

CHAPTER FOUR

Savings and Investment, from the Price Mechanism to the Multiplier

The Price Mechanism... stabilizes the economy...

— Almost Any Mainstream Economist

Up to now, our analysis of Henry George's themes has stayed close to his thinking. Now, however, we have to go beyond what he actually said to what he might have said, or should have said, had he known later economic realities and thinking. A key example: George's concept of "progress" is, in fact, a fuller version of what economists call "economic growth" today, but the modern concept is built around the relationships between savings and investment, which George hardly mentions. To move from his analysis to today's world we have to bring in savings and investment, and we have to move from a largely agricultural economy predominantly made up of small farms and small firms—the craft economy—to a largely urban and industrial economy, one of mass production, dominated by giant corporations (e.g., the largest 2,000 firms produce roughly 70 percent of GNP). *Progress and Poverty* describes a craft economy, small farms and small firms employing small-scale technology, but with the special feature of being a frontier economy as well—at the time it was written, there was free land available in the West. Arguably, this made America a "high-wage" economy, and it also made it

difficult to accept George's contention that rents would expand at the expense of, rather than along with, wages and profits. We need to examine the development of industry in the craft economy, something George mentions but doesn't explore.

The Price Mechanism and Marshallian Technology

Consider how such an economy adjusts to changes in supply and demand. The principles underlying the craft economy are centered on the short-run employment-output relationship. In the craft economy (Nell 1998a, 1998b), we can reasonably assume (short-run) diminishing returns to the employment of labor, in relation to a normal (or average) position. Adding extra workers to work teams operating given equipment brings growing total output but progressively lower additional output, while removing workers leads to progressively larger losses of marginal output. There will be a point in between where the given equipment is being operated most efficiently.

In general, it will take time and effort to adjust levels of employment; it will not be done lightly (Marshall 1890). Workers cooperate in teams that cannot be easily broken apart or added to; all workers have to be present and working for a process to be executed at all; processes cannot be started up and shut down easily. The craft economy not only has diminishing returns, it also has inflexible employment (Nell 1998a, chap. 9). The model applies, of course, to farming on "no-rent" land, and in regard to industry, to production in the "no-rent"

factory—that is, to production in the plant operating at a cost level that just barely earns the going rate of profit. All operations paying positive rents (or superprofits, since they may eventually be competed away) will do so because of location or position or special but fixed technological aspects that provide a boost to productivity. New plants will typically be superior and earn rents; as such new and superior plants come online,¹⁰ productivity rises—often at least partly due to better work teams—and with new plants we can expect wages to drift up, since the new factories can afford to pay more in order to attract the best workers.

Looking more closely at the “margin of production” for a craft-based factory, an analogy with agriculture can be found. New plant and equipment cannot be very large, the technology is small-scale, and plants must be built to optimal size (cf.

¹⁰ An unsettling possibility arises here, which is that investment might be undertaken not to improve the product or reduce the costs but for a firm or group of firms to *impose costs* on competitors. A mill owner might buy a farm upstream from his major competitor, and divert water from the stream for use in irrigation, reducing the force of the flow driving the competing mill. Regulators might stop this, although irrigation could surely be a legitimate use of water—but if it is not, regulators can sometimes be bribed. Very commonly, a firm will find some reason to sue its competitors, if it believes that the cost or inconvenience to them will be great enough to warrant the legal expenses—even though there is not much of a case against them (a practice widely attributed to Donald Trump). The targets of this kind of behavior may be asked, or may offer, to pay a fee to stop it—a rent! For an interesting survey of such “rent-seeking” behavior (which, if it absorbs investible resources, may thereby reduce growth), integrated into endogenous growth models, and starting from Adam Smith, see D’Agata, Ch 11 in Salvadori, ed., 2003.

Robinson 1931). Expansion is risky, so investment cannot run ahead of demand; likewise, credit is limited and won't be advanced ahead of demand. Older plants generally cannot be retrofitted or improved if the technology is embodied in equipment; they have to be scrapped, or run for what they can earn. If there were retrofitting, the old labor force would have to be retrained; indeed, very often the cost advantage will be partly or wholly "embodied" in the specific labor force of the firm. In short, following an innovation, the positions of firms are "fixed," just as land fixes the relative positions in farming.

