

Breaking Out of the Walrasian Box: The Cases of Schumpeter and Hansen

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Since World War II, mainstream neoclassical economics has followed the general equilibrium paradigm of Swiss economist Leon Walras (1834–1910).¹ Economic analysis now consists of the exegesis and elaboration of the Walrasian concept of general equilibrium, in which the economy pursues an endless and unchanging round of activity—what the Walrasian Joseph Schumpeter aptly referred to as “the circular flow.” Since the equilibrium economy is by definition a changeless and unending round of robotic behavior, everyone on the market has perfect knowledge of the present and the future, and the pervasive uncertainty of the real world drops totally out of the picture. Since there is no more uncertainty, profits and losses disappear, and every business firm finds that its selling price exactly equals its cost of production.

It is surely no accident that the rise to dominance of Walrasian economics has coincided with the virtual mathematization of the social sciences. Mathematics enjoys the prestige of being truly “scientific,” but it is difficult to mathematize the messy and fuzzy uncertainties and inevitable errors of real world entrepreneurship and human actions. Once one expunges such actions and uncertainties, however, it is easy to employ algebra and the tangencies of geometry in analyzing this unrealistic but readily mathematical equilibrium state.

Most mainstream economic theorists are content to spend their time elaborating on the general equilibrium state, and simply to assume that this state is an accurate presentation of real world activity. But some economists have not been content with contemplating general equilibrium; they have been eager to apply this theory to the real world of dynamic change. For change clearly exists, and for some Walrasians it has not sufficed to simply translate general equilibrium analysis to the real world and to let the chips fall where they may.

The author learned the basic insights of this article many years ago from lectures of Professor Arthur F. Burns at Columbia University.

As someone who has proclaimed that Leon Walras was the greatest economist who ever lived, Joseph A. Schumpeter (1883–1950) faced this very problem. As a Walrasian, Schumpeter believed that general equilibrium is an overriding reality; and yet, since change, entrepreneurship, profits, and losses clearly exist in the real world, Schumpeter set himself the problem of integrating a theoretical explanation of such change into the Walrasian system. It was a formidable problem indeed, since Schumpeter, unlike the Austrians, could not dismiss general equilibrium as a long-run tendency that is never reached in the real world. For Schumpeter, general equilibrium had to be the overriding reality: the realistic starting point as well as the end point of his attempt to explain economic change.²

To set forth a theory of economic change from a Walrasian perspective, Schumpeter had to begin with the economy in a real state of general equilibrium. He then had to explain change, but that change always had to *return* to a state of equilibrium, for without such a return, Walrasian equilibrium would only be real at *one single point* of past time and would not be a recurring reality. But Walrasian equilibrium is a world of unending stasis; specifically, it depicts the consequences of a fixed and unchanging set of individual tastes, techniques, and resources in the economy. Schumpeter began, then, with the economy in a Walrasian box; the only way for any change to occur is through a change in one or more of these static givens.

Furthermore, Schumpeter created even more problems for himself. In the Walrasian model, profits and losses were zero, but a rate of interest continued to be earned by capitalists, in accordance with the alleged marginal productivity of capital. An interest charge became incorporated into costs. But Schumpeter was too much of a student of Böhm-Bawerk to accept a crude productivity explanation of interest. The Austrian approach was to explain interest by a social rate of time preference, of the market's preference for present goods over future goods. But Schumpeter rejected the concept of time-preference as well, and so he concluded that in a state of general equilibrium, the rate of interest as well as profits and losses are all zero.

Schumpeter acknowledged that time-preference, and hence interest, exist on consumption loans, but he was interested in the production structure. Here he stressed, as against the crude productivity theory of interest, the Austrian concept of imputation, in which the values of products are imputed back to productive factors, leaving, in equilibrium, no net return. Also, in the Austrian manner, Schumpeter showed that capital goods can be broken down ultimately into the two original factors of production, land and labor.³ But what Schumpeter overlooked, or rather rejected, is the crucial Böhm-Bawerkian concept of time and time-preference in the process of production. Capital goods are not *only* embodied land and labor; they are embodied land, labor, and *time*, while interest becomes a payment for "time." In a productive loan, the creditor of course exchanges a "present good" (money that can be used now)

for a “future good” (money that will only be available in the future). And the primordial fact of time-preference dictates that every one will prefer to have wants satisfied now than at some point in the future, so that a present good will always be worth more than the *present prospect* of the equivalent future good. Hence, at any given time, future goods are discounted on the market by the social rate of time-preference.

