

# TIME PREFERENCE AND INVESTMENT EXPENDITURE

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*Abstract:* This paper offers a critique of the Austrian theory according to which social time preference determines the proportion between aggregate consumption and aggregate saving, and therefore also the volume of total investment expenditure. We argue that there is no such necessary relationship between the (pure) interest rate and the volume of aggregate investment. Then we discuss the implications of our thesis for growth theory and business-cycle theory, stressing in particular the need to distinguish between two types of growth and two corresponding types of inter-temporal misallocation.

*Key words:* Time Preference, Time Market, Investment Expenditure, Growth Types, Inter-Temporal Mis-allocation, Austrian Business-Cycle Theory, Austrian Macroeconomics.

*JEL classification:* B53, D01, D40, D92, E22, E32, E43.

The purpose of this paper is to offer a critique of the theory according to which social time preference determines the proportion between aggregate consumption and aggregate saving, and therefore also the volume of total investment expenditure. This theory is held by virtually all Austrian economists past and present. We will first present it based on Rothbard's *Man, Economy, and State*, where it is stated in the clearest and most detailed form. Then we will examine its shortcomings and discuss some implications of our findings.

## I. EXPOSITION OF THE CONVENTIONAL THEORY

To demonstrate that time preference determines aggregate savings, Rothbard proceeds in two steps. First he shows that individual time-preference schedules are the only causal factor explaining interest rates. Then he goes on to argue that they also determine the aggregate proportion between consumption and savings. He concludes that time preference determines both phenomena simultaneously. Let us briefly review these stages of his argument.

Following Böhm-Bawerk's approach, Rothbard explains that interest rates are formed through the exchange of present goods against future goods. All such exchanges are part of what he calls the «time market» on which a supply of present goods (monetary savings) confronts a demand for present goods. Rothbard demonstrates that both demand *and* supply schedules on this market derive from the same source, namely, individual time-preference schedules. The latter are therefore the unique cause of the pure rate of interest, which he also calls the social time-preference rate.<sup>1,2</sup>

Each individual prefers present goods to future goods. In every single individual value scale, therefore, future goods rank lower than present goods of the same type, for example, 100 future dollars rank lower than 100 present dollars. However, the exact ordering is different from one individual to another. Some individuals have a higher time preference, while others have a lower one. As a consequence, for any rate of exchange between present and future dollars (for any rate of interest), some individuals will act on the demand side of the time market, while others will figure on the supply side (*Man, Economy, and State*,

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<sup>1</sup> See M.N. Rothbard, *Man, Economy, and State* (3<sup>rd</sup> ed., Auburn, Ala.: Mises Institute, 1993), p. 497. He provides detailed criticism of the Fisherian neoclassical approach, in which only the *supply* of present goods is determined by time preference, whereas the demand for present goods is determined by the marginal productivity of capital (see *Man, Economy, and State*, pp. 360-364).

<sup>2</sup> Mises calls this rate «the rate of originary interest» or simply «originary interest.» See Mises, *Human Action* (Scholar's edition; Auburn, Ala.: Mises Institute, 1998), pp. 523, 535.

figures 1 and 2; see appendix). The time market is in equilibrium at the interest rate for which the aggregate demand for present goods equals the aggregate supply thereof (*Man, Economy, and State*, figure 3; see appendix). And this interest rate is exclusively determined by time preference.

So far, so good.<sup>3</sup>

Then Rothbard turns to analysing the relationship between time preferences on the one hand, and the proportion between consumption and savings on the other hand. He considers an extreme scenario in which all capitalists (savers) decide to spend all their money for consumption, rather than save a part of it. Then he goes on to analyse this event:

What could be the reason for such a precipitate withdrawal of savings and investment in favor of consumption? The only reason—on the free market— would be a sudden and massive increase in the time-preference schedules of the capitalists, so that present satisfactions become worth very much more in terms of future satisfactions. Their higher time preferences mean that the existing rate of interest is not enough to induce them to save and invest in their previous proportions. They therefore consume a greater proportion of their gross income and invest less.

Each individual, on the basis of his time-preference schedule, decides between the amount of his money income to be devoted to saving and the amount to be devoted to consumption. The aggregate time-market schedules (determined by time preferences) determine the aggregate social proportions between (gross) savings and consumption. It is clear that the higher the time-preference schedules are, the greater will be the proportion of consumption to savings, while lower time-preference schedules will lower this proportion. At the same time, as we have seen, higher time-preference schedules in the economy lead to higher rates of interest, and lower schedules lead to lower rates of interest.

