

PROBLEMS WITH AUSTRIAN BUSINESS CYCLE THEORY

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AS A HISTORIAN, I have long been interested in applying the insights of Austrian theory to the interpretation of business cycles as they have occurred in history. In pursuing this endeavor, I have encountered what I believe are a number of problems with Austrian business cycle theory. Although brought into relief by historical inquiry, the problems themselves are not historical. On the contrary, they are all theoretical in nature. Some are merely areas where the implications of Austrian theory have yet to be fully worked out. Others are more serious in that, if they are not resolved, they imply that Austrian business cycle theory is erroneous. Some I feel close to having resolved myself; on others, I can only offer constructive comments.

I will present six of these problems in this paper, but first I should expose one of my fundamental assumptions. This assumption informs my presentation of several of these problems and, in my experience, has proved very controversial. Frequently, those attempting to resolve these questions will do so by challenging this assumption.

According to Austrian theory, the boom or cyclical upswing consists of a lengthening of the structure of production induced by credit expansion. The depression or cyclical downturn consists of a shortening of the structure of production until it is back into coordination with consumers' time preferences. The importance for Austrian theory of these changes in the structure of production cannot be overrated. Unlike many other economic theories of the business cycle, Austrian theory does not fix or hold constant the capital stock but makes it *the* crucial variable. This fact further permits the integration of Austrian growth theory with Austrian business cycle theory.

My fundamental assumption consists of the observation that, because the boom is a lengthening of the structure of production while a depression is a shortening of it, violent fluctuations in time preferences that generate similar alternations between lengthening and shortening can theoretically cause a business cycle. Stated another way, this assumption means that the lengthening of the structure of production that occurs as the result of credit expansion and the lengthening of the structure of production that occurs as the result of a genuine shift in time preferences are basically identical *except* for the fact that the lengthening due to credit expansion must in the future be reversed because it is inconsistent with underlying consumers' tastes.

Much Austrian writing on the business cycle is not only compatible with this fundamental assumption but directly implies it. If the changes in the structure of production induced by credit expansion are different from changes in the structure of production caused by changes in time preferences in some essential respect other than that they must in the future be reversed, no one has explicitly identified this additional difference. The only argument against this assumption that I have encountered alleges that the two lengthenings of the structure of production are different in character because one involves a coordination of the plans of consumers and entrepreneurs while the other involves a discoordination of plans.¹ Therefore, one is in some sense more real than the other, which is merely illusory. This argument, however, does nothing more than restate in different words the basic difference already admitted: the lengthened structure of production induced by credit expansion must be reversed when consumers' actual time preferences finally reassert themselves. It does not prove the existence or indicate the nature of any additional differences.

Perhaps I can illustrate this point more clearly with an analogy. Assume that consumers' money that would be spent on good A is expropriated by the government through taxes to be spent on good B. Entrepreneurs divert resources in response to the new market signals. Now, one can say that the economy is disordinated with the desires of consumers, that resources spent on the production of B are wasted, and that if the government stops its expropriation, the market will shift back again. One cannot, however, contend that the demand for B manifested by the government with its ill-gotten gains is illusory or that the effect it has on the economy is any different from the effect if the consumers themselves had shifted in a similar degree from A to B. Money creation is just another means of expropriation, and if it did not actually succeed in diverting resources, there would be no reason to employ it. Credit expansion does divert real resources—that is the meaning of "forced savings"; and to the extent that it does so, the lengthened structure of production induced by credit expansion is just as real as the lengthened structure of production caused by changes in time preferences.

Problem 1: Asymmetry. During the boom when the structure of production is lengthened, the capital goods industries (or goods of the higher orders) expand while the consumers' goods industries (or goods of the lower orders) contract. Labor is bid from consumers' goods industries to capital goods industries. During the depression, when the structure of production is shortened, the reverse takes place. The consumers' goods industries expand, the capital goods industries contract, and labor is bid from the latter to the former. Why are these two processes not symmetrical in their effect? Why is the expansion of the capital goods industries and the contraction of the consumers' goods industries accompanied by *general* prosperity and full employment, while the expansion of the consumers' goods industries and

the contraction of the capital goods industries accompanied by *general* depression and unemployment? Why is not frictional unemployment equally great in both directions? Why, to use the analogy above, is the process not similar to taxing expenditures on good A to make expenditures on good B? When the tax is imposed, industry B expands and industry A contracts. When the tax is repealed, a reverse, but symmetrical, reaction takes place.²

