts.

Although this state of affairs is not irreversible, it is indicative of a fundamental sickness in the American economy—a systemic disease whose symptoms and etiology have escaped the mainstream of current economists

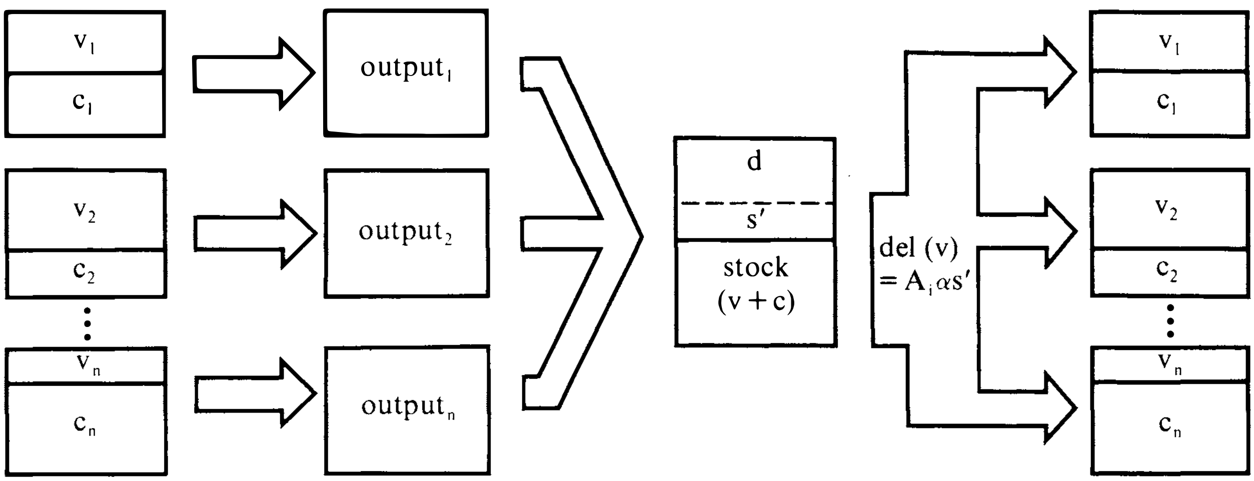


Figure 1
FLOW CHART OF SECOND-GENERATION LAROUCHE-RIEMANN MODEL

The model begins with the inputs to a cycle of economic production divided into the tangible goods necessary for reproduction of the productive workforce (labeled v_i, for the tangibles consumed by the productive workforce in the *i*th sector) and the tangible goods required for the reproduction of plant, equipment, and raw materials (labeled c_i). These inputs are consumed in the production process, resulting in output from each sector.

Each sector produces surplus ("value added") in proportion to the productivity of that sector; causally, the employment of productive labor creates profits. The model then pools the output from each sector and divides the total output into three categories: first, the stocks necessary for an exact equilibrium reproduction of the labor force and capital goods of the economy (this will equal the sum of the v_i and c_i of the next cycle of production); second, the surplus invested in the expansion of v and c in the next cycle (this reinvestment goes either to an expansion in scale or quality of the economic process); and third, the other "overhead" expenditures (labeled d) out of which are met stock of tangibles both necessary (health, education, some services, some parts of government, and so forth) and unnecessary. The successful reproduction of an economy depends on the relative size of the productive compared to the nonproductive expenditures. On this basis, the model defines a "free-energy ratio," $s'/(c+v)$. If this ratio is increasing at an increasing rate, then the economy is progressing.

and policymakers. The misdiagnoses are familiar; to take some examples: "imported oil"; yet the Europeans and Japanese import more than 90 percent of their oil, while the U.S. imports about half that percentage. Or "energy waste"; yet the energy efficiency of the U.S. economy has nominally *increased* since 1973, and the U.S. economy has gotten worse. Or "cheap foreign labor"; yet West German steel workers are better paid than Americans.

The Fusion Energy Foundation, in collaboration with *Executive Intelligence Review,* has undertaken a detailed study of the American economy using the LaRouche-Riemann econometric model (see Figs. 1 and 2). The preliminary conclusions from this study provide a striking view of the current state of the U.S. economy and the policies necessary for an American recovery.

The policies of recovery

First, the American economy over the last 20 years has suffered from acute underinvestment. A comparison between the West German and U.S. economies performed with the LaRouche-Riemann model shows, for example, that an economy investing at the accelerated rates of the West German economy can weather a disturbance like the 1973 oil price rise with relatively few ill effects. (See *Fusion*, Sept. 1980, p. 73.) The U.S. economy totally lacks that resiliency.