It is clear how this process works in a loan, in an exchange between creditor and debtor. But Böhm-Bawerk’s analysis of time-preference and interest went far deeper, and far beyond the loan market for he showed that time-preference and hence interest return exist apart from or even in the absence of any lending at all. For the capitalist who purchases or hires land and labor factors and employs them in production is buying these factors with money (present good) in the expectation that they will yield a future return of output, of either capital goods or consumer goods. In short, these original factors, land and labor, are future goods to the capitalist. Or, put another way, land and labor produce goods that will only be sold and hence yield a monetary return at some point *in the future*; yet they are paid wages or rents by the capitalist now, in the present.

Therefore, in the Böhm-Bawerkian or Austrian insight, factors of production, hence workers or landowners, do *not* earn, as in neoclassical analysis, their marginal value product in equilibrium. They earn their marginal value product discounted by the rate of time-preference or rate of interest. And the capitalist, for his service of supplying factors with present goods and waiting for future returns, is paid the discount.⁴ Hence, time-preference and interest income exist in the state of equilibrium, and not simply as a charge on loans but as a return earned by every investing capitalist.

Schumpeter can deny time-preference because he can somehow deny the role of time in production altogether. For Schumpeter, production apparently takes no time in equilibrium, because production and consumption are “synchronized.”⁵ Time is erased from the picture, even to the extent of assuming away accumulated stocks of capital goods, and therefore of any age structure of distribution of such goods.⁶ Since production is magically “synchronized,” there is then no necessity for land and labor to receive any advances from capitalists. As Schumpeter writes:

There is no necessity [for workers or landowners] to apply for any “advances” of present consumption goods. . . . The individual need not look beyond the current period. . . . The mechanism of the economic process sees to it that he also provides for the future at the same time. . . . Hence every question of the accumulation of such stocks [of consumer goods to pay laborers] disappears.

From this bizarre set of assumptions, “it follows”, notes Schumpeter, “that everywhere, even in a trading economy, produced means of production are

nothing but transitory items. Nowhere do we find a stock of them fulfilling any functions." In denying, further, that there is any "accumulated stock of consumer goods" ready to pay laborers and landowners, Schumpeter is also denying the patent fact that wages and rents are always paid out of the accumulated savings of capitalists, savings which could have been spent on consumer goods but which laborers and landowners will instead spend with their current incomes.

How can Schumpeter come to this conclusion? One reason is that when workers and landowners exchange their services for present money, he denies that these involve "advances" of consumer goods, because "It is simply a matter of exchange, and not of credit transactions. The element of time plays no part." What Schumpeter overlooks here is the profound Böhm-Bawerkian insight that the time market is not merely the *credit* market. For when workers and landowners earn money *now* for products that will only reap a return to capitalists in the future, they *are* receiving advances on production paid for out of capitalist saving, advances for which they in effect pay the capitalists a discount in the form of an interest return.⁷

In most conceptions of final equilibrium, net savings are zero, but interest is high enough to induce *gross* saving by capitalists to just replace capital equipment. But in Schumpeter's equilibrium, interest is zero, and this means that *gross* saving is zero as well. There appear to be neither an incentive for capitalists to maintain their capital equipment in Schumpeterian equilibrium nor the means for them to do so. The Schumpeterian equilibrium is therefore internally inconsistent and cannot be maintained.⁸

Lionel Robbins puts the case in his usual pellucid prose:

If there were no yield to the use of capital . . . there would be no reason to refrain from consuming it. If produced means of production are not productive of a net product, why devote resources to maintaining them when these resources might be devoted to providing present enjoyment? One would not have one's cake rather than eat it, if there were no gain to be derived from having it. It is, in short, *an* interest rate, which, other things being given, keeps the stationary state—the rate at which it does not pay to turn income into capital or capital into income. If interest were to disappear the stationary state would cease to be stationary. Schumpeter can argue that *no* accumulation will be made once stationary equilibrium has been attained. But he is not entitled to argue that there will be no *decumulation* unless he admits the existence of interest.⁹ (emphasis added)

