THE HAYEKIAN THEORY OF CHRONIC UNEMPLOYMENT

DAVID SANZ*
JUAN MORILLO**

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Abstract: It is usually assumed that, while John Maynard Keynes developed a theory of chronic unemployment, Friedrich August Hayek did not. However, we defend in this paper that in «Profit, Interest and Investment» (1939) there is an implicit explanation of the high and persistent unemployment of the 1930s. The aim of this paper is to explain Hayek's view about the economic crisis and recovery and to assess if we could talk about a Hayekian theory of chronic unemployment. We will defend that chronic unemployment has its origin in a dynamically inefficient design of some of the institutions that rule the market.

Keywords: Economic crisis, recovery, dynamic efficiency, chronic unemployment, Ricardo effect.

JEL Classification: E14, E22, E24, E32, E63.

Resumen: Suele asumirse que, al contrario de John Maynard Keynes, Friedrich August Hayek no desarrolló una teoría del desempleo crónico. Sin embargo, en este artículo defendemos que en «Profit, Interest and Investment» (1939) hay una explicación implícita al alto y persistente desempleo de la década de 1930. El objetivo de este artículo es explicar la visión de Hayek sobre la crisis y la recuperación económica y evaluar si puede hablarse de una teoría del desempleo crónico. Defenderemos que el desempleo crónico tiene su origen en un diseño dinámicamente ineficiente de algunas instituciones que gobiernan el mercado.

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* Dr. David Sanz is dean of the School of Social Science and Law of the Catholic University of Ávila (Spain); email: david.sanz@ucavila.es.

** Dr. Juan Morillo is professor of Economics and Global Business at EAE Business School and Ostelea School of Tourism & Hospitality (Barcelona, Spain); email: juan.morillo.bentue@campus.eae.es.

Palabras clave: Crisis económica, recuperación, eficiencia dinámica, desempleo crónico, efecto Ricardo.

Clasificación JEL: E14, E22, E24, E32, E63.

I
INTRODUCTION

It is usually assumed that, while John Maynard Keynes developed a theory of chronic unemployment, Friedrich August Hayek did not. Indeed, a theory like this one was never explicitly explained by Hayek (eg. cf. Cadwell, 2004; Ebenstein, 2001; O'Driscoll, 1977).

However, we defend «Profit, Interest and Investment» (1939a) was written as a theoretical explanation of the high and persistent unemployment of the 1930s. We believe that the assumptions chosen by Hayek reveal that intention: «We shall start here from an initial situation where considerable unemployment of material resources and labor exists, and we shall take account of the existing rigidity of money wages and of the limited mobility of labor. More specifically, we shall assume throughout this essay that (…) money wages cannot be reduced (…) and finally, that the money rate of interest is kept constant» (Hayek, 1939a, 213-214). These assumptions are similar to the institutional and macroeconomic conditions of the British economy in the late 1930s. Besides, these assumptions are radically different from those chosen in *Prices and Production* (1931). In that book, Hayek assumed as a starting point in his discussion, a) full employment, b) labor mobility, c) flexible wages and d) flexible rate of interest. Thus, we believe that Hayek tried to adapt his model to the new circumstances.

We will argue in this paper that this essay could be interpreted as a theory of chronic unemployment and economic stagnation. Also, it will be defended that this phenomenon has its explanation in a dynamically inefficient design of some of the institutions that rule the market (Huerta de Soto, 2009, 1-33).

In order to do so, we will have to explain the essence of the economic fluctuations in the Hayekian theory and its insights about the conditions for the economic recovery. As we will see, the economic recovery is a delicate process that can be easily disrupted, especially if the institutional framework is not correctly designed. This is probably why Hayek saw the economic development of the 1930s as a succession of frustrated recoveries.

On the following pages, we will start explaining some theoretical considerations to illustrate Hayek's theory of the business cycle. We will then explain Hayek's take on the crisis and the recovery, following with an overview of his theory of chronic unemployment. Finally, we will list the main conclusions from this research.

II
THEORETICAL CONSIDERATIONS

In order to understand the theory of the business cycle developed by Hayek, it is necessary to explain some key ideas of his model: his concept of economic equilibrium, the importance of the balance between saving and investment, and the market's mechanisms that tend to balance them (that is, the interest rate and the Ricardo effect).