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<sup>3</sup> Rothbard's analysis up to this point is liable to criticism, but these issues cannot be addressed here and do not affect our present considerations. For a critique of the time-preference theory of interest, see J.G. Hülsmann, «A Theory of Interest,» *Quarterly Journal of Austrian Economics*, vol. 5, n.º 4 (2002).

He concludes:

From this it becomes clear that the time preferences of the individuals on the market determine simultaneously and by themselves both the market equilibrium interest rate and the proportions between consumption and savings (individual and aggregate). Both of the latter are the obverse side of the same coin. In our example, the increase in time-preference schedules has caused a decline in savings, absolute and proportionate, and a rise in the interest rate.<sup>4</sup>

As we have stated above, virtually all Austrian economists subscribe to this view, though not all of them discuss it in great detail. For example, Hayek stresses that time preference has a direct impact only on the rate of saving, where its impact on the interest rate is indirect (through saving).<sup>5</sup> And among contemporary writers, Jesus Huerta de Soto, Hans-Hermann Hoppe, and Steven Horwitz endorse—in fact, almost literally restate—the Rothbardian position as quoted above.<sup>6</sup>

Ludwig von Mises is less unequivocal on the question. Contrary to Rothbard, he stresses the *ceteris paribus* condition when he states that «Changes in the ordinary rate of interest and in the amount of savings are—other things [...] being equal—two aspects of the same phenomenon.»<sup>7</sup> He also asserts: «What restricts the amount of saving and investment is time preference.»<sup>8</sup> This could be taken to mean that there is some (variable) proportionality between time preference on the one hand, and

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<sup>4</sup> Rothbard, *Man, Economy, and State*, p. 342. See also idem, *America's Great Depression* (5<sup>th</sup> ed., Auburn, Ala.: Mises Institute, 2000), pp. 9-10.

<sup>5</sup> See Hayek, *The Pure Theory of Capital* (Chicago: University of Chicago Press, 1941), p. 234.

<sup>6</sup> See Huerta de Soto, *Money, Bank Credit, and Economic Cycles*, p. 313; Hoppe, *Democracy - The God That Failed*, p. 2; Horwitz, *Microfoundations and Macroeconomics*, p. 201.

<sup>7</sup> Mises, *Human Action*, p. 530.

<sup>8</sup> Ibid., p. 487. Similarly, George Reisman states: «Time preference determines the proportion in which people devote their income and wealth to present consumption versus provision for the future.» Reisman, *Capitalism*, p. 743.

the amount of saving and investment on the other hand. However, we shall see below that he has no such proportionality in mind.

## II. CRITIQUE

We do not contest the basic elements of Rothbard's analysis of the time market. Given individual time-preference schedules, it follows by logical necessity that both the demand and the supply of present goods are exclusively determined by those schedules, and that time preference is therefore the unique cause of market interest rates. A higher time preference entails a higher pure interest rate, and a lower time preference creates the opposite tendency.

However, we do not find the same logical necessity in the statements purporting to demonstrate that time-preference is a cause (or even the unique cause) of the proportion between aggregate saving and aggregate consumption.

The emphasis is here on *aggregate* savings versus *aggregate* consumption. As far as individuals are concerned, it is true that variations of time-preference schedules logically imply corresponding variations of the proportion between saving and consumption. If Smith's time preference increases, he will tend to save less and to consume more than it would otherwise have been the case. But the question is whether we can generalise this fact. Rothbard thinks so. Consider again the following excerpt from the passage that we already quoted above:

Each individual, on the basis of his time-preference schedule, decides between the amount of his money income to be devoted to saving and the amount to be devoted to consumption. The aggregate time-market schedules (determined by time preferences) determine the aggregate social proportions between (gross) savings and consumption. It is clear that the higher the time-preference schedules are, the greater will be the proportion of consumption to savings, while lower time-preference schedules will lower this proportion.<sup>9</sup>

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<sup>9</sup> Rothbard, *Man, Economy, and State*, p. 342.

We contend that the third sentence is not true and does not follow from the first two sentences. The reason is that individual time-preference schedules determine *both sides* of the time market.<sup>10</sup> *Higher time-preference schedules not only imply a reduced supply of present goods at any given rate of interest, but also an increased demand.* This rigorously leads to the standard conclusion: The only necessary consequence of higher time-preference schedules is an increase of the price (of the pure interest rate). *But there is no systematic impact on the volume of the market (aggregate savings exchanged for aggregate future goods).* Depending on the (contingent) supply and demand *schedules* on the time market, the new equilibrium might involve a somewhat larger volume of aggregate saving, but it might just as well, and with equal likelihood, involve a somewhat reduced volume of aggregate saving.

