

DOES THE CONCEPT OF SECULAR GROWTH HAVE A PLACE IN CAPITAL-BASED MACROECONOMICS?

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Macroeconomic analysis has been relatively neglected by Austrian economists since the beginning of the Austrian revival in the early 1960s with the publication of Murray N. Rothbard's *Man, Economy, and State* (1993)¹ and *America's Great Depression* (2000). Rothbard's treatise contained new and improved elaborations of the Austrian theories of money, capital, and business cycles. In particular Rothbard integrated the structure-of-production analysis developed by Wicksell and Hayek with the Fetter-Mises pure time-preference theory of interest, thus at last reuniting after many years two divergent strands of Böhm-Bawerk's capital and interest theory.² In *America's Great Depression*, Rothbard provided a notable application of Austrian business cycle theory that still stands as the exemplar of applied research in Austrian economics.

Unfortunately, after Rothbard's pathbreaking contributions, systematic thinking in Austrian macroeconomics was not very vigorously pursued.

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¹See esp. pp. 160-200, 273-86, 463-501, 661-764.

²Perhaps because he was so eager to distance himself from Böhm-Bawerk's flawed notion of a backward-looking and quantifiable "average period of production," Mises (1998, pp. 476-534) eschewed analysis in terms of an aggregate structure of production in his detailed restatement of capital and interest theory.

Macroeconomic research was not even stimulated by the awarding of the Nobel Prize in economics to Hayek in 1974—a prize that was bestowed for the superb work Hayek had done in the 1930s on capital and business cycle theory. With two notable exceptions, methodological and microeconomic concerns came to dominate the Austrian literature in the early 1970s and continued to almost completely engross the attention of Austrian economists for the last quarter of the twentieth century. The nature and function of entrepreneurship; whether the market process is inherently equilibrating or harbors disequilibrating tendencies; the primary function of the price system as a disseminator of knowledge or a tool of monetary calculation; the nature and source of monopoly and of expectations—these are the kinds of issues and controversies that have absorbed the lion's share of the attention from economists writing in the Mengerian tradition since Rothbard formulated his research program for modern Austrian macroeconomics.

One of the two notable exceptions to this microeconomic trend in contemporary Austrian thinking involved William Hutt's efforts in the 1970s to formulate an approach to macroeconomic issues that was rooted in the Austrian microfoundations of a dynamic market process in a remarkable trilogy of works: *A Rehabilitation of Say's Law* (1974), *The Theory of Idle Resources* (1977), and *The Keynesian Episode: A Reassessment* (1979). While there have been a few scattered attempts to follow up Hutt's work, no strong movement in this direction has yet emerged.³ The second exception is the ongoing internecine debate over the consequences of unregulated fractional reserve banking for the financial system and for the overall economy.⁴ However, this controversy, while it has led to some important clarifications and elaborations of Austrian monetary theory, hardly substitutes for the systematic advancement of Austrian macroeconomic analysis that has become so urgently necessary in the face of the revolutionary development that mainstream macroeconomics has undergone since the rational-expectations revolution of the mid-1970s and that continues today in the endogenous growth literature.⁵

In *Time and Money*, Roger Garrison (2001) now provides the substantial restatement and diagrammatic elaboration of Austrian macroeconomic analysis that has been so sorely lacking these many years. Garrison accomplishes this by constructing an analytical apparatus that Austrians can bring to bear

³For Austrian treatments of Hutt's macroeconomic contributions, see Salerno (1991, pp. 325–43); Egger (1994, pp. 107–38); and Horwitz (2000, pp. 176–202).

⁴For recent contributions to the long-running “free banking” controversy, see Selgin and White (1996, pp. 83–107), and Hoppe, Hülsmann, and Block (1998, pp. 19–50).

⁵On the spectacular dimensions of this development, see, for example, Snowden and Vane, eds. (1999, pp. 1–90).

on the central issues and problems of interest, business cycles, and growth that are of concern to contemporary mainstream macroeconomists. Clearly, future research in Austrian macroeconomics will rest on the analytics of Garrison's "capital-based macroeconomics." For this reason it is crucial to get the analytics right from the very start. In particular, it is essential to carefully scrutinize Garrison's analytical apparatus to ensure that it does not implicitly assume any causal relationships that contradict the underlying verbal-logical theorems that it is built upon.

In this spirit, I would like to address what I believe to be a problem with Garrison's conception of secular growth. According to Garrison:

Secular growth occurs without having been provoked by policy or by technological advance or by a change in intertemporal preferences. Rather, the ongoing gross investment is sufficient for both capital maintenance and capital accumulation. (p. 54)

Nor is the case of secular growth merely a theoretical curiosity for Garrison, for he maintains, "The macroeconomics of secular growth provides a more realistic baseline [than a stationary, or no-growth, economy] for analyzing particular changes in preferences or policies" (p. 55).⁶ Garrison's characterization of secular growth thus implies that—all other things including technology equal—period after period, net investment can occur without a deliberate act of net saving, that is, a choice to forego an additional quantity of current consumption evoked by a definite fall in time preferences.