Actually, one must distinguish two aspects of this asymmetry between booms and depressions. First, there is asymmetry in employment. Second, even without employment effects, there is asymmetry in the way individuals generally perceive their economic fortunes. As Austrians frequently and quite correctly emphasize, depressions are not centered in single industries or groups of industries but are general phenomena in which losses and failures are widespread. Conversely, booms are periods of general prosperity.

The asymmetry in employment is easier to discuss. F. A. Hayek, in *Prices and Production*, offers one explanation that I find unsatisfactory.³ He essentially argues that when the expansion in the consumers' goods industries bids some labor away from the capital goods industries, the remaining laborers in the capital goods industries are thrown out of work because there are not enough of them to complete the projects in the higher orders but too many of them to be absorbed in the lower orders where the projects are too short. Clearly, this argument makes some peculiar assumptions about the demand curves for labor in both the higher and lower orders. Is there no wage rate low enough at which all labor could be reabsorbed by the lower orders?

As a substitute for Hayek's tortuous explanation, one could more simply explain the employment asymmetry by reference to real wages. During the boom, as credit expansion drives the interest rate down, real wages (measured by comparing nominal wages with the price of labor's product) are by implication going up. During the depression, as the reassertion of time preferences brings the interest rate back up, real wages fall. The shift of labor during the boom is accompanied by rising real wages; the shift of labor during the depression, by falling real wages. This could explain the asymmetry in employment. Including the real wage as a factor, however, forces Austrian economists to relinquish the claim that they, unlike other schools of thought, explain unemployment solely by reference to the maldistribution of labor.

Hayek also deals with the asymmetry in prosperity, again in *Prices and Production*, in a footnote:

The reason for this asymmetry [*sic*] between a transition to longer processes of production, which need not bring about any of these peculiar disturbances, and a transition to shorter processes, which will regularly be accompanied by a crisis, will perhaps become more evident if it is considered that in the former case there will necessarily be

time to amortize the capital invested in the existing structure before the new process is completed, while in the latter case this will evidently be impossible and therefore a loss of capital and a reduction in income inevitable.⁴

To the extent that I understand what Hayek is driving at, he is saying that a shortening of the structure of production, by its nature, requires capital losses, while lengthening does not.

If my interpretation of Hayek is correct, he is stating in another manner the same explanation for the asymmetry in prosperity that is implied in the works of Ludwig von Mises and Murray Rothbard. Both Mises and Rothbard assert, when discussing growth, that an economy in which the structure of production is being lengthened experiences net pure (entrepreneurial) profits, while an economy in which the structure of production is being shortened experiences net pure losses. According to Mises, the net pure profits in a progressing economy result from the additional wealth and increased real income produced by the lengthened structure of production.⁵ While intuitively appealing, Mises's reasoning is hardly conclusive, especially in view of the time lag between the initiation of a new lengthening process and the increased output of consumers' goods. Rothbard's explanation is a bit more rigorous:

For profits to appear, there must be undercapitalization, or overdiscounting, of productive factors on the market. For losses to appear, there must be overcapitalization, or underdiscounting, of factors on the market. But if the economy is stationary, i.e., if from one period to another the total gross investment remains constant, the total value of capital remains constant. . . . Aggregate capital values remain constant, and therefore any profits . . . must be offset by equal losses. . . . In the progressing economy, on the other hand, there are additional investment funds made available through new savings, and this provides a source of new revenue not yet capitalized anywhere in the system. These constitute the aggregate net profits during this period of change. In the retrogressing economy, investment funds are lowered, and this leaves net areas of overcapitalization of factors in the economy. Their owners suffer aggregate net losses during this period of change.⁶