Similarly, a lowering of time-preference schedules has only one necessary implication, namely, a reduction of the interest rate. Yet it has no systematic impact on aggregate saving, and thus on aggregate investment.

As we have seen, Rothbard's analysis focuses on the supply side of the time market. He singles out one group of people, namely, current savers or capitalists, and argues as though these were the only people whose time-preference schedules increase, while the time-preference schedules of all other individuals remain the same.<sup>11</sup> In this case it is true of course that *both* the market interest rate will tend to increase *and* aggregate saving will tend to diminish.<sup>12</sup> But again, no logical bridge leads from

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<sup>10</sup> This is why the consequences of individual behaviour cannot be generalized in this case, in distinct contrast to other markets, where demand and supply are determined by *different* factors.

<sup>11</sup> Consider also this paragraph, immediately following the passage we already quoted: «From this it becomes clear that the time preferences of the individuals on the market determine simultaneously and by themselves both the market equilibrium interest rate and the proportions between consumption and savings (individual and aggregate). Both of the latter are the obverse side of the same coin. *In our example*, the increase in time-preference schedules has caused a decline in savings, absolute and proportionate, and a rise in the interest rate.» (*MES*, 342, emphasis added).

<sup>12</sup> The literature on capital theory contains many statements of this point. While the connection between savings and time preference is not always made explicit, the

here to the generalisation that «the higher the time-preference schedules are, the greater will be the proportion of consumption to savings.»<sup>13</sup> In fact, in his example, the increased time preference of the savers could have been matched by a simultaneous increase of the time preference of wage earners and land owners. The latter could have been ready to work at lower wage rates and to sell land services at lower prices; or there might have been an influx of new wage earners due to immigration.<sup>14</sup> The overall result would have been the one we pointed out: an increase of the pure interest rate with no systematic impact on the volume of present goods (monetary savings) traded on the time market.

Had Rothbard's unilateral focus been on the demand side of the time market, this illegitimate generalisation would have been immediately obvious.<sup>15</sup> If the time preference of wage earners and land owners increases, while the time preference of capitalists does not change, then not only the interest rate will increase, but also the volume of savings, because the higher interest rate incites capitalists to save somewhat more. Would he have generalised *this* result, concluding that «the higher the

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authors typically start from the hypothesis of an increase or decrease in savings and then point out the repercussion on the rate of interest. Böhm-Bawerk (*Capital and Interest*, vol. II, p. 365) states: «The interest rate in a given economy will rise in inverse ratio to the subsistence fund [...]» and stresses that this is «one of the best attested and most widely recognised facts of our experience.» See also Fetter, *Economic Principles*, vol. I, p. 488; Hayek, *Prices and Production*, pp. 75-85; Mises, *Human Action*, p. 530; Skousen, *The Structure of Production*, p. 232; Huerta de Soto, *Money, Bank Credit, and Economic Cycles*, pp. 318ff; Garrison, *Time and Money*, pp. 61f.

<sup>13</sup> Rothbard, *Man, Economy, and State*, p. 342.

<sup>14</sup> Mises considers the similar case of a capital export to meet wage earners in less developed foreign countries; see *Human Action*, p. 495.

<sup>15</sup> This neglect of the demand side of the time market is the basic shortcoming of the conventional theory, as criticized in the present paper. In chapter 9 of *Man, Economy, and State*, Rothbard goes into a rather detailed discussion of supply schedules of factor owners, yet without analyzing the implications for the time market. Similarly, Richard von Strigl points out that wage rates (he speaks of «rations» into which the wage fund is split) do have an impact on the time structure of production, but does not discuss the implications for the relationship between savings and the interest rate. See Strigl, *Capital and Production*, pp. 71f. Mises argues that one way to make longer production processes viable is for the «wants of producers» to decrease, but does not go into any further detail. See Mises, *Theory of Money and Credit* (Indianapolis: Liberty fund, 1980), p. 400.

time-preference schedules are, the greater will be the proportion of savings to consumption»? Hardly so.

Still, there is some merit in focusing, as Rothbard does, on the behaviour of distinct groups. For the danger in using aggregate concepts such as social time preference, aggregate savings and so on is to insinuate that all people's time preferences always change in the same direction, whereas in actual fact the social time-preference rate is but the overall result of individual time-preference schedules. Let us therefore follow Rothbard's suggestion and disaggregate the social time-preference rate into the demand side and the supply side. As we shall see, this will lead us to the astonishing conclusion that the aggregate proportion of consumption to savings is not systematically related to the interest rate.