Second, the most important parameter reflecting this lack of investment is the secular decline in U.S. industrial productivity. Using the model, a more sophisticated measure of productivity has been developed that shows that this decline in productivity—more than any other parameter—measures the failure of an economy. It is the long-term decline of productivity of key sectors of the economy like steel and the utilities (through attacks on nuclear energy) that has made the growing overhead burden of financial speculation, government debt, and transfer payments unbearable. The result has been double-digit inflation.

Third, the U.S. economy is now at the point of a catastrophic collapse; and this collapse is inevitable unless an emergency reindustrialization program is implemented. Without a drastic long-term mobilization of the country's manpower, capital, and brainpower, our economy will collapse. (For details on the Riemannian

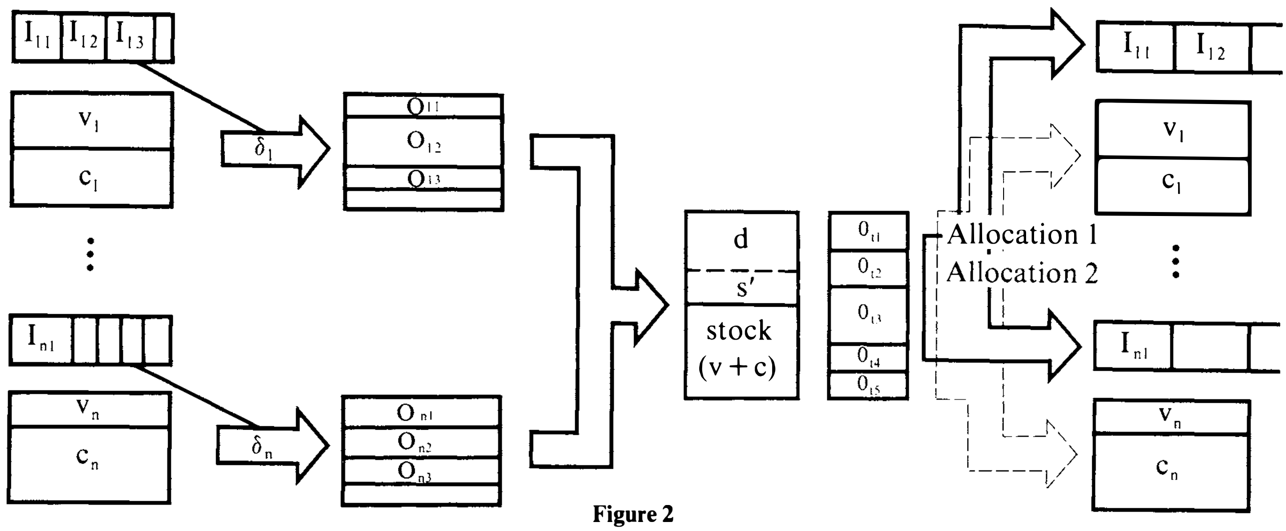


Figure 2
FLOW CHART OF THE THIRD-GENERATION LAROUCHE-RIEMANN MODEL

A real economy functions on two levels simultaneously, only one of which is treated by the model shown in Figure 1. In addition to the flows of tangibles tracked in the second-generation model, the economy's reproduction depends on the material composition of these flows. Thus, a certain mix of labor, capital, energy, and new technologies implies reproduction in the next cycle at a certain level of productivity, higher or lower.

In the third-generation model, this composition is taken into account by a productivity measure that functionally depends on the input-output vectors for that sector. This allows the modeler to determine the productivity of a given sector by varying the inputs to that sector (its energy intensivity, for example).

Once the production cycle is completed, two allocations must be made.

The first of these replicates the financial allocation of reinvestment to each sector parallel to that in the first chart. In addition, the surplus product must be allocated in its material form. This latter allocation is especially critical in bottleneck areas like machine tools where a small shift of investments from one sector to another can greatly affect the overall productivity.

analysis of the threat to the U.S. economy of "thermodynamic death," see *Fusion*, May 1980, pp. 57-66.)