To return to Schumpeter's main problem, if the economy begins in a Walrasian general equilibrium modified by a zero rate of interest, how can any economic change, and specifically how can economic development, take place? In the Austrian-Böhm-Bawerkian view, economic development takes place through greater investment in more roundabout processes of production, and that investment is the result of greater net savings brought about by a general fall

in rates of time-preference. Upon such a fall, people are more willing to abstain from consumption and to save a greater proportion of their incomes, and thereby invest in more capital and longer processes of production. In the Walrasian schema, change can only occur through alterations in tastes, techniques, or resources. A change in time-preference would qualify as a very important aspect of a change in consumer “tastes” or values.

But for Schumpeter, *there is no* time-preference, and no savings in equilibrium. Consumer tastes are therefore irrelevant to increasing investment, and besides there are *no savings* or interest income out of which such investment can take place. A change in tastes or time-preferences cannot be an engine for economic change, and neither can investment in change emerge out of savings, profit, or interest.

As for consumer values or tastes apart from time-preference, Schumpeter was convinced that consumers were passive creatures and he could not envision them as active agents for economic change.¹⁰ And even if consumer tastes change actively, how can a mere shift of demand from one product to another bring about economic development?

Resources for Schumpeter are in no better shape as engines of economic development than are tastes. In the first place, the supplies of land and labor never change very rapidly over time, and furthermore they cannot account for the necessary investment that spurs and embodies economic growth.

With tastes and resources disposed of, there is only one logically possible instrument of change or development left in Schumpeter’s equilibrium system: technique. “Innovation” (a change in embodied technical knowledge or production functions) is for Schumpeter the only logically possible avenue of economic development. To admire Schumpeter, as many economists have done, for his alleged realistic insight into economic history in seeing technological innovation as the source of development and the business cycle, is to miss the point entirely. For this conclusion is not an empirical insight on Schumpeter’s part; it is logically the only way that he can escape from the Walrasian (or neo-Walrasian) box of his own making; it is the only way for any economic change to take place in his system.

But if innovation is the only way out of the Schumpeterian box, how is this innovation to be financed? For there are no savings, no profits, and no interest returns in Schumpeterian equilibrium. Schumpeter is stuck: for there is no way within his own system for innovation to be financed, and therefore for the economy to get out of his own particularly restrictive variant of the Walrasian box. Hence, Schumpeter has to invent a *deus ex machina*, an exogenous variable from outside his system that will lift the economy out of the box and serve as the only possible engine of economic change. And that *deus ex machina* is inflationary bank credit. Banks must be postulated that expand the money supply through fractional reserve credit, and furthermore, that lend that new money exclusively to innovators—to new entrepreneurs who are willing

and able to invest in new techniques, new processes, new industries. But they cannot do so because, by definition, there are no savings available for them to invest or borrow.

Hence, the conclusion that innovation is the instrument of economic change and development, and that the innovations are financed by inflationary bank credit, is *not* a perceptive empirical generalization discovered by Joseph Schumpeter. It is not an empirical generalization at all; indeed it has *no* genuine referent to reality. Suggestive though his conclusion may seem, it is solely the logical result of Schumpeter's fallacious assumptions and his closed system, and the only logical way of breaking out of his Walrasian box.

One sees, too, why for Schumpeter the entrepreneur is always a disturber of the peace, a disruptive force *away* from equilibrium, whereas in the Austrian tradition of von Mises and Kirzner, the entrepreneur harmoniously adjusts the economy in the direction of equilibrium. For in the Austrian view the entrepreneur is the main bearer of uncertainty in the real world, and successful entrepreneurs reap profits by bringing resources, costs, and prices further in the direction of equilibrium. But Schumpeter starts, not in the real world, but in the never-never land of general equilibrium which he insists is the fundamental reality. But in the equilibrium world of stasis and certainty there are no entrepreneurs and no profit. The *only* role for entrepreneurship, by logical deduction, is to innovate, to disrupt a preexisting equilibrium. The entrepreneur cannot adjust, because everything has already been adjusted. In a world of certainty, there is no room for the entrepreneur; only inflationary bank credit and innovation enable him to exist. His only prescribed role, therefore, is to be disruptive and innovative.