Above, we have analysed the consequences that follow if the time-preference schedules of both sides of the time market move into the *same* direction. We saw that these were in fact the standard consequences following from basic price theory: tendency for the interest rate to move in a definite direction, while there is no systematic impact on volume.

Let us now consider the case of time-preference schedules on the supply side moving in the *opposite* direction of both sides of time-preference schedules on the demand side. Again, the logical implication follows from basic price theory: tendency for the volume to move in a definite direction, while there is no systematic impact on price. If for example time-preference schedules decrease only on the supply side, while they increase only on the demand side, then both the supply of and the demand for present goods will increase. As a consequence, the volume of present goods exchanged will necessarily tend to increase. In other words, the proportion of aggregate savings to aggregate consumption will tend to increase. Yet we cannot make any definite statement about the impact on the interest rate. Depending on the (contingent) elasticity of supply and demand, the interest rate may somewhat increase or it may —with equal likelihood— somewhat decrease. In short, there is no systematic impact on the interest rate.

The same general conclusion must be drawn for the inverse case, in which time-preference schedules increase only on the



supply side, while they decrease only on the demand side. Here the proportion of aggregate saving to aggregate consumption will decrease, yet again there is no systematic impact on the interest rate.

This very basic analysis leads us to a general conclusion very different from the one drawn by Rothbard and most other economists writing on capital theory. This conclusion is that *the aggregate proportion of savings to consumption is not systematically related to the interest rate*. Increases and decreases of the interest rate may go in hand with the same proportion of savings to consumption, but also, and just as well, with a lower proportion or with a higher one. And since aggregate investment expenditure is but the flip side of aggregate savings, it follows that *there is no systematic relationship between the (pure) interest rate and the volume of aggregate investment*. Any observed *empirical* relationship between the interest rate on the one hand, and savings-investment on the other hand, must therefore be interpreted as a *contingent* relationship, at least from the point of view of the theory of capital.

This also seems to be Mises' point of view on this issue, which can be summarised in three points. One, time preference determines ordinary interest (the pure rate of interest).<sup>16</sup> Two, ordinary interest determines in its turn the demand for *and* the supply of capital on the time market.<sup>17</sup> Three, there is however no systematic relationship between ordinary interest on the one hand, and the proportion between saving and consumption on the other hand.<sup>18</sup> The only critical remark we need to make about Mises'

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<sup>16</sup> See Mises, *Human Action*, pp. 521, 523.

<sup>17</sup> «Ordinary interest is not a price determined on the market by the interplay of the demand for and the supply of capital or capital goods. Its height does not depend on the extent of this demand and supply. It is rather the rate of ordinary interest that determines both the demand and the supply of capital and capital goods. It determines how much of the available supply of goods is to be devoted to consumption in the immediate future and how much to provision for remoter periods of the future.» (ibid., p. 524).

<sup>18</sup> «The quantity of the available supply of capital goods influences neither the rate of ordinary interest nor the amount of further saving. Even the most plentiful supply of capital need not necessarily bring about either a lowering of the rate of ordinary interest or a drop in the propensity to save.» (ibid., p. 530).

position is that it is expressed in the form of assertions. It does not retrace the chain of causation, as we have tried to do above.

### III. IMPLICATIONS OF THE CRITIQUE

The consequences following from our argument cannot be fully discussed in the present paper. We will limit ourselves to highlighting some major implications for the theories of capital and of growth, as well as for business cycle theory.

#### 1. The Time Structure of Production

Two central contentions of Austrian capital theory remain unaffected by our argument. One, the inter-temporal value scales of individuals definitely do determine the pure interest rate. Two, the pure interest rate does in fact determine the time structure of production, with lower interest rate entailing more roundabout production processes and higher interest rates implying shorter ones.

However, our analysis suggests that the structure of production may become lengthier without an increase of aggregate savings (and even in the case of a decrease of aggregate savings). To see this point, it is crucial to distinguish between the length and the width of the overall structure of production. In the case of an overall lengthening, not all investment projects could be lengthened at the same time, because the available savings are limited. It would therefore be necessary to cut or discontinue some projects and to use these funds to lengthen other projects. Thus the structure of production becomes on average slimmer and lengthier.