1. **Definition of equilibrium**

First of all, it is necessary to study Hayek's (1937) conception of the economic equilibrium in the market process. For him, the economic equilibrium is a synonym of coordination between all the economic agents. There are two conditions in particular we must mention related to economic equilibrium:

a) There is compatibility between the different plans made by the individuals involved in that process.
b) There is a correct foresight of the external facts expected by all the members of the society.

According to Hayek, this definition implies that the continuance of a state of equilibrium is not dependent on the objective data being constant in an absolute sense and it is not necessarily confined to a stationary process. Thus, as long as compatibility between plans remains and expectations about the external facts are correct, equilibrium could be maintained even though there is economic growth, for example.

Also, Hayek (1937, 41-42) explains that his definition does not require perfection from that individual's foresight «in the sense that it need extend into the indefinite future, or that everybody must foresee everything correctly. We should rather say that equilibrium will last so long as the anticipations prove correct, and that they need to be correct only on those points which are relevant for the decisions of the individuals.»

Within this framework, we are able to understand Hayek's developments on the coordination between saving and investment.

2. **The dynamic balance between saving and investment**

According to Hayek, the market is a network of millions of companies that complement and coordinate with each other intertemporally and synchronically, forming an extremely complex production structure. In order to understand how and why this structure is coordinated or uncoordinated, we need to build a theory allowing us to study the way it works (cf. Huerta de Soto, 1998, chap. V).

In his model, time is a central variable in understanding any production process:

On the supply side, production is not immediate. On the contrary, a significant amount of time is needed to produce goods and services. Indeed, the present (and future) supply of final goods is limited and conditioned by the investments that were made in the past. In this sense, the current investment structure produces a flow of final goods and services that reaches the final markets in a staggered and continuous manner over successive periods of time. In order to change the amount or/and the composition of consumer goods and services that arrive at the final markets in each period, it is necessary to modify the investment structure.

On the demand side, there is also a flux of money that arrives to the final markets which constitutes the consumer demand. The origin of this money is, of course, the income perceived by the different factors of production for their participation in the production process. Thus, this money could have been earned in the past (savings) or in the current period. The problem is that, while production takes time, money could be converted in final demand almost instantaneously.

If we leave aside past savings, the current rate of saving determines the proportion of the current incomes which is transformed into final demand. Hayek explains that the dynamic «balance» of any structure of production depends on an adequate coordination between the «ripening» of investments in the form of final goods and services and of the income generated by such investments in the form of final demand.

In *Prices and Production* (1931), Hayek defended that, in order to have a sustainable structure of production, there must be an equilibrium between the aggregate volume of saving and investment. However, this definition is problematic in dynamic terms. For this reason, in his following works, he came to the conclusion that «… the ultimate test for the correspondence between saving and investment in the relevant sense is really whether the current demand and the current supply of consumers' goods are so matched that there is no inducement either to increase or to decrease this current supply at the expense or in favor of the provision of the future» (Hayek, 1941, 313).

Thus, the key element in the Hayekian system is the correct coordination between consumers and entrepreneurs on the amount and type of final goods and services over the successive time periods.

In this sense, as long as these two sets of decisions (demand and supply) coincide over time, the relative prices of consumer goods and capital goods will remain constant and, therefore, entrepreneurs will not have incentives to alter their investments. In other words, the structure of production will remain stable.

In this regard, in each period, entrepreneurs will try to anticipate changes in the consumer's demand in order to adapt their offer of consumer goods. However, entrepreneurs have a limited

ability to forecast the future demand, which can change by alterations in the consumer's preferences or by monetary causes. Hence, in a context of dynamic coordination, two situations could happen:

a) *Savings exceeding entrepreneur expectations*

The final demand could be insufficient to purchase all the goods and services offered by the entrepreneurs.

In this sense, regarding the supply of goods, if savings exceed entrepreneurs' expectations, this will lead to a temporary accumulation of the stocks. In most cases, consumption could be delayed. Hayek (1941, 316) concedes that «No doubt there will always be some goods, like stocks of perishable products, which, because of their high specificity, cannot be shifted to production for later dates, and on which, therefore, considerable loss will be made.»

Hayek does not mention the supply of services. Obviously, services cannot be stored. Therefore, if savings are greater than what is expected, many final services will not be produced.