The entrepreneur, then, pays interest to the banks, interest for Schumpeter being a strictly monetary phenomenon. But where does the entrepreneur-innovator get the money to pay interest? Out of profits, profits that he will reap when the fruits of his innovation reach the market, and the new processes or products reap revenue from the consumers. Profits, therefore, are *only* the consequence of successful innovation, and interest is only a payment to inflationary banks out of profit.

Inflationary bank credit means, of course, a rise in prices, and also a redirection of resources toward the investment in innovation. Prices rise, followed by increases in the prices of factors, such as wages and land rents. Schumpeter has managed, though not very convincingly, to break out of the Walrasian box. But he has not finished his problem. For it is not enough for him to break out of his box; he must also get back in. As a dedicated Walrasian, he must return the economy to *another* general equilibrium state, for after all, by definition a real equilibrium is a state to which variables tend to return once they are replaced. How does the return take place?

For the economy to return to equilibrium, profits and interest must be evanescent. And innovation of course must also come to an end. How can this

take place? For one thing, innovations must be discontinuous; they must only appear in discrete clusters. For if innovation were *continuous*, the economy would never return to the equilibrium state. Given this assumption of discontinuous clusters, Schumpeter found a way: When the innovations are “completed” and the new processes or new products enter the market, they out-compete the old processes and products, thereby reaping the profits out of which interest is paid. But these profits are made at the expense of severe losses for the old, now inefficient, firms or industries, which are driven to the wall. After a while, the innovations are completed, and the inexorable imputation process destroys all profits and therefore all interest, while the sudden losses to the old firms are also ended. The economy returns to the unchanging circular flow, and stays there until another cluster of innovations appears, whereupon the cycle starts all over again.

“Cycle” is here the operative term, for in working out the logical process of breakout and return, Schumpeter has at the same time seemingly developed a unique theory of the business cycle. Phase I, the breakout, looks very much like the typical boom phase of the business cycle: inflationary bank credit, rise in prices and wages, general euphoria, and redirection of resources to more investment. Then, the events succeeding the “completion” of the innovation look very much like the typical recession or depression: sudden severe losses for the old firms, retrenchment. And finally, the disappearance of both innovation and euphoria, and eventually of losses and disruption—in short, a return to a placid period which can be made to seem like the state of stationary equilibrium.

But Schumpeter’s doctrine only *seems* like a challenging business cycle theory worthy of profound investigation. For it is not really a cycle theory at all. It is simply the only logical way that Schumpeter can break out and then return to the Walrasian box. As such, it is certainly an ingenious formulation, but it has no genuine connection with reality at all.

Even within his own theory, indeed, there are grave flaws. In the Walrasian world of perfect certainty (an assumption which is not relaxed with the coming of the innovator), how is it that the old firms wait until the “completion” of the innovation to find suddenly that they are suffering severe losses? In a world of perfect knowledge and expectations, the old firms would know of their fate from the very beginning, and early take steps to adjust to it. In a world of perfect expectations, therefore, there would be no losses, and therefore no recession or depression phase. There would be no cycle as economists know it.

Finally, Schumpeter’s constrained model can only work if innovations come in clusters, and the empirical evidence for such clusters is virtually nil.¹¹ In the real world, innovations occur all the time. Therefore, there is no reason to postulate any return to an equilibrium, even if it had ever existed in the past.

In conclusion, Schumpeter’s theory of development and of business cycles has impressed many economists with his suggestive and seemingly meaningful

discussions of innovation, bank credit, and the entrepreneur. He has seemed to offer far more than static Walrasian equilibrium analysis and to provide an economic dynamic, a theoretical explanation of cycles and of economic growth. In fact, however, Schumpeter's seemingly impressive system has no relation to the real world at all. He has not provided an economic dynamic; he has only found an ingenious but fallacious way of trying to break out of the static Walrasian box. His theory is a mere exercise in equilibrium logic leading nowhere.