Similarly, the average production period may become shorter even if aggregate savings do not decrease (and even if they increase), namely, if savings are reallocated from the early stages of certain projects into new or larger projects of a shorter length. Thus the structure of production becomes on average wider and shorter.

Rothbard does not admit the difference between a lengthening and a widening of the structure of production (vertical vs. horizontal extension). He thinks that *any* extension is vertical. Increased saving can in his eyes result only from lower time-preference schedules, and the latter necessarily entail lower interest rates and thus a lengthening of the average production period. He briefly considers a possible objection:

One qualification to the law that increased investment lengthens production processes appears when investment turns to a type of good which is less useful than the goods previously acquired, yet which has a shorter process of production than some of the others. Here the investment in this process was checked, not by the length of the process, but by its inferior (value) productivity. Yet even here the structure of production was lengthened, since people have to wait longer for the new and the old goods than they previously did for the old good. New capital investment always lengthens the overall structure of production.»<sup>19</sup>

This argument boils down to a mere terminological quibble. Rothbard insists on calling any additional investment a lengthening of production. However, the fact is that one can use additional savings either to create «earlier» stages of *already existing production projects*, or to create altogether new lines of production. A reduced volume of savings can therefore either lead to a shortening of the average production period, or to eliminating certain lines of business without changing the average period of production.<sup>20</sup> Hence, variations of the proportion between savings and consumption do not have any necessary implications for the time structure of production, and thus for the pure interest rate.

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<sup>19</sup> Rothbard, *Man, Economy, and State*, p. 488.

<sup>20</sup> Mises points out this difference and presents the argument according to which any extension implies a lengthening of the structure of production as a terminological issue. See Mises, *Human Action*, p. 492. He distinguishes between «lateral» and «longitudinal» expansions of production; see *ibid.*, p. 553.

## 2. Two Types of Growth

Rothbard states: «It is clear that a feature of the progressing economy must necessarily be a fall in the pure rate of interest.»<sup>21</sup> The reduced interest rate triggers increased investment in the higher stages of production and also the creation of *additional* higher stages.<sup>22</sup> This lengthening of the structure of production makes human labour more physically productive – the economy is growing. Rothbard tells us that this is necessarily how the economy grows. Increased production can result *exclusively* from a lengthening of the structure of production.<sup>23</sup>

However, if, as we have argued, additional savings can be used to extend the structure of production either horizontally (widening) or vertically (lengthening), then we must distinguish between two growth types that correspond to these two types of extension.<sup>24</sup> Let us briefly discuss them in turn.

First, the economy can grow if the additional savings are used to simply add new investment projects of a similar length than the ones already existing. Such a widening of the structure of production could take place if the population opted for longer working hours, thus matching the increased supply of present goods (monetary savings) by an increased demand for present goods (more hours worked for payment). In this case the pure rate of interest, and thus the time structure of production, would not be affected by the increase of savings. Yet there would still be growth in terms of absolute physical output. And these additional investments might even entail a productivity growth (physical output per hour worked and per dollar invested). The reason is that there is now an increased division of labour as well as an increased division of capital, which might over-compensate the decreasing returns from investment.<sup>25</sup>

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<sup>21</sup> Rothbard, *Man, Economy, and State*, p. 495.

<sup>22</sup> *Ibid.*, figure 4.

<sup>23</sup> This was also the opinion of the early Mises. See Mises, *Theory of Money and Credit*, p. 400.

<sup>24</sup> Compare again with Mises, *Human Action*, p. 553.

<sup>25</sup> See L. Lachmann, *Capital and Its Structure*, pp. 80f. Lachmann also coins the phrase «division of capital.»

Second, the economy can grow if the additional savings are used to extend the length of already existing investment projects, creating «earlier» stages to these projects. This is the type of growth stressed in conventional Austrian capital theory. It entails higher physical output both in absolute and in relative terms. Let us notice in particular that it *systematically* enhances the productivity of labour and of capital, in contrast with the above case of a widening of the production structure, in which increased savings *might* entail higher relative output, but do not always do so, because of decreasing returns from investment.

### 3. Two Types of Inter-temporal Misallocation

If it is appropriate to distinguish between two types of growth—or, more precisely, between two types of extensions of the structure of production—then it is similarly appropriate to distinguish between two types of errors that entrepreneurs can commit in adjusting the structure of production to the value judgements of the market participants. One, entrepreneurs can make wrong judgements about the pure interest rate, but be right on the volume of savings. Two, entrepreneurs can be right on the interest rate, whereas they are wrong about the volume of savings.