One would suppose that if the assumption of net pure profits during a lengthening and net pure losses during a shortening of the structure of production was crucial to Austrian business cycle theory, then it would have received greater attention in Austrian writings. If Austrian theory cannot explain the asymmetry in prosperity, it cannot explain the business cycle at all. The reason, of course, that the issue of net pure profits has not received the attention it deserves is that it has never been raised within the context of cycles but rather always within the context of growth. Indeed, by injecting

the issue into the discussion of cycles, I have opened myself to the criticism of confusing cycles with growth. This accusation, however, is simply another way of challenging my fundamental assumption about the basic similarity of a lengthened structure of production due to credit expansion and a lengthened structure of production due to changes in time preferences, and the same arguments apply. The asymmetry in prosperity must either be inherent in the nature of changes in the structure of production itself, or it is inherent in the process used to alter the structure of production. The issue of net pure profits implies the former. If this is so, then the same process should create booms and depressions regardless of what is happening to the structure of production, and the entire lengthening-shortening analysis becomes superfluous verbiage disguising the real issue.

Problem 2: Definition of the Money Stock. For most Austrian economists, an exact definition of the money stock may be a thorny empirical question, but it does not pose any serious theoretical issues. I think the problem does have theoretical significance, but before I indicate why, I will restate the problem in a more precise fashion. In any developed economy, a wide spectrum of various types of financial instruments exist, ranging from bank notes and deposits to bonds and bills of exchange. What is needed is not a definition for money; all Austrians recognize that money is a generally accepted medium of exchange. What is needed is a defining criterion for what constitutes a money substitute, so that this wide spectrum of financial instruments can be clearly divided between those that are money substitutes and those that are credit instruments.

The reason a clear dividing line is necessary relates to the various means by which a genuine change in time preferences on the part of consumers can manifest itself. An individual with a money income continuously faces three possible ways of allocating that income. He can spend it on consumers' goods, he can spend it on investment goods, or he can increase (or decrease) his cash balances. Time preferences determine the aggregate ratio between consumption and investment, which in turn determines the nature of the structure of production. A simple change in time preferences occurs when spending is reallocated from consumption to investment or *vice versa*. But non-neutral changes in the demand for money can also affect the structure of production. A neutral change in the demand for money would be, say, a fall in cash balances that increased equally both consumption and investment spending, thus maintaining the same aggregate consumption-investment ratio. If, however, cash balances fall primarily by adding to investment spending, this is, in effect, a fall in time preferences. Similarly, if cash balances fall primarily by adding to consumption spending, this represents a rise in time preferences.

The dividing line between money substitutes and credit instruments is the margin between cash balances and investment. If this margin is not well defined, then it becomes theoretically impossible to distinguish between

changes in the stock of money and changes in time preferences brought about by non-neutral shifts in the demand for money relative to investment spending. For example, time deposits are an item that some Austrian economists view as money substitutes, while others view them as credit instruments. Suppose that, for some reason, people turn in their demand deposits for time deposits, so that the aggregate quantity of one falls in favor of a rise in the aggregate quantity of the other. Now, if time deposits are money substitutes, then this shift merely reflects a change in the form in which people wish to hold money. But if time deposits are credit instruments, then, *ceteris paribus*, this shift represents a fall in the demand for money in favor of investment spending, that is, a genuine fall in time preferences.

Let us assume that we have an economy which has a banking system with only time deposits and that there is no central bank. Consider the case in which the quantity of time deposits increases over a period until a banking panic wipes them all out. Such a sequence of events, especially in the absence of a central bank, may not be very likely, but it is at least theoretically conceivable. Clearly, all would agree that this sequence would generate the characteristic boom and depression of the business cycle. Depending, however, on whether one considers time deposits to be money substitutes or credit instruments, one could attribute this cycle either to credit expansion or to violent fluctuations in time preferences (manifested through non-neutral changes in the demand for money).

Many of the earlier Austrians recognized this close connection between changes in the stock of money and changes in the demand for money. Hayek evaded the whole issue by talking about the effective money supply (some form of MV) and making a distinction between a constant money supply and a neutral money supply, the latter being one in which shifts in the stock of money counteract non-neutral shifts in demand.⁷ The haziness of the borderline between credit expansion and changes in time preferences also reinforces my fundamental assumption about the basic similarity of the impact of either on the structure of production. I do believe, however, that it is possible to arrive at a theoretical criterion that clearly and unambiguously divides money substitutes from credit instruments and thus preserves the important distinction between credit expansion and genuine changes in time preferences, but that is the subject of another paper on which I am currently working, and I do not have the space to present my conclusions here. My point here was to explain why I think the problem is important enough to be worth resolving.