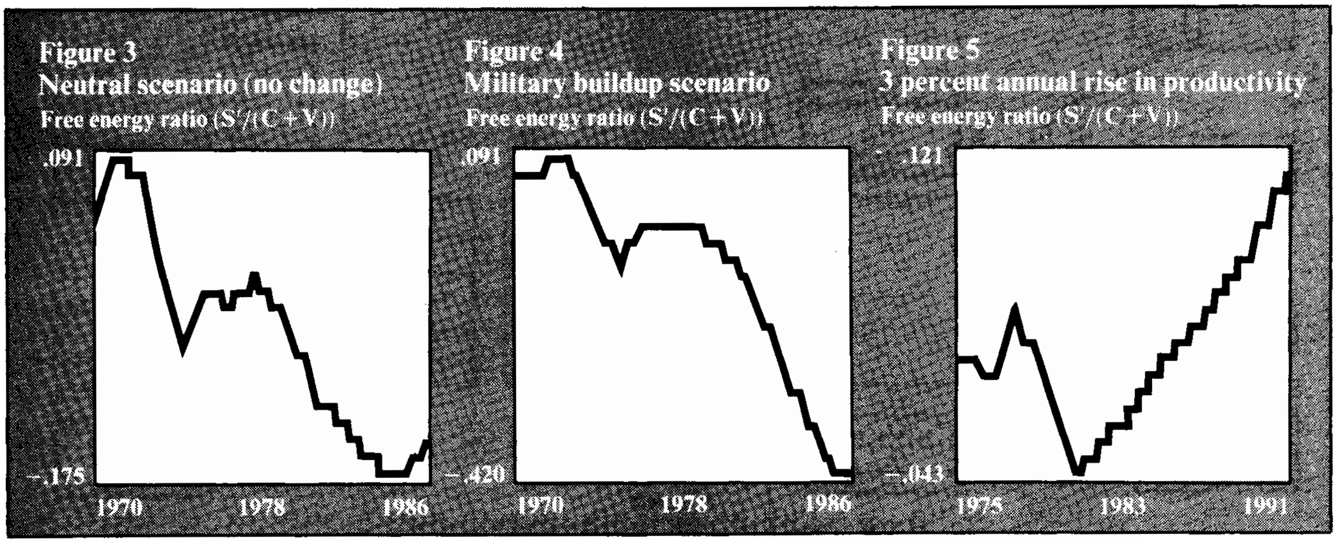
The Riemannian litmus test

Using the model, we have found that the litmus test for any reindustrialization program is its effect on *productivity*. Since the LaRouche-Riemann model is based on the fundamental causal relations among productivity, capital investment, and technological progress, the model shows unequivocally that nothing can succeed but a reindustrialization program that results in accelerated investment into the frontier areas of new technologies, the translation of these technologies into industrial production techniques, and the training of the increasingly skilled labor force needed to man these new technologies.

In quantitative terms, the model shows the folly of basing a reindustrialization program, as some have proposed, on an expansion of military production "in width"; that is, with little or no investment in the most advanced new technologies and scientific ideas. Figures 3, 4, and 5 contrast this "in-width" military build-up (Figure 3), with a neutral scenario projecting more of the same (Figure 4) and a minimumm recovery program (Figure 5). As the graphs show, the model predicts that the present health of the U.S. economy is so poor that it is unable to sustain the additional overhead costs of a military program that lacks technological and productivity spin-offs. Furthermore, even a continuation of present policies with no additional military spending would mean a serious depression in the next year.

The model's calculations show that a *minimum* 3 percent per year rise in productivity is necessary for the U.S. economy to recover. Given this rate of productivity increase, a much larger budgetary overhead could be sustained—and in fact, must be sustained—to pay for the research and development, education, and training required to make a reindustrialization program work.

As subsequent parts of this series outline, productivity increases of this magnitude can be realized only in an economy where the momentum is supplied by an Apollo-style program of technological development. Investments in the frontiers of science and engineering, most specifically space exploration and nuclear fusion, are the prime ingredients in such a program. The only way a desperately needed reindustrialization program can succeed is to "pull" the economy forward with technological development.



The figures show the free-energy ratio (the ratio of reinvested profit to reproduction costs) for the U.S. economy in three alternate scenarios: The first, Figure 3, shows a neutral scenario based on a continuation of the present policies of credit restrictions, declining industrial production, and growing unemployment. The U.S. economy is now so weak that it faces a serious collapse within the next year if such policies are continued.

The second graph, Figure 4, shows the same chart for the economy with a reindustrialization effort based on a program of military production "in width." This simulation assumes that there is a significant shift of investment toward heavy industry. Initially, this has a beneficial effect on the economy since the average productivity of these sectors tends to be higher than the average in the economy, and the economy is shifted toward these sectors. However, the additional overhead burden bogs down this increased average productivity after two and one-half years.

The economy as a whole collapses in a severe depression by the middle of 1982.

The third scenario, Figure 5, attempts to measure the minimum productivity increase that would be necessary to sustain an increased overhead of the magnitude required for reindustrialization. The initial calculations show that an average 3 percent per year increase in productivity would be sufficient for the modest recovery of the American economy shown in Figure 5.