In actual practice there can of course be any combination of these two types, but the basic distinction is nevertheless useful because it has consequences for the analysis of business cycles. In fact, Austrian business cycle theory purports to explain the causes and consequences of «clusters of entrepreneurial errors.»<sup>26</sup> This obviously presupposes a definition of the nature of the errors at stake and, in fact, the literature on Austrian business cycle theory contains descriptions of the two basic types that we highlighted above. The problem is that they are not clearly distinguished.<sup>27</sup> Some authors such as Rothbard present both of

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<sup>26</sup> See Rothbard, *America's Great Depression*, pp. 8f; Hülsmann, «Toward a General Theory of Error Cycles,» *Quarterly Journal of Austrian Economics*, vol. 1, n.º 4 (1998).

<sup>27</sup> The reason is, again, that most Austrian economist hold that increases of savings and decreases of the interest rate are but flip sides of the same coin. Accordingly,

them in juxtaposition without noticing the difference.<sup>28</sup> Other authors focus on one of them and invariably present this type of error as «the» cause of the business cycle. The result is that Austrian economists occasionally talk past one another when it comes to business cycle theory.

In what follows we will therefore try to highlight the characteristic features of the two basic types of errors. Each of them manifests a different sort of inter-temporal misallocation, in which entrepreneurial errors concern different objects, play themselves out differently, and are eventually corrected under the impact of somewhat different factors.

In case of the first basic type of error, entrepreneurs make wrong judgements about the pure interest rate, while they are right on the volume of savings. Suppose that as a consequence of such an error the interest rate drops below its equilibrium level. This would trigger an increased production of consumer goods for a more remote future (A), at the expense of consumer goods in the nearer future (B). The resulting proportion between (A) and (B) would be artificial, in the sense that it does not reflect real consumer preferences. However, the latter will eventually assert themselves through effective demand, that is, through spending on consumer goods. This spending according to real consumer preferences will create windfall profits for (B) and spell doom for (A). It therefore comes to a crisis consisting of the more or less simultaneous bankruptcy of the (B) projects. The crisis might conceivably be prevented through a change of consumer preference schedules.<sup>29</sup> However, political intervention—such as monetary policy designed to create forced savings—does not bring such changes about.

This interpretation of the nature and repercussions of an inter-temporal misallocation seems to go back to Hayek; and it was

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when it comes to explaining clusters of entrepreneurial errors, they typically assert that increases of the money supply, if injected into the economy through the credit market, may mislead a great number of entrepreneurs into seeing here an increase of (real) savings and that *therefore* the pure interest rate drops below its equilibrium level, thus provoking an inter-temporal misallocation of savings.

<sup>28</sup> See Rothbard, *Man, Economy, and State*, pp. 854-863.

<sup>29</sup> See Rothbard, *Man, Economy, and State*, p. 861.

later restated and developed in the writings of Rothbard, Skousen, Garrison, and others.<sup>30</sup> Notice that in this scenario the *volume of savings plays no decisive role*. Entrepreneurial errors concern essentially the pure interest rate, which, as we have seen, is not systematically related to the volume of savings. What happens is that entrepreneurs use available savings to make the structure of production longer (but also thinner) than it would be in equilibrium. This new structure is unsustainable, not in the sense that it would be altogether impossible to maintain it for any physical reason, but in the sense that it does not fit consumer preferences. Unless the latter change in a way to accommodate the new production structure—and there is no a priori reason why such a change should occur—some firms reap profits, while other firms incur losses, and the latter eventually must go out of business.

Things are different in the case of the second basic type of error. Here entrepreneurs are right on the interest rate, but wrong about the volume of savings. They will then launch investment projects *that cannot be completed for sheer physical reasons*, because the necessary resources simply do not exist, respectively, cannot be produced in the required time frame. The crisis is therefore inevitable. It breaks out at the moment when investors run out of resources and realise that the factors of production necessary to complete their projects simply do not exist. The crises therefore cannot be prevented through a change of consumer preferences or any sort of political intervention. The pure interest rate and the average length of the production structure play here no role at all. Even if the structure of production were geared toward the right *proportion* between consumer goods for a more remote future (A) and consumer goods for the nearer future (B), the crisis would still be inevitable because the available resources are not sufficient. For example, if savings were sufficient to complete, in accordance with consumer preferences, fifteen (A) projects and ten (B) projects, then it would not help at all to keep

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<sup>30</sup> See Hayek, *Prices and Production*, pp. 55-58; Rothbard, *Man, Economy, and State*, pp. 856-858; idem, *America's Great Depression*, pp. 10-14; Skousen, *The Structure of Production*, pp. 298f; Garrison, *Time and Money*, p. 72.

this proportion and launch thirty (A) projects and twenty (B) projects.