It is undoubtedly at least a partial realization of this unhappy fact that prompted Schumpeter to expand his business cycle theory from his open-cycle model of the *Theory of Economic Development* of 1912 to his three-cycle schema in his two-volume *Business Cycles* nearly three decades later.¹² More specifically, Schumpeter saw that one of the problems in applying his model to reality was that if the length of the boom period is determined by the length of time required to "complete" the innovation and bring it to market, then how could his model apply to real life, where simultaneous innovations occur, each of which requires a different time for its completion? His later three-cycle theory is a desperate attempt to encompass such real-life problems. Specifically, Schumpeter has now postulated that the economy, instead of unitarily breaking out and returning to equilibrium, consists of three separate hermetically sealed, strictly periodic cycles—the "Kitchin," the "Juglar," and the "Kondratieff"—each with the same innovation-inflation-depression characteristics. This conjuring up of allegedly separate underlying cycles, each cut off from the other, but all adding to each other to yield the observable results of the real world, can only be considered a desperate lapse into mysticism in order to shore up his original model.

In the first place, there are far more than three innovations going on at one time in the economy, and there is no reason to assume strict periodicity of each set of disparate changes. Indeed, there is no such clustering of innovations as would be required by the theory. Secondly, in the market economy, all prices and activities interact; there therefore can never be any hermetically sealed cycles. The multicycle scheme is an unnecessary and heedless multiplication of entities in flagrant violation of Occam's Razor. In an attempt to save the theory, it asserts propositions that cannot be falsifiable, since another cycle can always be conjured up to explain away anomalies.¹³ In an attempt to salvage his original model, Schumpeter only succeeded in adding new and greater fallacies to the old.

In the years before and during World War II, the most popular dynamic theory of economic change was the gloomy doctrine of "secular stagnation" (or "economic maturity") advanced by Professor Alvin H. Hansen.¹⁴ The explanation of the Great Depression of the 1930s, for Hansen, was that the United States had become mired in permanent stagnation, from which it could not be lifted by free market capitalism. A year or two after the publication of Keynes's *General Theory*, Hansen had leaped on the New Economics to become

the leading American Keynesian; but secular stagnation, while giving Keynesianism a left-flavor, was unrelated to Keynesian theory. For Keynes, the key to prosperity or depression was private investment: flourishing private investment means prosperity; weak and fitful investment leads to depression. But Keynes was an agnostic on the investment question, whereas Hansen supplied his own gnosis. Private investment in the United States was doomed to permanent frailty, Hansen opined, because (1) the frontier was now closed; (2) population growth was declining rapidly; and (3) there would be hardly any further inventions, and what few there were would be of the capital-saving rather than labor-saving variety, so that total investment could not increase.

George Terborgh, in his well-known reputation of the stagnation thesis, *The Bogy of Economic Maturity*, concentrated on a statistical critique.¹⁵ If the frontier had been “closed” since the turn of the century, why then had there been a boom for virtually three decades until the 1930s? Population growth too, had been declining for many decades. It was easy, also, to demolish the rather odd and audacious prediction that few or no further inventions, at least of the labor-saving variety, would ever more be discovered. Predictions of the cessation of invention, which have occurred from time to time through history, are easy targets for ridicule.

But Terborgh never penetrated to the fundamentals of the Hansen thesis. In an age beset by the constant clamor of population doomsayers and zero-population-growth enthusiasts, it is difficult to conjure up an intellectual climate when it seemed to make sense to worry about the *slowing* of population growth. But why, indeed, should Hansen have considered population growth as *ipso facto* a positive factor for the spurring of investment? And why would a slowing down of such growth be an impetus to decay? Schumpeter, in his own critique of the Hansen thesis, sensibly pointed out that population growth could easily lead to a fall in real income per capita.¹⁶