However, in Austrian capital theory, each dose of net investment, *ceteris paribus*—and after a transition period during which the appropriate resource reallocations have been completed—brings about a stationary economy in which the new higher level of gross investment and the elongated structure of production is just sufficient to support a definite increase in the flow of consumer goods. As long as gross investment is maintained at its new higher level, the output of consumer goods per period will remain constant. In other words, regardless of how great is the increment of real income forthcoming from a previous act of net saving—net investment, any additional lengthening of the production structure can only be initiated by an alteration in intertemporal preferences. The increase in real income resulting from a given dose of net investment does not buy, as it were, an automatic and continuous flow of extra capital goods that can be utilized for further extensions of the structure of production; all capital goods created by an act of net saving are fully absorbed in maintaining the enhanced flow of real income characterizing the new stationary economy.

⁶It should be noted, however, that Garrison goes on to conduct his comparative static analyses using the no-growth economy as his baseline while keeping the secular component of growth in the background.

Let me illustrate my argument with a simple numerical example that traces the evolution of a Robinson Crusoe economy through five periods, starting with T_0 and ending with T_4 . The economy is represented in Table 1 (below) in terms of the daily allocation of Crusoe's labor among alternative employments and the resulting product of each of these employments. In period T_0

TABLE 1

PERIOD	INPUT	OUTPUT	DURABILITY NEW CAPITAL	GROSS & NET INVESTMENT/TOTAL CAPITAL
T_0	12 hrs. → 12 hrs. →	12 hrs. leisure 4 fish		$G = 0$; $N = 0$; $K = 0$
T_1	11 hrs. → 9 hrs. → ----- 4 hrs. →	11 hrs. leisure 3 fish ----- building net ($B = 500$ hrs.)	Fishing net: 500 days	$G = 4$ hrs. per day $N = 4$ hrs. per day $\Delta K = 4$ hrs. per day for 125 days
T_2	14 hrs. → 9 hrs. → ----- 1 hr. →	14 hrs. leisure 9 fish ----- replacing net		$G = 1$ hr. per day $N = 0$ hrs. per day $K = 500$ hrs.
T_3	13 hrs. → 7 hrs. → ----- 1 hr. → 3 hrs. →	13 hrs. leisure 7 fish ----- replacing net building ladder ($B = 600$ hrs.)	Ladder: 1,200 days	$G = 4$ hrs. per day $N = 3$ hrs. per day $\Delta K = 3$ hrs. per day for 200 days
T_4	13 hrs. → 8 hrs. → 1½ hrs. → ----- 1 hr. → ½ hr. →	13 hrs. leisure 8 fish 6 coconuts ----- replacing net replacing ladder		$G = 1\frac{1}{2}$ hrs. per day $N = 0$ hrs. per day $K = 1,100$ hrs.
T_5	13 hrs. → 7 hrs. → 1 hr. → ----- 1 hr. → ½ hr. → 1½ hrs. →	13 hrs. leisure 7 fish 4 coconuts ----- replacing net replacing ladder building house ($B = 3,000$ hrs.)	House: 10,000 days	$G = 3$ hrs. per day $N = 1\frac{1}{2}$ hrs. per day $\Delta K = 1\frac{1}{2}$ hrs. per day for 2,000 days

Crusoe divides his daily labor endowment of 24 hours evenly between the production of leisure and the catching of fish by hand, yielding 12 hours of leisure and 4 fish. The result is a stationary economy in which gross investment (G), which is equal to replacement investment (R) plus net investment (N), and total capital invested (K) are both constant and equal to 0. Net investment, defined as a change in total invested capital, is therefore also 0.

It can now be assumed that Crusoe experiences a lowering of his time preferences and decides to invest in building a durable good, let us say, a fishing net that will triple his future productivity in catching fish. The net, we assume, requires a building time (B) of 500 hours of labor and will remain fully productive for 500 days, after which it will become totally useless and must be replaced. We further assume that its durability is invariant to the intensity of its daily use. Crusoe chooses to allocate 4 hours per day for 125 days to build the net, sacrificing or “saving” 1 fish and 1 hour of leisure per day and accumulating a total capital investment of 500 labor hours during the transition period, T_1 . Crusoe’s pattern of productive activities during T_1 brings into being a progressing economy in which net investment is positive and total capital is increasing. When the fishing net is completed at the end of T_1 , and assuming Crusoe’s intertemporal preferences remain unchanged, a new stationary economy emerges in period T_2 in which Crusoe’s standard of living improves to 14 hours of leisure and 9 fish. To maintain this standard of living intact, Crusoe would need to devote 1 hour of labor per day to replacing the existing fishing net with a new one, so that total capital invested in this economy remains constant at 500 hours and net investment falls back to 0.