The nature and implications of this second basic type of error were stressed in Mises' original 1912 statement of the Austrian business cycle theory. It is true that Mises analysed a mixed case, in which both error types were present, but he clearly recognised the physical impossibility that characteristically results from the second type. He wrote:

[...] But there cannot be the slightest doubt where this will lead. A time must necessarily come when the means of subsistence available for consumption are all used up although the capital goods employed in production have not yet been transformed into consumption goods. [...] The means of subsistence will prove insufficient to maintain the laborers during the whole period of the process of production that has been entered upon.<sup>31</sup>

In *Human Action*, Mises presented the same basic line of argument, emphasising that it does not matter whether the misdirected investment activities result in a lengthening or in a widening of the structure of production. In other words, he now recognised that the cluster of entrepreneurial errors does not necessarily concern the interest rate.<sup>32</sup> And he illustrated his argument with the following example:

The whole entrepreneurial class is, as it were, in the position of a master-builder whose task it is to erect a building out of a limited supply of building materials; if this man overestimates the quantity of the available supply, he drafts a plan for the execution of which the means at his disposal are not sufficient. He oversizes the

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<sup>31</sup> Mises, *Theory of Money and Credit*, p. 401. See also idem, *Geldwertstabilisierung und Konjunkturpolitik* (Jena: Fischer, 1928), p. 49

<sup>32</sup> «The entrepreneurs embark either upon lateral expansion of production (viz., the expansion of production without lengthening the period of production in the individual industry) or upon longitudinal expansion (viz., the lengthening of the period of production). In either case, the additional plants require the investment of additional factors of production. But the amount of capital goods available for investment has not increased.» (*Human Action*, p. 553).



groundwork and the foundations and only discovers later in the progress of the construction that he lacks the material needed for the completion of the structure.<sup>33</sup>

Rothbard too endorses this illustration, and among contemporary Austrian economists, Hoppe, Huerta de Soto, and Hülsmann have restated and developed Mises' line of argument, again, in analysing mixed cases in which both types of errors were present and without noticing that the argument at stake concerns only one of them.<sup>34</sup>

#### IV. CONCLUSION

We have argued that the pure interest rate is not systematically related to the proportion between savings and consumption. The contrary opinion is very widespread among Austrian economists, but it cannot be based on the pure time-preference theory of interest, as developed from Böhm-Bawerk into the present day. Our argument vindicates Ludwig von Mises' point of view on this question, though Mises did not deliver a praxeological demonstration to substantiate his assertions.

We have moreover spelled out the implications of our argument for growth theory and business cycle theory. In particular, we have shown that it is necessary to distinguish between two basic types of inter-temporal misallocation, both of which have long been known in the relevant literature.

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<sup>33</sup> Mises, *Human Action*, p. 557.

<sup>34</sup> See Rothbard, *Man, Economy, and State*, p. 857; Hoppe, *The Economics and Ethics of Private Property* (Boston: Kluwer, 1993), pp. 65, 122; Huerta de Soto, *Money, Bank Credit, and Economic Cycles*, pp. 350f, 363-382; Hülsmann, «Toward a General Theory of Error Cycles».