Ironically, however, Schumpeter did not recognize that Hansen, too, in his own way, was trying to break out of the Walrasian box. Hansen began implicitly (not explicitly like Schumpeter) with the circular flow and general equilibrium, and then considered the various possible factors that might change—or, more specifically, might increase. And these were the familiar Walrasian triad: land, labor, and technique. As Terborgh noted, Hansen had a static view of “investment opportunities.” He treated them as if they were a limited physical entity, like a sponge. They were a fixed amount, and when that maximum amount was reached, investment opportunities were “saturated” and disappeared. The implicit Hansen assumption is that these opportunities could be generated only by increases in land, labor, and improved techniques (which Hansen limited to *inventions* rather than Schumpeterian innovations). And so the closing of the frontier meant the drying up of “land-investment opportunities”, as one might call them, the slowing of population growth, the end of “labor-investment opportunities,” leading to a situation where innovation could not carry the remaining burden.

And so Hansen's curious view of the economic effects of diminishing population growth, as gloomily empirical as it might seem, was not really an empirical generalization at all. Indeed, it said nothing about dynamic change or about the real world at all. The allegedly favorable effect of high population growth was merely the logical spinning out of Hansen's own unsuccessful variant of trying to escape from the Walrasian box.

Notes

1. Before World War II, the dominant paradigm, at least in Anglo-American economics, was the neo-Ricardian partial equilibrium theory of Alfred Marshall. In that era, Walras and his followers, the earliest being the Italian Vilfredo Pareto, were referred to as "the Lausanne school." With the Walrasian conquest of the mainstream, what was once a mere school has now been transformed into "microeconomics."

2. In maintaining that Schumpeter was more influenced by the Austrians than by Walras, Mohammed Khan overlooks the fact that Schumpeter's first book, and the only one still untranslated into English, *Das Wesen und der Hauptinhalt der Theoretischen Nationaleconomie* (The Essence and Principal Contents of Economic Theory) (Leipzig, 1908), written while he was still a student of Böhm-Bawerk, was an aggressively Walrasian work. Not only is *Das Wesen* a nonmathematical apologia for the mathematical method, but it is also a study in Walrasian general equilibrium that depicts economic events as the result of mechanistic quantitative interactions of physical entities, rather than as consequences of purposeful human action—the Austrian approach. Thus, Fritz Machlup writes that

Schumpeter's emphasis on the character of economics as a quantitative science, as an equilibrium system whose elements are "quantities of goods," led him to regard it as unnecessary, and, hence, as methodologically mistaken for economics to deal with "economic conduct" and with "the motives of human conduct" (Fritz Machlup, "Schumpeter's Economic Methodology," *Review of Economics and Statistics* 33 (May 1951: 146–47).

Cf. Mohammed Shabbir Khan, *Schumpeter's Theory of Capitalist Development* (Aligarh, India: Muslim University of India, 1957).

On *Das Wesen*, see Erich Schneider, *Joseph Schumpeter: Life and Work of a Great Social Scientist* (Lincoln, Neb.: University of Nebraska Bureau of Business Research, 1975), pp. 5–8. On Schumpeter as Walrasian, also see Schneider, "Schumpeter's Early German Work, 1906–17," *Review of Economics and Statistics* (May 1951): 1–4; and Arthur W. Marget, "The Monetary Aspects of the Schumpeterian System," *ibid.* p. 112ff. On Schumpeter as not being an "Austrian," also see "Haberler on Schumpeter," in Henry W. Spiegel, ed., *The Development of Economic Thought* (New York: John Wiley and Sons, 1952), pp. 742–43.

3. Thus, Schumpeter wrote that

in the normal circular flow the whole value product must be imputed to the original productive factors, that is to the services of labor and land; hence the whole receipts from production must be divided between workers and landowners and there can be no permanent net income other than wages and rent. Competition on the one hand

and imputation on the other must annihilate any surplus of receipts over outlays, any excess of the value of the product over the value of the services of labor and land embodied in it. The value of the original means of production must attach itself with the faithfulness of a shadow to the value of the product, and could not allow the slightest permanent gap between the two to exist. . . . To be sure, produced means of production have the capacity of serving in the production of goods. . . . And these goods also have a higher value than those which could be produced with the produced means of production. But this higher value must also lead to a higher value of the services of labor and land employed. No element of surplus value can remain permanently attached to these intermediate means of production (Joseph A. Schumpeter, *The Theory of Economic Development: An Inquiry Into Profits, Capital, Credit, Interest, and the Business Cycle*. New York: Oxford University Press, 1961, pp. 160, 162).