In any case, in this situation, final prices will be reduced. However, contrary to the Keynesian traditional vision, Hayek explains that this situation of excess of saving is less likely to occur that the opposite one.

b) *Savings falling short of entrepreneur expectations*

Also, it could happen that the demand for consumer goods and services proves to be higher than their offer. In other words, leaving aside the possibility of dissaving, in this situation the volume of current incomes (generated by the investment process) transformed in final demand, would be larger than the flux of final goods and services that arrive at the market in that period.

Hayek (1941, 316) explained that this situation is problematic because «while it is almost always possible to postpone the use of things now ready or almost ready for consumption, it is in many cases impossible to anticipate returns which were intended to become available at later date».

Let us put an example: a building is a capital good that produces services of accommodation over time. Each month it is able to produce a certain amount of accommodation services. For this reason, even if there is a rise in the demand, it is impossible to increase the current offer of accommodation services that the building produces in that period.

Therefore, if the final demand exceeds the potential of production of final goods and services, prices will rise.

Thus, for Hayek, the biggest economic problem is that consumers should be willing to «wait» long enough to allow the consumer goods and services to emerge in final markets. Otherwise, the phenomenon of inflation will appear, and, as it will be explained later, this phenomenon will seriously endanger the sustainability of the production structure. This is why, for Hayek, savings are so important.

3. **Coordination mechanisms**

We have seen that the economic coordination between entrepreneurs and consumers is vital for the sustainability of the structure of production. In this sense, Hayek explains that there are two forces which tend to coordinate these decisions: the interest rate and the Ricardo effect.

On the one hand, the interest rate is an essential price for the coordination of the production structure. According to him, the interest rate measures the relative scarcity of capital in the economy. Thus, when entrepreneurs want to initiate new investments, they have to demand loanable funds and, unless savings grow in proportion, the interest rate will raise. As a consequence, «the industries that could not earn profits at this higher rate would have to curtail or stop production» (Hayek, 1939a, 231). Indeed, while writing about war economics, Hayek clarified that: «It is a widely prevalent misconception that the main function of the rate of interest is to bring forth the supply of savings needed. If this were true, its importance under present conditions [the war] would indeed be small. In war time the current supply of savings required for war purposes can most effectively be increased by

taxation. But it is doubtful whether the rate of interest is ever very important in this respect. Its main importance is always to regulate the allocation of the limited supply of capital to the purpose for which it can be used with the greatest advantage» (Hayek, 1939b, 159; cf. 1933, 74).

However, because of the nature of the banking system and the usual government monetary manipulations, Hayek (1939a, 251-252) expresses some doubts about the real efficacy of the interest rate to stop an unsustainable expansion of the volume of investment. In this sense, he acknowledges that the rate of interest depends «largely on accidental and arbitrary factors» (Hayek, 1939a, 252). Because of that, there could be considerable delays in the changes of the rate of interest when there are changes in the market conditions. For this reason, the interest rate might be unable to perform coordination between savers and investors.

On the other hand, the Ricardo effect is the second market mechanism to coordinate investors and consumers. Hayek explains that the permanence in time of a productive structure requires the permanence of a parallel structure of relative prices. Thus, any change in the relative prices of consumer and capital goods will change the relative profitability of the different investments already made. Hence, changes in the final prices will induce entrepreneurs to modify their investment strategy. In order to develop this idea, Hayek (1942) defines the following concepts:

— Rate of turnover (T): «Expresses (as an integer or fraction) the number of times the capital is turned over in the course of one year» (Hayek, 1942, 262). In other words, the number of times the money invested in a business is, again, transformed into money. The more capitalist a production process is, the lower the rate of turnover will be. For example, if the investment made in a shipyard is transformed fully into money after 10 years, the rate of turnover will be 1/10; if the investment made in a bar is transformed into money in 4 months, the rate of turnover will be 3 (3 times a year).
— Profit margin (M): the percentage of profits in each turnover.
— Internal rate of return (I): the percentage of profit per year.

Given these definitions, $I = T \times M$ or $M = I/T$

Hayek explains that there are many ways to produce a concrete product. Some of these production strategies require more capital than others. In this sense, let us assume that, in a concrete moment, there are three ways (A, B and C) to produce a good. Let us assume that all the productive methods have the same internal rate of profit (e.g., 6%), but they require different amounts of investment. As it is shown in Table 1, A (the less capitalist method or the most labor-intensive method) has the highest rate of turnover, but the lower profit margin, B is in an intermediate position and C (the most capitalist method or the less labor-intensive method) has the lower rate of turnover, but has the higher profit margin. Logically, the more capitalistic method, the higher the labor productivity will be, and vice versa.