Look back at the Sraffa equations in chapter 1. In each, the various inputs are given, according to the technology; then the labor input; and, finally, the rental rate times land:

$$(1 + r)(A_a p_a + B_a p_b + \dots, K_a p_k) + wL_a + \rho_l \Lambda_l = A p_a$$

The same holds here for industry, except that in place of land we have productive capacity of a certain quality, and in place of land rent we have industry superprofit (the percentage above the normal rate of profit, or of costs below normal costs). When overall demand fluctuates, the scale of activity changes, but in the same proportion for all, so the ratios of costs, and therefore profits, do not change.

The model here is based on an aggregate function, a representative factory times total capacity, shown in the diagram below (Figure 4.1), where varying numbers of workers are operating given equipment—a factory. We have assumed a conventional

shape and properties.¹¹ Aggregation will be based on long-run normal prices, those ruling at the optimal points. It might reasonably be thought that there is a normal distribution of efficiency; then the aggregate function would be the representative average function multiplied by total capacity.¹² Next, we assume that, for a craft economy, output increases with the labor applied to given equipment according to a curved line that rises from the origin with a diminishing slope. As the intensity of utilization rises, output rises, but at a diminishing rate. (By contrast, mass production will be characterized by a straight line rising from the origin.) Finally, as a first approximation, consumption can be identified with wages and salaries, while for the purpose of drawing the diagram investment can be taken as exogenous. As employment rises, the wage bill—and so consumption spending—will rise at a constant rate, namely, the normal wage rate. Total expenditure will then be calculated by adding investment to the wage-consumption line.

¹¹ Note that in actual fact these relationships will be rough and ready, discontinuous; we are smoothing them out and assuming continuity—so that we can draw diagrams recognizable to economists!

¹² To avoid complications, we will assume that when demand changes, it changes in the same percentage for all firms. In practice, the better firms might well use the opportunity of shifting demand to improve their competitive positions.

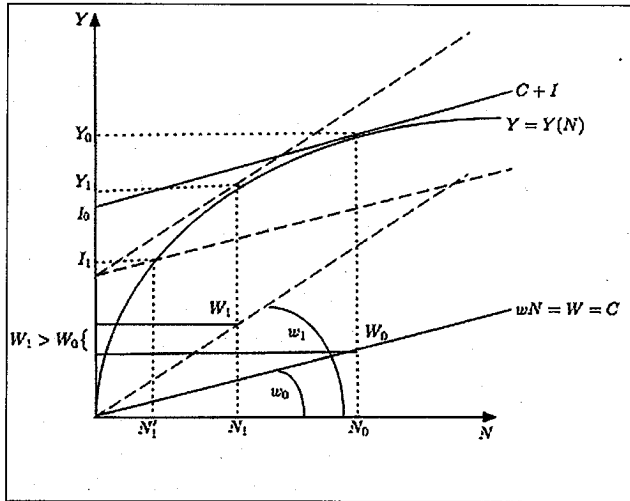


Figure 4.1. Adjustment to Demand Fluctuations in the Craft Economy (showing a rise in the real wage)

The diagram above presents the aggregate utilization function, with output, Y , on the vertical axis and labor employed, N , on the horizontal.¹³ This function is curved, its slope falling as N increases. The wage bill, W (including salaries), will be assumed to be equal to consumption spending, C , that is, no household saving and no consumption out of profits—but both assumptions are easily modified, and transfer payments

¹³ We are calling this a “production function,” though it is *not* the “true” neo-classical concept (Hicks 1932; Samuelson in Kurz, ed., 2003; Nell and Errouaki 2013), where each point shows the optimal adjustment of equipment.

could be included also.¹⁴ So the wage bill, also representing consumption spending, is shown by a straight line rising to the right from the origin; its angle is the wage rate. Investment spending, I , will be treated as exogenous in the short run, and so will be marked off on the vertical axis. Aggregate demand will then be the line $C + I$, rising to the right from the I point on the vertical axis; its slope is the wage rate.