Problem 3: Net Investment. Lengthening the structure of production entails positive net investment. Maintaining the structure of production intact at its current length entails zero net investment. Shortening the structure of production entails disinvestment. During depressions, therefore, net investment should be negative. But in U.S. history, the only depression in which measured net investment was actually negative was the

Great Depression. In all the others for which data are available, net investment fell but still remained positive. Does this mean that Austrian theory is irrelevant to all but one major depression in U.S. history?⁸

One obvious way around this difficulty is to show how the Austrian concept of net investment is different from the net investment measured by national income accountants. This, in fact, is the approach taken by Hayek in *Prices and Production*, where he argues that net investment will be measured, not only when the structure of production is initially lengthened, but continuously until the new structure is completed and the expanded output of consumers' goods pours forth on the market. He concludes that, once a structure is lengthened, there is some declining rate of positive net investment that will exactly maintain it until the time of completion, when measured net investment can fall to zero. Any fall in measured net investment faster than this rate will necessitate a shortening of the structure.⁹

In a later essay, "Price Expectations, Monetary Disturbances and Malinvestments," Hayek took a slightly different approach. By the time Hayek wrote this essay, he had despaired of giving any meaning to the notion of maintaining capital intact. This made it impossible to measure net investment at all. Hayek therefore decided that all statements about the absolute size of the capital stock should be purged from discussions of business cycles. What is important is whether the plans of entrepreneurs coincide with the plans of consumers. If they do, everything is fine; if they do not, regardless of whether "entrepreneurs lengthen the investment period by more than is justified by the voluntary 'saving' of consumers" or "they do not shorten the existing processes of production sufficiently to take full account of the 'impatience' of consumers," a depression will result.¹⁰

On the whole, I think Hayek's first approach to the problem is more fruitful. As pointed out above, the discoordination of the expectations of entrepreneurs with the tastes of consumers is simply another way of stating that market forces are going to require the entrepreneurs to revise their plans. This revision will be necessary regardless of whether or not entrepreneurial plans were at one time consistent with consumers' preferences. Hayek in effect admits this in the very same essay when he points out that both credit expansion and violent fluctuations in saving will generate business cycles. Furthermore, the direction of the discoordination is vitally important. Hayek would certainly not contend that, if entrepreneurs somehow underestimate consumer saving and thus are forced to revise their plans and quickly lengthen the structure of production, a boom followed by a depression will result. Yet that is what he must contend if it is solely the discoordination that is important. In reality, the fact that the discoordination requires sudden shortening of the structure of production is what is important. Without the shortening, there will be no depression.

Despite these objections, "Price Expectations, Monetary Disturbances and Malinvestments" does make an important contribution as the first

attempt to apply Austrian business cycle theory within a dynamic setting. All other discussions of Austrian business cycle theory superimpose the impact of credit expansion on a stationary economy. Presumably, some of the conclusions might need modification if, instead, the impact of credit expansion is superimposed upon a progressing economy with falling time preferences. A depression could be forestalled if the increased real saving that otherwise would have further lengthened the structure of production is sufficient to maintain the malinvestments induced by credit expansion.

Problem 4: Deflation. Actually, this problem subsumes a lot more than its title implies. It includes all the additional events other than credit expansion that will, according to a consistent application of Austrian theory, cause a depression. All of them can cause depressions with no previous boom; a few seem to necessitate a trailing boom. I have called this the deflation problem not only because deflation appears to be the most empirically probable of these possibilities but also because of Rothbard's position that deflation is not really harmful but is in some cases beneficial.¹¹

a. Capital Consumption: I have already noted that violent fluctuations in time preferences can cause a boom-depression sequence. In fact, all that is strictly necessary is a rise in time preferences. As time preferences rise, the structure of production will shorten, and a depression will continue until time preferences stabilize. Capital consumption will always involve depression.