TABLE 1
METHODS OF PRODUCTION
A, B AND C IN EQUILIBRIUM POSITION

Method of production	*Rate of turnover (T)*	*Profit margin (M)*	*Internal rate of profit (I)*
A	3	2	6%
B	2	3	6%
C	1	6	6%

In this situation, let us assume that some companies choose method A, others method B and others method C.

Let us assume that the price of the final product rises 2%. In this situation, the profit margin (M) of all the methods of production will rise in 2%, but the internal rate of profit (I) will increase differently due to the different rates of turnover (T). As we can see in Table 2, the less capitalistic the method is, the more the internal rate of profit will increase. The reason is that those companies with higher rate of turnover could take advantage of the price rise more times per year. Thus, Hayek points out that inflation tends to promote production processes with lower capital per worker, that is, labor-intensive methods of production.

TABLE 2
METHODS OF PRODUCTION
A, B AND C WITH AN INCREASE IN PRICES OF 2%

Method of production	*Rate of turnover (T)*	*Profit margin (M)*	*Internal rate of profit (I)*
A	3	4	12%
B	2	5	10%
C	1	8	8%

If we assume that the price of the final product diminishes 2%, the opposite will happen. As is shown in Table 3, in this situation, the more capitalistic the production method is, the more profitable it becomes in relative terms. Indeed, in this situation, method A is not profitable at all. Thus, Hayek points out that deflation tends to promote production processes with higher capital per worker, that is, capital-intensive methods of production.

TABLE 3
METHODS OF PRODUCTION
A, B AND C WITH A REDUCTION IN PRICES OF 2%

Method of production	*Rate of turnover (T)*	*Profit margin (M)*	*Internal rate of profit (I)*
A	3	0	0%
B	2	1	2%
C	1	4	4%

As a consequence, Hayek defends that the market process has a tendency towards the coordination between saving and investment due to the Ricardo effect:

a) when there is a reduction in the rate of saving, prices go up, and there is a reduction in the volume of aggregate investment or, in

other words, the production processes will become more labor-intensive than in the previous situation;

b) when there is an increase in the rate of savings, prices go down, and there is an increase in the volume of aggregate investment or, in other words, the production processes will become more capital-intensive than in the previous situation.

It should be noted that any drastic change in the entrepreneurial strategies of production will imply costs. In both cases, there will be changes in the composition of the investment demand, and, as a result, some suppliers of capital goods that lose part of their demand will be forced to lay off workers or even to cease business. Thus, changes in the final prices will provoke that some parts of the investment structure of the economy will become useless. Of course, other areas of the capital structure will experiment an increased demand, resulting in new jobs and a bigger investment.

However, as we said, there is an important difference between the two processes. At the end of the adjustment process, the situation with an excess of consumer demand will lead to an absolute reduction in the aggregate volume of investment, whereas, the situation where there was an excess of saving will lead to an increase of the aggregate volume of investment. This is why the first process leads to an economic crisis, whereas the second leads to a process of economic growth.

In short, for Hayek, at any moment, there is a tendency towards coordination between saving and investment (or demand and supply of consumer goods and services) thanks to the interest rate and, above all, the Ricardo effect.

III
CRISIS AND RECOVERY

In the previous section, we have explained some crucial points of Hayek's capital theory: his concept of economic equilibrium, the conditions of equilibrium in the structure of production and the coordination mechanisms by which the economic activity tends to

be driven towards the economic equilibrium. In this section we will explain the dynamics of the economic crisis and of the economic recovery.

1. **Crisis**

As we have seen, the essence of an economic crisis is the net reduction of the volume of capital in a society. This happens when, during enough time, more money than final goods and services flows to the final markets and, as consequence, inflation shows up.

The rise in final prices leads to a spontaneous process of disinvestment in the production processes and abandonment of certain types of investments that are no longer profitable. Therefore, in this process, it becomes evident that part of the complementarity of the past investments has disappeared or, in other words, part of the capital structure has become useless[1].