Suppose investment is unusually low, below normal, so that this line cuts the utilization function at a point below the normal level of output and employment, N^1 . Since it is difficult to adjust employment and output, there will tend to be overproduction, and prices will fall. Since it is even harder to adjust employment than output, prices will fall more readily than money wages. Hence, the real wage will rise, from w_0 to w_1 , (the real wage is in italics in the diagram). As a result, the $C + I$ line will swing upward, until it is *tangent* to the utilization function; employment thus settles not at N^1 but at N_1 . Notice that this point of tangency will tend to be close to the normal level of employment and output, and will become closer the more concave the function. In short, when investment is abnormally low, the real wage will rise; if the rise in real wages is proportionally greater than the decline in employment, consumption will increase. This is the case illustrated in the diagram: investment falls from

¹⁴ Wages and salaries in the aggregate are closely correlated with consumption spending but do not fully explain it. Some obvious adjustments are easily made. Consumer spending also depends on the terms and availability of consumer credit; in addition, it reflects transfer payments. Wealth and profitability are significant variables. But for the present purposes, which are purely illustrative, a simple "absolute income" theory will suffice.

I0 to I1, prices fall, and real wages rise. Clearly, the wage bill, and so consumption, is higher at N1 than at N0.

Conversely, suppose investment were exceptionally high, or that the C + I line had too steep a slope, indicating too high a real wage. In either case, expenditure would lie above output at any feasible level of employment. Under these conditions, prices would be bid up relative to money wages and the C + I line would swing down, until it came to rest on the utilization function at a point of tangency (Nell 1998a, 455–57). Again, this point would tend to lie close to the normal level, based on the concavity of the function. When investment is unusually high, consumption will tend to adjust downward.

Notice that adjusting the real wage to equal the marginal product of labor both assures a unique equilibrium and maximizes profit.¹⁵ When the C + I line is tangent to the utilization

¹⁵ The model has six variables and six equations. The variables: Y = GNP, w/p = average real wage, N = employment, g = growth rate, r = profit rate, I = level of investment. K^* is given, and the production function has positive first and negative second derivatives. The six equations are:

$$Y = (w/p)N + rK^*$$

$$Y = Y(N, K^*)$$

$$g = I/K^*$$

$$g = r$$

$$r = dY/dK^*$$

$$w/p = dY/dN$$

Unlike the model in note 5, where dN is not acceptable, dK^* is acceptable here because Y is a function of two variables, and when N changes, the marginal product of K is affected even though K is fixed.

curve, the distance to the wage line is at a maximum; if $C + I$ cuts the utilization curve, there will be two equilibria, and the distance between the intersection points and the wage line will be less than that at the tangency. (Given the real wage, profit rises with employment at a diminishing rate from the origin to the tangency point; it then falls at an increasing rate until it reaches zero, at the point where the production function intersects the wage line.)

Growth and the Price Mechanism: Flexible Prices and the Golden Rule

At any given time, the craft economy consists of a large number of small firms and farms, each normally operating at an optimal—minimum-cost—level, paying wages to its workers and what Mill called “wages of superintendence” to its managing owners (Robinson 1931). Profits will be distributed as interest and dividends to banks and owners, respectively. (Taxes will support schools and sewers, police and infrastructure, maintaining and improving productivity, though the public sector will not be considered here.) Firms will be divided between established and new; the age structure of the workforce at established firms remains constant—new workers are hired as aging workers retire. Retired workers live off and consume their pensions. However, as a first approximation, apart from pensions and “saving up” for consumer durables, worker households do not save. Permanent saving (capital accumulation) comes out of capital income, not household wages—neither worker wages nor “wages of

superintendence," Mill's term for the profits that accrue to the business owner.

As a first approximation, we can assume that all profits are saved and invested in setting up new firms,¹⁶ which may hire new entrants to the labor force or bid the best workers away from existing firms. New entrants are cheaper, but also inexperienced; the new firms will have to go through an internal organizing and learning process. New entrants are important because entry-level wages are flexible; wages of established workers tend not to be—and this matters, as we shall see.

Owners either invest profit income or they bank it and receive interest, and the banks loan the funds to entrepreneurs who wish to start new businesses. Retired owners *do not* consume their capital (as retired workers do); they pass along the management of the firms they own and live off the interest of their holdings. (If they saved for retirement out of their wages of superintendence, they will consume those savings.) When they die, they leave their capital to their children. If the rate of growth of the population of capital-owning families is equal to the rate of capital accumulation (and family size remains the same, for example), then wealth per capita will tend to be constant.