b. Deflation: Deflation or, more precisely, credit contraction will drive the loan rate of interest above the natural rate. If credit contraction occurs as a secondary feature of a depression already caused by previous credit expansion, it will bring about more shortening of the structure of production than is necessary and aggravate the depression. If credit contraction occurs with no immediately preceding credit expansion, it will cause a depression with no prior boom. In both cases, a trailing boom should follow when consumers' time preferences reassert themselves.

c. Consumption spending stimulated through monetary expansion:¹² If new money, rather than entering the loan market, is spent exclusively on consumption, then this should artificially shorten the structure of production. A depression with a trailing boom will result. This conclusion is noteworthy because one might argue that war-time monetary expansions actually follow this pattern. Historically, however, war-time monetary expansions have not been accompanied by depressions, although they also have not generally created investment booms. This would suggest that in practice war-time monetary expansions have been neutral with respect to the structure of production. I should further add that the consequences predicted, both for deflation and consumption spending stimulated through monetary expansion, are based on the assumption of a stationary economy. If one assumes an underlying progressing economy, then some of the depression effects will be offset by falling time preferences.

Problem 5: Constant Rate of Credit Expansion. Austrian economists are very fond of claiming that once a credit expansion has induced a boom the only alternatives open are a depression or a hyperinflation. The implication of this claim is that only an accelerating rate of credit expansion can keep the boom fueled. But nowhere is the outcome of a credit expansion at a steady rate clearly specified. Presumably, since such a policy cannot generate a continuous boom, it must either result in (a) a continuous alternation of booms and depressions or (b) a boom followed by a continuous depression. Much Austrian writing is ambiguous between these two alternatives.¹³

When I first formulated this problem, I was uncertain about the answer. I have now concluded that a constant rate of credit expansion will produce a boom, followed by a period in which the economy is adjusted to the credit expansion. The reason for this conclusion is that, *ceteris paribus*, a constant rate of increase in credit has the same impact on the structure of production as a once-and-for-all fall in time preferences that moves the consumption-investment ratio to a new stable level. In other words, the structure of production is lengthened and then maintained at the new level. This result must not be confused with a continuous boom, which involves a continuous lengthening of the structure of production. That obviously does require accelerating credit expansion.

Surprisingly, especially in light of the fact that in his popular writings Hayek is one of the most prominent purveyors of the hyperinflation-depression trade-off, my conclusion finds support in some of Hayek's writings. For instance, in *Prices and Production*, Hayek says:

... in order to attract as great a proportion of the original factors, i.e., in order merely to maintain the already existing capital, every new increase would have to expand progressively at a constant rate. But in order to bring about constant additions to capital, it would have to do more: it would have to increase at a constantly increasing rate.¹⁴

More recently, in "Three Elucidations of the Ricardo Effect," Hayek seems to admit that a constant rate of increase would maintain the malinvestments.¹⁵ In both locations, however, Hayek goes on to express doubts that such measures can maintain the malinvestments indefinitely.

Obviously, there must exist *some* rate at which credit expansion will maintain the lengthened structure of production. A frequent argument used to support the proposition that this rate must be an accelerating one is that anticipations will adjust to the credit expansion and counteract its effects. To be convincing, however, this argument must identify exactly what is being anticipated. Anticipations about changes in the price level cannot alleviate a distortion of relative prices. The Fisher effect may raise the interest rate, but because it operates on both the demand and supply side of the loan market, it will not raise interest enough to overcome the impact of the new credit. If the natural rate is 4 percent and a credit expansion begins which lowers the loan

rate to 3 percent and causes a 2 percent increase in the price level, the Fisher effect will drive the loan rate up to 5 percent. To offset the credit expansion, however, it would have to push the loan rate up to 6 percent; but in order to do that, it would have to affect the demand and supply for loanable funds disproportionately. The supply must fall relative to the demand, which would mean that real savings are decreasing and time preferences rising.