Now it may be the case that, as a result of the more abundant provision of present consumer goods resulting from his previous act of net saving, Crusoe’s time preferences fall again, so that the stationary economy depicted in T_2 never materializes, and Crusoe’s economy moves directly to the progressing economy depicted in period T_3 . In other words, the present prospect of the eighth and ninth fish and the fourteenth hour of leisure per day ranks lower on Crusoe’s current value scale than, for example, the quantity of future coconuts that may be obtained by investing in the construction of a ladder that permits him to collect them from trees. Thus Crusoe invests 3 hours per day for 200 days building a ladder that will completely wear out after providing a product for 1,200 days, again regardless of the intensity of its daily use. When the ladder has been completed Crusoe’s economy may then (a) either settle into the stationary economy depicted in T_4 , in which net investment is once again zero and total capital investment is maintained constant at 1,100 hours with daily replacement investment equal to $1\frac{1}{2}$ hours, or, (b) by virtue of a further decline in his time preferences induced by his rising real income, Crusoe may immediately undertake yet another act of net investment. For instance, he may undertake the construction of a house, as in T_5 , that will

cost him a decline in the potential standard of living attainable in the stationary economy of T_4 .

It is important to note that, despite the fact that Crusoe's real income in T_3 is sufficiently greater than it was in T_1 to afford Crusoe both an unambiguously higher standard of living and the wherewithal to undertake extra investment beyond the requisite replacement investment, the resources needed for the net investment are not somehow gratuitously available but are the product of a fall in Crusoe's time preferences and a corresponding act of net saving. The same is true with regard to the relationship between the progressing economies described in periods T_5 and T_3 , respectively. Thus, in the course of Crusoe's economic development, it is possible that the stationary economies portrayed in periods T_2 and T_4 are never realized, because Crusoe's economy is in continual transition to a production structure based on ever-higher levels of the total capital stock. Nevertheless, these notional no-growth economies still play a key role in the evolution of Crusoe's economy because they are the source of the opportunity costs incurred by Crusoe in his choices to undertake discrete acts of net saving and net investment. Thus, in T_5 , Crusoe lengthens his production structure vis-à-vis T_4 in order to accommodate his choice to sacrifice present enjoyment of 1 fish and 2 coconuts for a period of 2,000 days to achieve his investment goal of a shelter that yields him housing services for the succeeding 10,000 days.

This example is not designed to prove my argument against Garrison but merely to illustrate the difference in our positions and to shed light on an important methodological assumption upon which we differ. Garrison holds that "secular growth" occurs when ongoing gross investment with fixed technology and intertemporal preferences is sufficiently large to provide for maintenance of the existing capital structure as well as providing resources for accumulating additional capital. According to Garrison, therefore, Crusoe's choice in T_1 to reallocate 4 hours of labor from consumer goods' industries (above the dashed line) to capital goods industries (below the dashed line) initiates a secular growth process that propels the economy sequentially through periods T_3 and T_5 without any further alteration in Crusoe's time preferences. Garrison's contention that this growth process takes place in the absence of intervening "wealth effects" implies that the stationary economies depicted in periods T_2 and T_4 are completely irrelevant to the story.⁷

My objections to Garrison's story on secular growth are both substantive and methodological. Substantively, an immediate inference from what Mises calls "categorical" time preference—the preference for present over future satisfaction that is expressed in every action—is that an actor's "period of provision"

⁷"Our treatment of secular growth abstracts from this relationship between wealth and time preferences" (p. 55).

can never be infinite and must come to a close within a definite period of the future.⁸ This implies that, with a given state of time preferences and technology, net investment and capital accumulation cannot go on indefinitely and that corresponding to each configuration of the data is a particular stationary economy in which gross investment is completely exhausted in replacing the existing capital structure in order to maintain the extant flow of consumer goods. Secular growth, construed in the Garrisonian sense, thus contradicts categorial time preference because it implies that at least some portion of investment in the economy is self-generating, requiring no renunciation of present goods and unconstrained by any agent's period of provision.⁹

On the methodological level, when analyzing economic change, Austrian economics employs the method pioneered by Carl Menger and Eugen von Böhm-Bawerk. This method rests on the recognition that every causal process involves a beginning and an end. A complete explanation of the market process therefore requires a description of the factors that maintain it in motion as well as of the conditions that bring about its cessation (Mises 1998, pp. 331–32). Market processes are actuated by entrepreneurs seeking to profit by adjusting production to (anticipated) changes in the underlying economic data. As long as the adjustment is not complete, positive and negative gaps will persist between input and output prices in various lines of production. These prospective profits and losses will continue to agitate the market as entrepreneurs persistently reshuffle resources between different industries and processes of production in an effort to attain profits and avert losses. However, once production has been completely adjusted to the new constellation of the data, the prospect of profit will disappear and the market process will cease its operation. The theory of entrepreneurship thus provides the positive description of the market process while the imaginary constructs of the final state of rest, the ERE and—for the special problems of capital accumulation

⁸The period of provision is defined by Mises as “the fraction of future time for which the actor in a definite action wants to provide in some way and to some extent” (1998, p. 478). On categorial time preference and its implication of a definite and finite period of provision, see pp. 480–81, 533–34.