In the textbook approach, starting with Solow (1956), the growth of the labor force sets the growth rate of the economy. However, neither Solow nor later writers offer an account of a market mechanism by which this will be brought about. They

¹⁶ Note that saving always tends to equal investment because investment spending, the active force, drives up prices (or lets them sag), which changes profits, so that saving adjusts to investment.

simply show that there is always a capital accumulation path consistent with any rate of growth in the labor force—and then *assume full employment*. The capital/labor ratio then adjusts appropriately. This result—that the growth of labor sets the pace for the economy—may well be correct for a craft economy, and George seems to have thought so, but it has to be shown that it can be brought about by a market mechanism.

The argument is simple and need only be sketched (see Figure 4.2; many qualifications can be imagined): starting from a balanced path in which the growth of the labor force equals that of capital, if the growth of labor speeds up (slows down), *entry-level* wages will fall (rise), encouraging (discouraging) the formation of new firms. When entry-level wages fall, for example, expected profits increase, so the incentive to invest will rise, encouraging investment—namely, the formation of new firms. But entry-level wage variations will not affect the current level of consumption spending, because workers newly being hired will not yet have received their paychecks, and in any case are a small fraction of the labor force.

The Growth Rate in Diagrams

The price mechanism explored above can be adapted so as to show the key elements in the process of growth in a craft economy. Measure Y/N on the vertical axis, K/N (real capital per worker) on the horizontal. A line rising left to right from the origin will measure I/K , the rate of growth. Add to this the wage bill per capita (the wage rate); the result will be the aggregate per

capita expenditure, which will adjust until it is tangent to the production function. If it lies above the production function, prices will go up, swinging the line down; if it lies below the production function, prices will fall and the line will swing up.

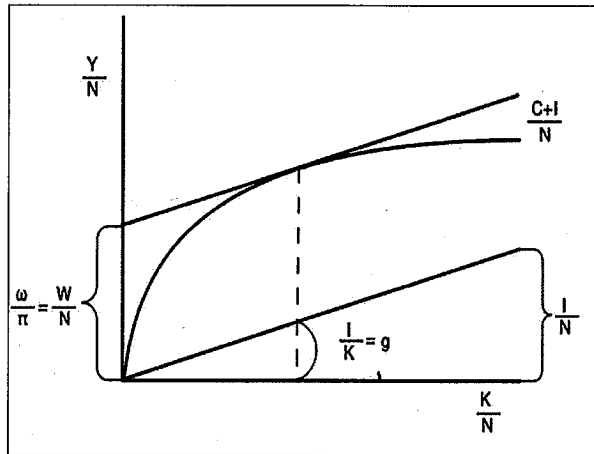


Figure 4.2. Growth Rate and Marginal Product

Figure 4.2, though it looks just like the textbook's, shows the working of a price mechanism in which changes in investment impact on prices, so as to change the level of real wages¹⁷. This

¹⁷ The similarity of this to the Solow Growth Model of textbook fame is unmistakable. But Solow added an assumption that is usually overlooked: although he introduces the marginal productivity relationships for both the real wage and 'quasi-rents', he assumes that prices will be constant (Solow, 1956, p. 79). As a result there is no price mechanism in his model: savings is assumed to drive investment and the equilibrium is determined by the changes

changes profits, and profits are savings, which here adjust until they are equal to investment. The intercept of the aggregate expenditure line is $(w/\pi)N/N = w/\pi$. The slope of the line is the growth rate, I/K . The equilibrium will be given by the point of tangency. The tangency between the expenditure line, with a slope of g , and the production function implies that the rate of growth will equal the marginal product of capital—the slope of the function. If the expenditure line is not tangent to the curve, then the price level will rise or fall, adjusting the intercept until the line just touches the production function. This equilibrium maximizes the real wage (per capita consumption); it has optimality properties as well as market stability, which might be expected in a neoclassical approach, although neither is present in the textbook models. For example, a rise in g will raise the expenditure line above the production function, indicating demand pressure that will bid up π , lowering the real wage and bringing the line back down to tangency at an optimizing short-run rate of profits, thus leading to a new equilibrium. This tangency point represents the golden rule,¹⁸ and contrary to Solow,

in the capital/labor ratio brought about by saving. There is no justification for Solow's assumption of a constant given price level, nor does he pretend to offer one — but it completely changes the character of the model.