Perhaps expectations about the rising prices of consumers' goods might cause consumers to increase their demand for such goods at an accelerating rate, bringing into operation the Ricardo effect. The money with which consumers do this, however, must come from somewhere. By hypothesis, it cannot come from rising nominal incomes because the new money is only entering the economy at a constant rate. Therefore, it must come at the expense of investment spending or cash balances. In either case, we again have a rise in time preferences. Or, a neutral fall in the demand for money that increases investment and consumption spending equally would also require the rate of credit expansion to accelerate if the lengthened structure of production is to be maintained. The consumption-investment ratio of consumers would be the same, but an increase in the nominal amount of consumption spending necessitates a similar increase in the nominal amount of new money spent on investment.

In sum, if time preferences and the demand for money remain the same, then a constant rate of credit expansion will maintain an artificially lengthened structure of production. Only if anticipations change time preferences or the demand for money, will the rate of credit expansion have to accelerate. Let me close by making clear what I am not claiming. I am not denying that prolonged credit expansion might have *other* deleterious and disordinating effects. I am not ruling out the kind of unsystematic distortions advanced by Leijonhufvud. Unsystematic distortions, however, do not constitute general phenomena, and as pointed out above, it is general phenomena that characterize the business cycle.

Problem 6: International Aspects. Rather than being a specific problem, this is an area where Austrian theory needs to be more fully worked out. Austrian economists have for the most part developed their business cycle theory within the context of a closed economy and have rarely applied it to an international setting. To illustrate, I list three kinds of international environments to which Austrian theory might be applied.

a. An international environment of competing national central banks. This is clearly the one international case for which a lot of work with Austrian theory has already been done.

b. An international environment with a central bank in one nation and a decentralized fractional-reserve banking system in another. Much can be extrapolated to this case from the previous one, although this case has not been explicitly considered. The reason this case is worth pursuing is that it represents the very relationship that existed between the United States and

Great Britain throughout most of the 19th century. How theoretically sound are the recent historical efforts suggesting that the U.S. banking system was just the tail being wagged by the Bank of England dog?

c. An international environment with a central bank in one nation and a commodity, 100 percent reserve standard in another. There has been no work, even by implication, on this case. It is important because it isolates the question whether capital flows from the country with a central bank can induce malinvestments in a country with a commodity standard. Are 100 percent reserves a safeguard against credit expansion elsewhere in the world?

The three cases that I have listed are not confined in their significance to an international environment. The principles discovered in examining them could also be applied to certain types of intranational monetary arrangements. The Jacksonian period in U.S. history, with its rich variety of banking schemes in the several states, is an example that immediately comes to mind.

Having completed my exposition of these six problems, I notice that I have offered more solutions than when I originally formulated the questions and started the paper. So I feel that I should add that I consider many of my conclusions tentative. My main purpose is not to argue that my resolutions are the final answers but to raise these issues so that others will be stimulated to think about them and perhaps arrive at more satisfactory answers. Rumor has it that at a recent strategy meeting, the top-flight Austrian economists decided that the Austrian business cycle theory should be deemphasized in favor of other aspects of Austrian theory. As is obvious from this paper, I think the exact opposite should be done. We need more, not less, work on Austrian business cycle theory.

1. Friedrich A. von Hayek implies this argument in his 1933 essay "Price Expectations, Monetary Disturbances and Malinvestments," which appears in his book *Profits, Interest and Investment* (1939; reprint ed., Clifton, N.J., 1975), pp. 135-56. Hayek himself does admit that violent fluctuations in real savings could also cause business cycles: see *Monetary Theory and the Trade Cycle* (1933; reprint ed., Clifton, N.J., 1975), pp. 205-6; "Saving," in *Profits, Interest and Investment*, pp. 166, 167; "Price Expectations," p. 143. I will return again in this essay to the latter essay.

Gerald P. O'Driscoll, Jr., and Sudha R. Shenoy, in an article which relies heavily on the discoordination theme, appear to make self-reversibility the defining characteristic of discoordination. See "Inflation, Recession, and Stagflation," in *The Foundations of Modern Austrian Economics*, ed. Edwin G. Dolan (Kansas City, Mo., 1976), particularly p. 201.

2. The asymmetry problem is not original with me. Gottfried Haberler raises it in *Prosperity and Depression*, 3d ed. (London, 1958), p. 71, and he cites as precursors E. F. M. Durbin, *The Problem of Credit Policy* (New York, 1935), pp. 242-47, and C. Bresciani-Turroni, "The Theory of Saving: II," *Economica*, n.s. 3 (1936): 175-76.