⁹*Ibid.*, p. 525:

As long as the world is not transformed into a land of Cockaigne, men are faced with scarcity and must act and economize; they are forced to choose between satisfaction in nearer and in remoter periods of the future because neither for the former nor for the latter can full contentment be attained. Then a change in the employment of factors of production which withdraws such factors from their employment for want satisfaction in the nearer future and devotes them to want-satisfaction in the remoter future must necessarily impair the state of satisfaction in the nearer future and improve it in the remoter future.

and capital consumption—the stationary economy provide the negative description of the (unrealizable) conditions of full adjustment that would suspend its motion.¹⁰

The construct of the stationary economy is thus indispensable in analyzing the process by which the capital structure of a modern market economy adjusts to a change in time preferences.¹¹ As noted, Austrian economists envisage all market adjustment processes as propelled by the entrepreneurial pursuit of profits whose existence indicates a maladjustment between the current pattern of resource allocation and the pattern that is consistent with the prevailing configuration of the economic data. The progressive adjustment achieved in the course of the market process is marked by a decline of profits and losses toward zero. In order to illuminate the contours of the adjustment process, the starting point and ending point of Austrian process analysis is therefore the image of an economy that is fully adjusted and in which the driving force of profits has been completely exhausted. The stationary economy defines a situation in which individual firms continue to reap profits and losses while aggregate profits equal zero. The aggregate capital values of all firms in the stationary economy, that is, total invested capital, therefore, remain constant, so that gross investment is equal to replacement investment and net investment is nil. Positive net investment disrupts the stationary economy and brings about a progressing economy involving capital gains for higher-order capital goods firms and capital losses for lower-order capital and consumer goods firms, with the excess of the former over the latter reflecting the progressive increase in total invested capital. The augmentation of the aggregate capital values of the economy's firms caused by increased investment expenditures accrues at first mainly in the form of aggregate positive profits to the higher-order firms. These profits induce producers of higher-order capital goods to expand their operations by increasing their demand for labor and other nonspecific resources whose prospective discounted marginal products suddenly exceed their real rental prices. As the entrepreneurial bidding process proceeds, real wage rates and land rents are eventually bid up to fully reflect the enhanced marginal productivity of labor and land factors, and the increment in real income is thus completely imputed to the owners of original resources (and the investors of the additional savings). In fact it is this very

¹⁰As Mises (*ibid.*, p. 331) notes "The main importance is to be attached to the positive description. The negative description resulting in the imaginary constructions of the final price and the evenly rotating economy is merely auxiliary."

¹¹Thus the imaginary construct of the stationary economy, and the related constructs of progressing and retrogressing economies play a central role in the capital theory of Austrians such as Mises and Rothbard. For Mises's description of these constructs, see *ibid.*, pp. 251-52, 256-57; for Rothbard's (1993, pp. 481-84) construction of the stationary economy which differs in one important respect from Mises's.

increase in the price appraisements of the original factors by entrepreneurs in the higher stages of production that induce the producers of consumer goods and their direct suppliers to seek to minimize their costs by releasing labor and land factors to the higher stages and substituting the newly produced capital goods, that is, by investing in rendering their operations more capital intensive (Hayek 1967, pp. 86-87). The disappearance of aggregate profits in the economy will thus coincide with the final adjustment of the production structure to the intertemporal preferences of consumers, at which point the progressing economy will necessarily give way to the stationary economy.¹²

Now Garrison's concept of secular growth in which net investment and therefore aggregate profits are routine phenomena which display no tendency toward obliteration does not appear to be amenable to this Mengerian style of process analysis. Secular growth—which recall entails ongoing net investment which is not called forth by changes in the data—seemingly involves an economic maladaptation that reproduces itself endlessly. But Garrison's treatment of secular growth involves another deviation from Menger's analytical method, as well as a pedagogical simplification of the market forces that determine the interest rate that I believe misleads him into a substantive error. Before addressing these issues, let me set out some basic principles on which Garrison and I would be in agreement.

In a modern market economy operating under a complex material and intellectual division of labor in which all exchanges are necessarily monetary exchanges, the length of the production structure is the outcome of the choices of myriads of individuals whose time preferences and periods of provision vary widely. Needless to say, unlike our hypothetical Crusoe, none of these individuals is capable of mentally grasping, let alone optimally arranging, the social production structure. In our hypothetical Crusoe economy, the actor's time preferences are reflected in a structure of intertemporal rates of substitution, or "own rates of interest," that vary between the different consumer goods. For example, in period T_4 , the own rate of interest for fish is approximately 360 percent per year, while the own rate for coconuts is about 90 percent per year.¹³ However, Crusoe need not know these rates to guide his intertemporal production decisions because, in his simple economy, he can

¹²For a fuller description of this process, see Mises (1998, pp. 292-95) and Rothbard (1993, pp. 479-84).

¹³In the case of fish, reallocating the 1 hour of daily replacement labor on the net to current fish production would increase current product by 1 fish today at the expense of the daily services of the net 500 days in the future, entailing a reduction in daily fish output from 9 to 3. In other words future fish are substituted for present fish in the ratio of 6:1, or 500 percent per 500 days. Similarly, in coconut production, forgoing one-half hour of replacement labor on the ladder today will expand daily production by two coconuts today, while causing coconut output to decline from 8 to 0 1,200 days in the future yielding an intertemporal substitution ratio of 4:1, or 300 percent per 1,200 days.

directly evaluate and compare the psychic revenues and costs of alternative actions. Moreover, even if he did compute these own rates of interest they would be of little use to him in evaluating potential investment projects because such rates result from an indissoluble intertwining of his valuations of present versus future satisfactions with his relative valuations of the concrete goods. Only in a monetary economy is the element of pure time preference disentangled from the relative valuations of the various commodities and given a unitary expression in the interest rate.¹⁴ Ironically, the individual—even if he possesses perfect knowledge of his own future value scales—is unable to assess his own overall time preference without recourse to monetary calculation.