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APPENDIX:  
 FIGURES FROM ROTHBARD'S *MAN,  
 ECONOMY, AND STATE*

FIGURE 1  
 COMPARISON OF TIME-PREFERENCE SCHEDULES

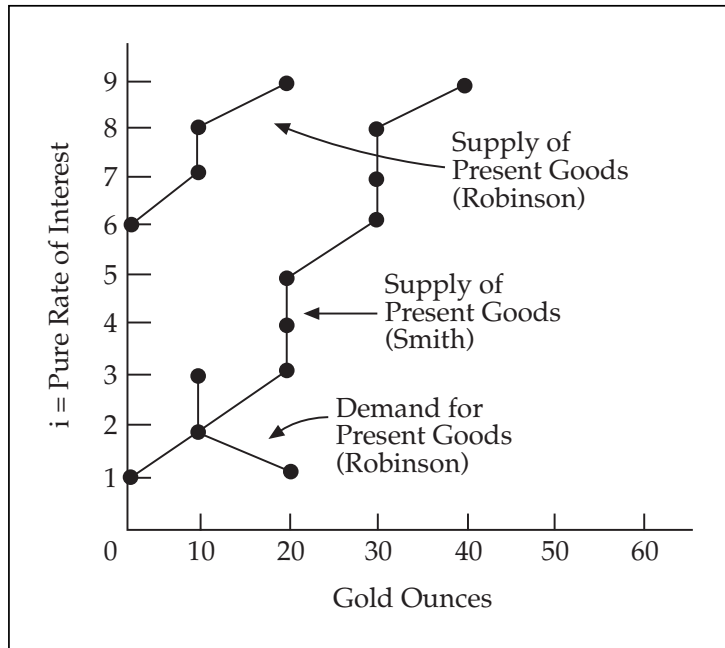


FIGURE 2  
INDIVIDUAL TIME-MARKET CURVE

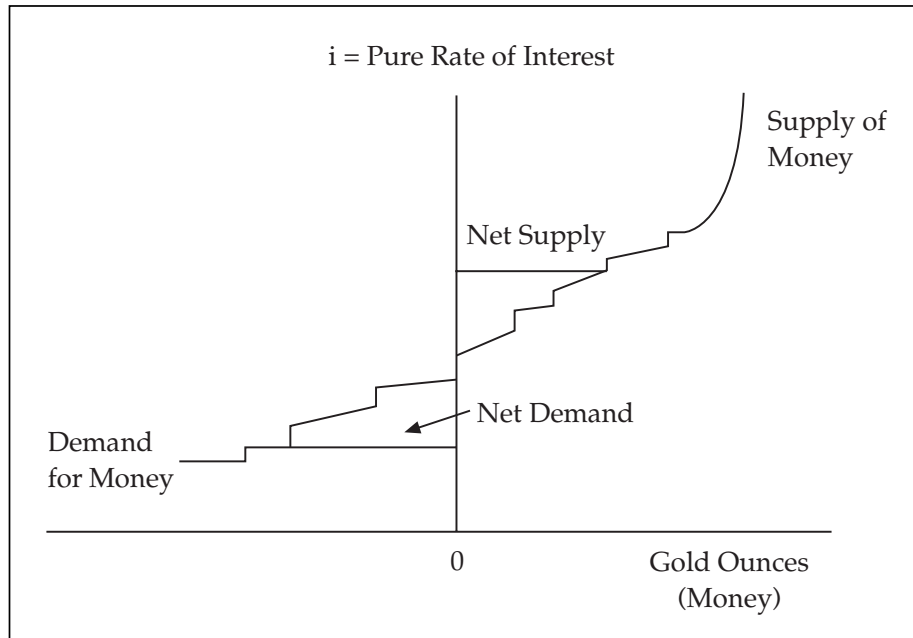


FIGURE 3  
AGGREGATE TIME-MARKET CURVES

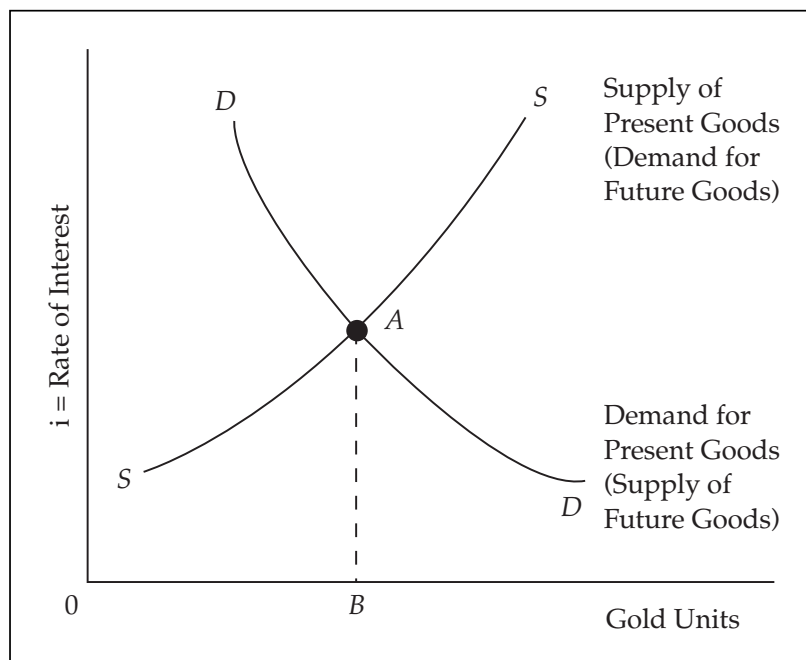


FIGURE 4  
LOWERING OF INTEREST SPREADS