3. F. A. Hayek, *Prices and Production*, 2d ed. (1935; reprint ed., New York, 1967), pp. 92–93.

4. *Ibid.*, p. 93. Later, in the title essay of *Profits, Interest and Investment*, when Hayek introduced the Ricardo effect, he partially got around the asymmetry in prosperity with a modification in timing. It was this slight shift in timing that confused so many of Hayek's critics, notably Kaldor, and convinced them that he had inverted his entire theory. In the new version, the expansion of the consumers' goods industries became the final phase of the boom. Unfortunately, the far-reaching but unrealistic assumptions under which the discussion in "Profits, Interest and Investment" is conducted—wages rigid downward, no mobility of labor between industries and hence between capital goods and consumers' goods industries, a fixed interest rate, and exclusively specific capital—make it almost totally irrelevant for grappling with the issues raised in this paper.

5. Ludwig von Mises, *Human Action*, 3d rev. ed. (Chicago, 1963), pp. 294–95.

6. Murray N. Rothbard, *Man, Economy, and State* (1962; reprint ed., Los Angeles, 1972), 2: 483–84. In a footnote, Rothbard discusses the consequences if these changes are anticipated:

It is possible that the changes in investment were anticipated in the market. To the extent that an increase or a decrease was anticipated, the aggregate profits or losses will accrue in the form of a gain in capital value before the actual change in investment takes place. Losses arise during the retrogression because previously employed processes have to be abandoned. The fact that the highest stages, already begun, have to be abandoned is an indication that the shift was not fully anticipated by the producers.

7. Hayek, *Prices and Production*, pp. 27, 113–34. Fritz Machlup, *The Stock Market and Capital Formation* (London, 1940), also introduced the effect on the business cycle of non-neutral changes in the demand for money.

8. This criticism was made by Alvin H. Hansen and Herbert Tout, "Annual Survey of Business Cycle Theory: Investment and Saving in Business Cycle Theory," *Econometrica* 1 (1933): 119–47, especially pp. 135–38.

9. Hayek, *Prices and Production*, pp. 136–39. This discussion was added to, and only appears in, the second edition.

10. Hayek, "Price Expectations," p. 154. In a later essay, Hayek elaborates on the problems involved with the concept of maintaining capital. "The Maintenance of Capital," *Economica*, n.s. 2 (1935): 241–76, reprinted in *Profits, Interest and Investment*.

11. Rothbard contends that because deflation causes no malinvestments it is harmless and that, if it occurs in conjunction with a depression, it will be beneficial because it will accelerate recovery. Murray N. Rothbard, *America's Great Depression* (1963; reprint ed., Los Angeles, 1972), pp. 21–25; *idem*, *Man, Economy, and State*, 2: 864–66. Neither Mises nor Hayek agrees with his position.

12. Hayek mentions this as a possible cause of depressions in "The 'Paradox' of Savings," *Economica* 11 (1931): 125–69, reprinted in *Profits, Interest and Investment*.

13. The one exception is O'Driscoll and Shenoy, "Inflation, Recession, and Stagflation," who opt for alternative (b).

14. Hayek, *Prices and Production*, pp. 149–50, emphasis in original. Hayek goes on to add that the constant rate will set off a "rapid and progressive rise in prices," which will offset the forced saving. Why a constant rate of monetary expansion produces accelerating price rises is not explained.

15. F. A. Hayek, "Three Elucidations of the Ricardo Effect," *Journal of Political Economy* 77 (1969): 274–85. Note particularly the following passage from p. 288:

What happens, however, if the increase in the quantity of money entering through additional investment continues for a much longer period? We shall now assume that it does so, not at a constant, absolute rate, but at such a rate as is necessary to maintain the increased volume of real investment. This will mean a constant percentage increase in the total flow (and quantity) of money, because, if before it needed a 1 percent addition to attract the additional resources to investment, after the total money stream (and general prices) will have risen by 1 percent, it will need an increase of 1.01 percent to produce the same effect, and so on.

This process can evidently go on indefinitely, at least as long as we neglect changes in the manner in which expectations concerning future prices are formed.