In the market economy, then, the interest rate fundamentally reflects the interaction of individual time preference scales in market exchanges between the owners of present and future goods, that is, in exchanges between the owners of saved money capital and the owners of original and intermediate factors of production. This “originary” (Mises) or “pure” (Rothbard) rate of interest is the rate of exchange between present goods and future goods and is primarily manifested as the uniform rate by which the prospective marginal value products yielded by currently invested factor services in time-consuming production processes of different lengths are discounted. This social time discount rate simultaneously determines the social consumption-saving ratio, the supply of and demand for capital, and the price margins (Hayek) or price spreads (Rothbard) between the inputs and outputs of each stage of production. The pure interest rate therefore also governs the profitability and thus the extent of investment in each production process and, hence, the overall length of the structure of production. In the stationary economy, entrepreneurial profit-seeking will drive the rate of return on investment, or, in Wicksellian terms, the “natural rate of interest,” toward equality in all stages and processes of production.

The prospective interstage price margins are thus the primary influence governing entrepreneurs’ actions in adjusting the structure of production to the intertemporal preferences of consumers.¹⁵ The loanable funds market is wholly

¹⁴Mises (1990, p. 65):

Only where money exists can we clearly analyze the difference in value between present and future goods. Only within a monetary economy can this value difference be comprehended in the abstract and separated from changes in the valuation of individual concrete economic goods.

¹⁵“The rate of originary interest directs the investment activities of the entrepreneurs. It determines the length of waiting time and of the period of production in every branch of industry” (Mises 1998, p. 529).

derivative and of secondary importance in the pure theory of capital and interest, as has been recognized by most leading Austrian capital theorists.¹⁶

This conclusion is reinforced by the Mengerian view of the market as essentially the process by which the interpersonal distribution of property is adjusted through exchanges that entail a mutual enhancement of want satisfaction. For Menger, then, prices were “symptoms of an economic equilibrium in the distribution of possessions between the economies of individuals.” Moreover, Menger (1981, p. 192) warned, because “prices are the only phenomena of the process [of want-satisfaction] that are directly perceptible,” there is an erroneous tendency to regard “the magnitude of the price as the most essential feature of an exchange.” In his own exposition and development of Mengerian price theory, Böhm-Bawerk was thus careful to verbally elaborate his analysis of price determination in terms of the “marginal pairs,” eschewing the graphical analysis of supply and demand. Thus, although Böhm-Bawerk (1960, p. 233) did “accord full recognition” to “the mathematical form of presentation,” he questioned whether it could adequately substitute for his “running commentary of the determination of price,” which highlighted the mutually beneficial restructuring of property of the individual traders that underlies and drives the emergence of the market price.

Richard von Strigl explicitly applied the Mengerian vision of the market process to “an economy based on the division of labor using roundabout methods.” As Strigl noted,

In this, too, the exchange can be restricted to correcting the distribution of property in the sense that individual economic subjects exchange what they have step by step for something they need more urgently: Laborers exchange their labor for immediate payment, the owner of capital goods sells these for cash, the producer of consumer goods also sells for immediate payment and, finally, those who function in general as entrepreneurs purchase originary and produced factors of production for cash, just as they sell products for cash. (2000, p. 110)

[W]hether the structure of production remains the same depends entirely upon whether entrepreneurs find it profitable to reinvest the usual proportion of the return from the sale of the product of their respective stages of production in turning out intermediate goods of the same sort. . . . The continuance of the existing degree of capitalistic organisation depends, accordingly, on the prices paid and obtained for the product of each stage of production and these prices are, therefore, a very real and important factor in determining the direction of production.” (Hayek 1931, pp. 48-49)

¹⁶“The loan market does not determine the rate of interest. It adjusts the rate of interest on loans to the rate of originary interest as manifested in the discount of future goods” (Mises 1998, p. 524). Also see Hayek (1931, p. 84) and Rothbard (1963, pp. 363-64).

The point of this digression on method is to draw attention to the fact that while the loanable funds market provides the most visible manifestation of the interest rate, it is by no means the market in which the distribution of property is ultimately adjusted in accordance with intertemporal preferences of consumers. The markets on which this adjustment occurs are the markets for productive resources, especially labor and natural resource markets. The ultimate recipients of the supply of present goods represented by the money savings of the capitalists are the owners of the original factors of labor and natural resources who supply the services of their factors in return. Entrepreneurial bidding for the variety of factor services with the scarce supply of capital establishes a uniform rental price for each that includes a unitary discount rate on their prospective marginal value products which simultaneously distributes and coordinates these services across an integrated structure of production and establishes the price margins between the various stages of this structure.¹⁷ The loanable funds market is not fundamental to this analysis of the Mengerian adjustment of the stocks of present and future goods that gives rise to the interest rate. It is, however, an important institution for lowering the costs of pooling and investing capital and for dividing and customizing risk-bearing and decision-making responsibilities among capitalist-entrepreneurs on the supply side of the market (Strigl 2000, pp. 110-11).