4. See the attack on this Austrian view from a Knightian neoclassical perspective in Earl Rolph, "The Discounted Marginal Productivity Doctrine," in W. Fellner and B. Haley, eds., *Readings in the Theory of Income Distribution* (Philadelphia: Blakiston, 1946), pp 278–93. For a rebuttal, see Murray N. Rothbard, *Man, Economy, and State* vol. I (Los Angeles: Nash Publishing Co., 1970), 431–33.

5. On this alleged synchronization, see Khan, *Schumpeter's Theory*, pp. 51, 53. The concept of synchronization of production is a most un-Austrian one that Schumpeter took from John Bates Clark, which in turn led to the famous battle in the 1930s between the Clark-Knight concept of capital and the Austrian views of Hayek, Machlup, and Boulding. See *ibid.*, p. 6n. Also see F.A. Hayek, "The Mythology of Capital," in Fellner and Haley, *Readings*, pp. 355–83.

6. In Khan's words, for Schumpeter "capital cannot have any age structure and perishes in the very process of its function of having command over the means of production" (Khan, *Schumpeter's Theory*, p. 48). Schumpeter achieves this feat by sundering capital completely from its embodiment in capital goods, and limiting the concept to only a money fund used to purchase those goods. For Schumpeter, then, capital (like interest) becomes a purely monetary phenomenon, not rooted in real goods or real transactions. See Schumpeter, *Economic Development*, pp. 116–17.

7. See Schumpeter, *Economic Development*, pp. 43–44.

8. Clemence and Doody attempt to refute this charge, but do so by assuming a zero rate of time-preference. Capitalists would then be interested in maximizing their utility returns over time without regard for when they would be reaped. Hence, capital goods would be maintained indefinitely. But for those who believe that everyone has a positive rate of time-preference, and hence positively discounts future returns, a zero rate of return would quickly cause the depletion of capital and certainly the collapse of stationary equilibrium. Richard V. Clemence and Francis S. Doody, *The Schumpeterian System* (Cambridge, Mass: Addison-Wesley, 1950), pp. 28–30.

9. In the excellent critique of Schumpeter's zero-interest equilibrium by Lionel Robbins, "On a Certain Ambiguity in the Conception of Stationary Equilibrium," *Economic Journal* 40 (June 1930): pp. 211–14. Also see Gottfried Haberler, "Schumpeter's Theory of Interest," *Review of Economics and Statistics* (May 1951): 122ff.

10. Thus, Schumpeter wrote: "It is not the large mass of consumers which induces production. On the contrary, the crowd is mastered and led by the key personalities in production" (italics are Schumpeter's) in "Die neuere Wirtschaftstheorie in den Vereinigten Staaten" ("Recent Economic Theory in the United States") *Schmollers Jahrbuch* (1910), cited in Schneider, *Joseph A. Schumpeter*, p. 13.

11. See Simon S. Kuznets, "Schumpeter's Business Cycles," *American Economic Review* (June 1940).

12. Joseph A. Schumpeter, *Business Cycles: A Theoretical, Historical, and Statistical Analysis of the Capitalist Process*, 2 vols. (New York: McGraw-Hill, 1939).

13. This does not mean that *all* propositions must be falsifiable; they can be self-evident or deduced from self-evident axioms. But no one can claim that the alleged *Kitchin*, *Juglar*, and *Kondratieff* cycles are in any sense self-evident.

14. See Alvin H. Hansen, *Fiscal Policy and Business Cycles* (New York: W.W. Norton, 1941). For a clear summary statement of his position, see Hansen, "Economic Progress and Declining Population Growth," in G. Haberler, ed., *Readings in Business Cycle Theory* (Philadelphia: Blakiston, 1944), pp. 366–84.

15. George Terborgh, *The Bogey of Economic Maturity* (Chicago: Machinery and Allied Products Institute, 1945).

16. Schumpeter, *Business Cycles*, p. 74.