¹⁸ The “golden rule” of capital accumulation, that the rate of growth should equal the rate of profits, was much discussed in the 1950s and 1960s, following a challenge by Joan Robinson. Neoclassicals argued that it maximized consumption per capita (Phelps,); neo-Ricardians thought it represented a balanced path. Nell argued that when $r = g$, the value of capital would be constant when distribution changed. See Robinson (1956); Samuelson (); Harcourt (1972); Nell (, 1971998a).

it is the true, market-driven, small-scale equilibrium, based on profit maximization.

In this system, technical progress—increasing productivity—will be shown by a shift upward in the production function; if the expenditure line had initially been tangent, the upward shift would now leave it below the production curve, implying output in excess of demand and leading to a tendency for the price level to fall. The benefits of technical progress will be distributed by falling prices, with money wages constant (as happened throughout the 19th century).

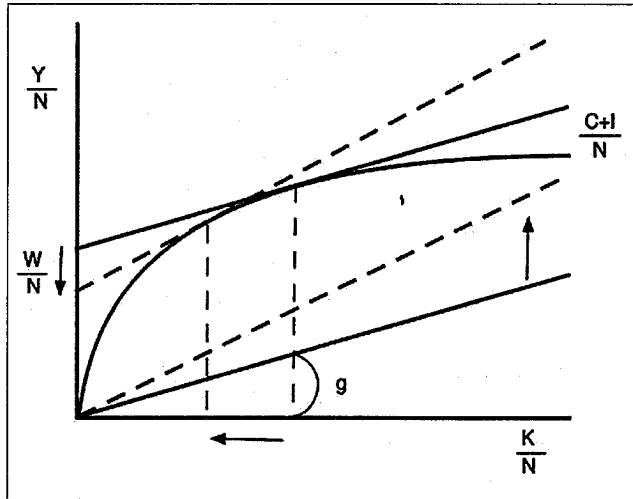


Figure 4.3.¹⁹ Adjustment to an Increase in the Growth Rate

¹⁹ The diagram may be misleading; the vertical distance between the dotted parallel lines should be the same as that between the solid lines.

Figure 4.2 shows the tangency growth equilibrium; Figure 4.3 shows the adjustment when the growth rate rises (the real wage falls) and aggregate demand is too low (the real wage rises). When g rises, shown as an upward swing in the angle of the growth line, investment spending increases; this drives up prices, so that the real wage declines (as indicated by the downward arrow).

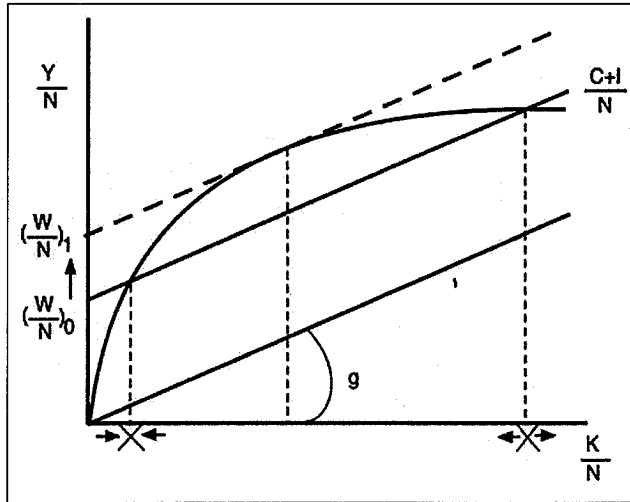


Figure 4.4. An Upward Shift of the Production Function

In the replicative growth process, the growth of capital per worker will tend to equal the growth of output per worker, which in turn will equal the growth of the real wage. As indicated in Figure 4.4, when the production function shifts up, the price

level will fall and real wages will rise. When the production function shifts upward (disembodied technical progress), it means that production processes have been reorganized, so that work will be done faster (Nell 1998a, chap. 7). Hence, more energy will be used, more materials will be processed, more wear and tear will take place—in other words, *working capital will be increased in proportion to the speedup*. Therefore, K/N will increase in proportion to the rise in productivity. So:

$$d(K/N)/(K/N) = d(Y/N)/(Y/N) = d(w/\pi)/(w/\pi)$$

This will also tend to be true for “mechanization,” where a proportional increase in K/N is matched by a proportional decrease in N per unit of output. This will maintain the equality on the left-hand side of the equation, and that on the right will follow as before, from a rise in productivity leading to a proportional fall in prices—as was true all during the 19th century. As a result, the capital/output ratio and the rate of profit will tend to stay constant. With both of these holding steady, the shares of profit and wages will also be unchanged.²⁰ This is the

²⁰ As the economy grows the banking system must grow *pari passu*, which means bank capital and bank reserves must be augmented along with other investment. The level of bank capital—the capital of the banking system—will support a certain level of bank loans, while the difference between deposit and lending rates will provide the profits of banks. The sustainable ratio of bank loans to bank capital can be indicated by λ then $\lambda(i_1 - i_d) = rb$, the profit rate of banks. When this profit is reinvested, bank capital, and therefore sustainable bank lending, will grow at this rate. If the profit rate in banking is the same as in the rest of the economy, and the rest of the economy likewise

“Victorian equilibrium.”

Rents and superprofits will tend to rise together with growth. George argues that rents will rise relative to wages and profits, because the wage rate is fixed by the margin of cultivation, which will be either fixed or falling, while profit/interest is fixed by the qualities of capital—and tied to wages. Since both are relatively fixed, growth would then end up increasing rents relative to other incomes. But as we have seen, George’s theory of capital and interest is weak, and while his theory of wages is plausible for a frontier economy, it won’t bring about falling wages if there is an “unbounded savannah” of equally good land—as he initially assumes. In his argument, when there is no longer free land, and especially if there is widespread monopolization of special factors, wages will tend to be driven down to subsistence, as in Europe. But in fact, in America real wages did not fall when the frontier closed; they did not fall, in fact, until the last part of the last century (some fell, some rose, most stagnated). And as industrialization took place, as factories were built, a new margin opened, the “margin of production,” which was discussed earlier. New factories were superior to old, and as they came on line they earned a kind of rent, or superprofits. Being lower cost, they were able to attract the best labor, further improving their position; *hence, wages tended to drift up from period to period.*

Rents did continue to rise, driven up by growth, and this largely overlooked feature of modern growth has an unsettling implication when we move from single proprietorships and small

reinvests its profits and grows at the golden rule rate, then the credit money required will always be available.

firms to the modern corporation. The analogy between land rent and superprofits is incomplete in an important way: superprofits in farming do not normally go to the low-cost farmer, they go to the landlord, who can charge for the land. But superprofits in industry do go to the owner/operator of the low-cost firm. However, when firms become corporations, superprofits will go not to the operator-managers of the firm, *but to the shareholders*—who may have no interest at all in the management of the company. The separation of ownership and management creates a condition, analogous to land ownership, for outsiders with no interest in the actual operation of the enterprise to reap the benefits simply by virtue of owning shares.

We have examined an abstract, but not idealized, picture of the working of capitalism in an era of craft industry and traditional agriculture, portraying a system that is self-adjusting in a weakly stabilizing manner, with a slight tendency toward “full employment,” while tending to establish an equilibrium that can claim some optimality properties. It has some affinity with the traditional ideas of neoclassicism, but it does not rest on the foundations of rational choice. It is, however, a pretty good description of the growth process in the world of Henry George. It fits with his account of progress, which both brings about and rests on innovation, and in which simple capital turns multi-dimensional and complex, becoming corporate, and in which (though he does not see the implications of this) the system capitalizes rents and we lose sight of them, even though they continue to increase regularly. Contrary to George, it looks as though this system could very well grow steadily, with rents rising in

proportion to growth, along with a consistent rise in wages and profits. Land speculation would, however, be very disruptive. And, as we shall see, speculation will become an even greater problem as we advance to the modern era of “financialization,” in which all operating assets have claims to their earnings attached to them—and many have financial derivatives (e.g., bets on the size of those earnings) attached as well.