Although Garrison clearly understands all this, he nevertheless employs the loanable funds market as one of the three key elements of his capital-based macroeconomics along with the production possibilities frontier and the Hayekian intertemporal structure of production. While the loanable funds market construction, like the production possibilities frontier, is thus an expositional simplification designed to couch capital-based macroeconomics in concepts familiar to mainstream macroeconomists, its use in his explanation of the case of secular growth appears to camouflage an error in his analysis. As Garrison describes the secular growth process:

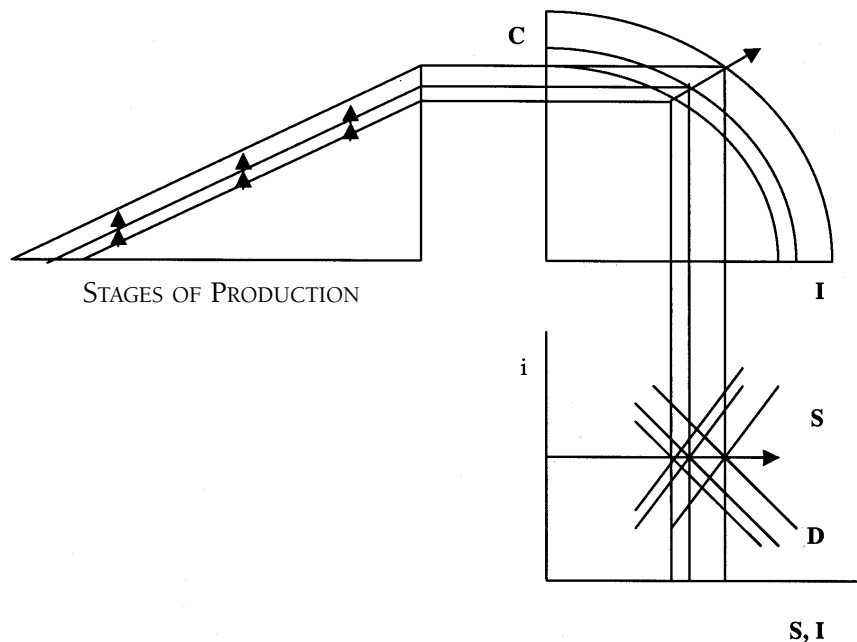
Savers are supplying increasing amounts of loanable funds out of their increasing incomes; the business community is demanding increasing amounts of loanable funds to maintain a growing capital structure and to accommodate future demands for consumer goods that are growing in proportion to current demands. With ongoing shifts in the supply and demand for loanable funds, the equilibrium rate of interest, which also manifests itself as the ongoing rate of return on capital generally, remains constant. . . . The unchanging rate of interest . . . translates into an unchanging slope of the hypotenuse for the successive Hayekian triangles. The interest rate allocates resources among the stages of production so as to change the size but not the intertemporal profile of the capital structure. (pp. 54-55)

¹⁷For a description of how the pure interest discount is determined on factor markets, see Böhm-Bawerk (1960, pp. 299-312).

There are two problems with this characterization of the secular growth process. The first relates to Garrison's conceptualization of the market for savings as a market for loanable funds. On the supply side, why should consumers save more out of their growing incomes unless their relative valuations between present and future goods have indeed changed? After all, *ceteris paribus*, to accommodate the additional savings, the discounted rents of the original factor services must be bid up, causing a contraction in the price margins between the stages of production and, hence, a fall in the natural rate of interest that precisely reflects the decline in the social ratio of exchange between present and future goods. Garrison avoids this conclusion, however, by positing a simultaneous and proportional shift of demand for loanable funds on the part of entrepreneurs who seek to maintain a growing capital structure and to meet the anticipated expansion in future demands for consumer goods that accompanies the growth process.

Garrison's appeal to the demand side of the loanable funds market, however, exposes a second problem with his portrayal of the secular growth process. In maintaining that "the intertemporal profile of the capital structure" does not change during this process, he implies that the price margins between the stages also remain constant. (Abstracting from compounding, the constant slope of the hypotenuse of the broadening, but not lengthening, Hayekian triangles in Figure 1 below, reproduced from Garrison's [p. 54] discussion of secular growth, graphically illustrates the constancy of the natural

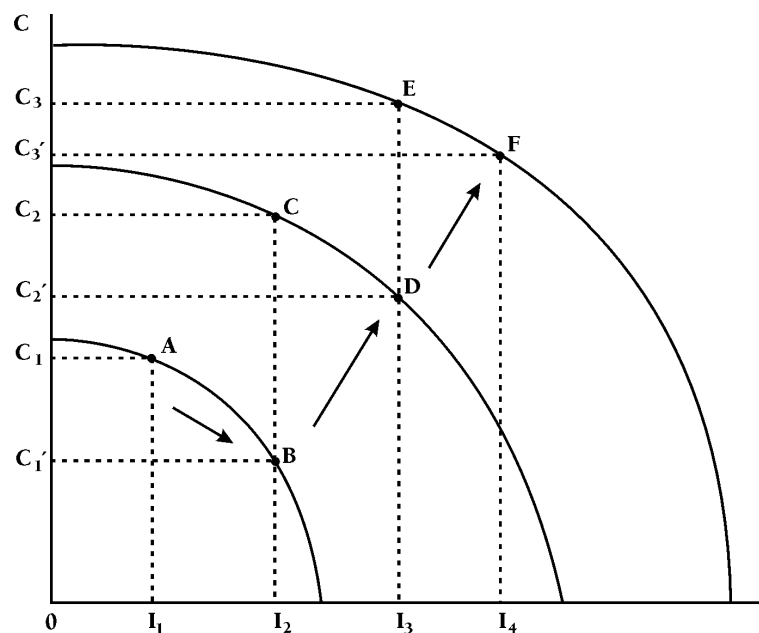
FIGURE 1



rate of interest.) From the *ex ante* viewpoint, then, there is no maladjustment in the distribution of time-dated goods to be corrected by a Mengerian-Striglian process. In other words, if the interest rate on the loanable funds market does not diverge from the natural rate of interest in production, what is the incentive for entrepreneurs to borrow and invest the additional funds, since additional investment will bring about a shrinkage of the spread between input and output prices causing the natural rate to decline below the loanable funds rate? Indeed, additional capital goods, which are the source of the growing real demands for future consumer goods, cannot be generated unless the time profile of the investment of the original factor services is lengthened. Given a labor force constant in quantity and quality, fixed stocks of natural resources and static technology, the production of more capital goods must entail the investment of labor and other relatively nonspecific resources for longer periods of time and a concomitant reduction in the natural interest rate, both reflecting a reduced social time preference rate.

Despite these criticisms of Garrison, however, it certainly is conceivable and even likely that modern capitalist economies will be characterized by ongoing net investment and a growing capital stock that coincides with an uninterrupted rise in living standards. But this will require a fall in time preferences as explained in the Robinson Crusoe model above. We can readily adapt one of the components of Garrison's capital-based macroeconomics apparatus to illustrate this development. In Figure 2 below, a capitalist market economy is depicted by a series of production possibilities frontiers

FIGURE 2



(PPFs). The economy begins its evolution at point A on the southwestern-most PPF. This point represents a stationary state in which gross investment, OI_1 , is equal to replacement investment with net investment equaling zero. Any point on this PPF, therefore, that lies to the northwest of point A represents a retrogressing economy featuring net disinvestment while points lying to its southeast denote a progressing economy with net investment. Now let us assume that there occurs a drop in time preferences resulting in a movement to point B as consumption falls from OC_1 to OC'_1 releasing resources for positive net investment equal to I_1I_2 . After a transition period during which the structure of production is adjusted, the PPF shifts rightward to the PPF containing the points C and D. Point C represents the new stationary economy in which the higher level of gross investment, OI_2 , is just sufficient to permanently maintain an increased output of consumable goods equal to OC_2 . However, the increase in real income and wealth that accrues in this process of capital accumulation in the form of net profits, higher factor rents, and increased interest returns induces a further fall in intertemporal preferences that drives the economy directly to point D. In this progressing economy, agents undertake net investment of I_2I_3 at the cost of additional consumable output of C'_2C_2 . Nonetheless, despite the ongoing net investment and the sacrificed consumption it entails, real income has grown sufficiently to permit living standards in the progressing economy at point D to exceed their levels at starting point B (and A). This second episode of net investment permits additional lengthening of the production structure that expands the economy's productive capacity even further as represented by the PPF containing points E and F. Once again the enhanced income and wealth generated by the capital accumulation process reduces the social ratio of exchange between present and future goods and stimulates further net investment redirecting the economy away from the stationary state at point E toward the progressing economy at point F, whose living standards nonetheless have risen with respect to those at point D.

We thus have a plausible explanation for the observed concurrence of ongoing net investment and rising living standards in modern capitalist economies that does not invoke technological progress and does not rely on a dubious notion of secular growth that apparently conflicts with the basic tenets of Austrian capital theory. However, Garrison may properly object that I have based my growth story wholly on the supply side of the present/future market and have not said a word about the demand side after roundly criticizing his account of it. Furthermore, without reference to the demand side, there can be no possibility of explaining the situation depicted in Figure 1 in which gross investment grows without altering the intertemporal profile of the capital structure. It is, therefore, an instructive analytical exercise to reproduce the exact outcome of the Garrisonian secular growth process while

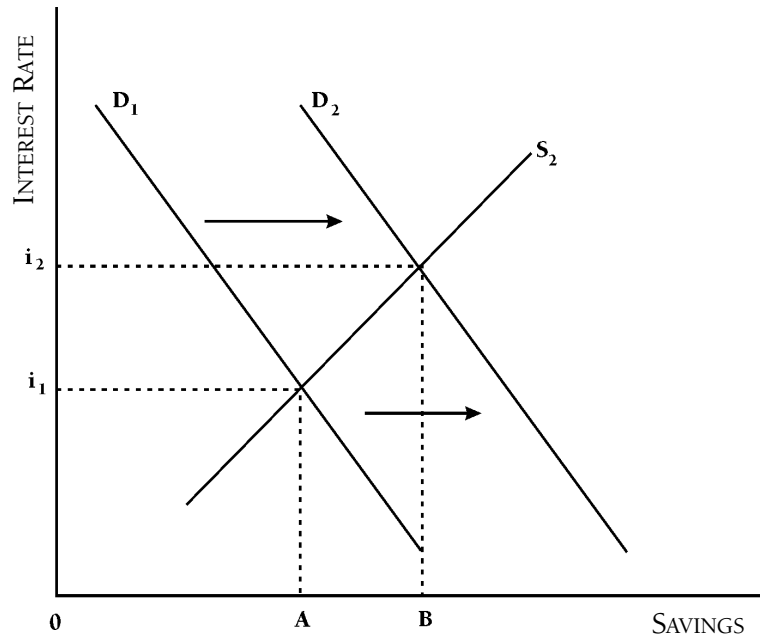
employing an alternative conceptualization of the present-future or “time,” market that I believe is more in accord with Austrian capital theory.

If we follow Garrison (p. 36) in netting out the use of saved funds for consumption purposes from both sides of this market, then the ultimate demanders of present goods on the time market are the owners of the original factors of production. Restricting our focus to labor as the quintessential original factor, an increase in the labor force in the stationary economy, *ceteris paribus*, will increase the demand for present goods in the form of money savings, raising the natural interest rate and shortening (and widening) the structure of production. The process by which this adjustment comes about begins with a reduction in wage rates in labor markets to accommodate the increased supplies and falling marginal productivities of the various labor factors (which we assume, for the sake of argument, all increase proportionally). Entrepreneurs operating in lower-stage, especially consumer-good, industries will find that more labor-intensive techniques have suddenly become less costly and they will increase their demand for labor while decreasing their demands for the products of higher-stage industries. Furthermore, the newly employed laborers will spend their wages on consumer goods, further expanding the price margins in the stages of production closest to consumers. Conversely, the higher-stage industries will experience a reduction in or outright elimination of their positive price margins, because the effect of the decline in demand for capital goods on their revenues will more than offset the effect of the declining price of labor on their costs.

Ultimately, the natural rate of interest will thus rise throughout the economy, the marginal product of factors invested in more time-consuming production processes will bear a proportionally heavier discount, and production processes will be shortened. Although the marginal product of labor and real wage rates will be lower in the new stationary economy, aggregate income as well as the aggregate output of consumer goods will be higher due to the increase of the labor input. Reinforcing this increase in aggregate output and the output of consumer goods will be an increased quantity of savings induced by the higher interest rate which will act to partially offset the shortening of the production structure and the falling marginal productivity of labor. This is illustrated in Figure 3, where the rightward shift in the demand for savings reflecting the increase in the labor force causes an increase in the interest rate from i_1 to i_2 and induces an increase in savings and investment equal to AB.¹⁸

¹⁸The graphical representation of the fundamental “time market” in Figure 3 is adapted from Rothbard (1963, pp. 323-60). Although Austrian capital theorists have not devoted much attention to alterations in the structure of production emanating from the demand side of the time market, our analysis accords with Bresciani-Turroni’s brief hint on the subject:

FIGURE 3



Now, if we assume that the supply of saved funds increases simultaneously and proportionally with the increased demand for present goods expressed by the enlarged labor force, then we get the Garrisonian result as displayed in Figure 1. The interest rate will remain constant as the supply and demand curves for saved funds continue to shift outward in tandem; capital investment will increase in amount, but the time profile of the capital structure will remain constant; total capital invested per laborer also will remain constant and, hence, so will the marginal productivity and real wage rates of the larger labor force; and the PPF will shift out from the origin while the point representing the expanding economy retains the same relative position on the curve indicating an unchanged ratio between consumption and investment. However, in this case, the graphical construction does not depict a Garrisonian secular growth process, because in my story the movement of the curves is driven by changes in the data, that is, in resources and time preferences.

A realistic conception of saving ought not to start from the assumption of a constant population, because in fact every year new groups of workers enter the labour market in excess of those who withdraw from it. This additional supply of labour would tend, if other things remained equal, to depress wages, and therefore to shorten the average period of production, or, in other words, to render the economic structure of the country less capitalistic. (Bresciani-Turroni 1936, pp. 15-16)

In concluding, I would like to emphasize two implications of my argument. First, the concept of secular growth as an uncaused phenomenon contradicts the Mengerian method of analyzing dynamic market processes as well as modern Austrian capital and interest theory and should be purged from capital-based macroeconomics. In its place should be substituted a causal analysis that accounts for the stylized fact of a steady secular growth trend in industrial economies in terms of the dynamic coordination of entrepreneurial plans with the historical development of time preferences, the size and quality of the labor force, natural resource endowments, and technological progress.¹⁹ This substitution can easily be made without in the least affecting the basic structure of the Garrisonian analytical framework. Second, and more important, the analytical simplification of the loanable funds market, while it may be a useful component of capital-based macroeconomics in treating the effects of changes of preferences and policies that impinge on the supply side of the intertemporal market, is liable to be dangerously misleading when dealing with demand-side influences on the capital structure. Consequently, perhaps a richer conception of the time market could be formulated and incorporated into capital-based macroeconomics without seriously damaging its potential appeal to mainstream macroeconomists.

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¹⁹I am indebted to John P. Cochran for this point.

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