This process of capital consumption will provoke unemployment in the areas where there are losses, i.e., typically, in the stages that are farther from the final markets. Hence, many families will suffer an important decrease of their incomes and, for this reason, they will reduce their demand of final goods and services. As a consequence, consumer industries will suffer also an economic crisis, although it will be less intense than the crisis in the more capitalistic stages of the production structure. Therefore, unemployment will also increase in the consumer industries and, hence, there will be a further reduction of the whole demand in the different stages of production. Thus, the economic crisis will be spread out through the whole economy.

In this situation, as long as the final demand is greater than the final supply of goods and services, the inflationary tendencies will remain and the process of contraction will continue. This situation will penalize long term investments that, although more productive,

[1] We leave aside the case where savings increase over investment. In this situation, some capital consumption may occur, but it will be offset by the new formation of capital. This is the essence of the secular growth based on capitalization (cf. Hayek, 1931, Lecture II).

have a slower output maturation, and will favor short term investments with a faster output maturation despite being less productive. Thus, during this process, the malinvestment will be purged and only the more sustainable business models will survive.

After some time of economic contraction, «a new position of temporary quasi-equilibrium would be reached in which, with a very low general level of employment, the demand for consumer' goods will once again have become equal to current output, and output and production will cease to shrink further» (Hayek 1939a, 233). In this position, the capital per worker will be lower than in the past, which means that the average productivity of labor will be lower than in past periods.

2. **Recovery**

Hayek (1939a, 247) states that it is very unlikely to achieve a sustainable full employment in the short run. The reason is that the distribution of the productive resources at the beginning of the recovery is «the legacy of former booms» and, therefore, it has already proven to be unable to coordinate producers and consumers. Hayek (1939a, 248) is very clear on this point: «if the last boom has come to an end because savings proved to be insufficient to maintain the rate of accumulation which full employment with the existing distribution of resources between industries implies, it is very probable that any attempt to reach full employment with the same distribution would lead to the same result.»

Hayek calls «short run employment ceiling» to the maximum level of occupation that could be achieved in the short run. The larger the volume of savings is, the closer the level of occupation will be to this «ceiling». Thus, if the volume of savings increases long enough, it is possible to achieve an important level of occupation. However, he thinks that full employment usually requires a transfer of some production resource to new sectors and regions.

To analyze the process of recovery, it is essential to understand how Hayek (1939a, 222) defines the components of the demand of

investment. He is inspired by the theory of the principle of the accelerator, although his approach is different[2]:

Demand of capital goods =
Demand of consumer goods («multiplicand») x «multiplier»

This «multiplier» varies depending on the productive goals of the entrepreneurs. In this sense, if entrepreneurs want to increase the labor productivity in order to improve their margin profit (M), the multiplier will be greater and, therefore, the same demand of final goods will be transformed in a greater demand of capital goods. On the contrary, if entrepreneurs, because of the great margins of profits originated by the inflation process, prefer to increase the rate of turnover of their investments (T), the multiplier will be lower and, therefore, the same demand of final goods will be transformed in a lower demand of capital goods.

In any case, the golden rule for a sustainable recovery is that the final markets have to remain in a dynamic equilibrium, that is, the flow of money in form of final demand cannot exceed the flow of final goods and services. As long as this condition is fulfilled, the structure of prices will remain constant, and there will not be sudden changes in the relative profitability of the new and past investments.

On the onset of the recovery, the profit margin of the different business will be low, which means that the importance of the wages in the total cost of the companies will be very high. Hayek (1939a, 235) explains that, in this situation, «investment will take highly capitalistic forms: entrepreneurs will try to meet the high costs of labor by introducing very labor-saving machinery — the

[2] There are two main differences between Hayek's accelerator principle and its usual formulation. First, as Klausinger points out (Hayek, 1939a, 222, n21), Hayek explicitly refers to a relationship between the levels of final demand and of investment demand, whereas, «the common understanding of the accelerator principle» relates «the demand for capital goods to the change in the demand for final goods». Second, the difference between the accelerator principle and Hayek approach is that the Austrian considers that the multiplier changes depending on the economic circumstances, whereas the usual formulation of the accelerator assumes that the multiplier will be always the same, no matter what happens.

kind of machinery which it will be profitable to use only at a very low rate of profit and interest». Thus, many companies will try to increase the productivity of their production processes, to increase the profit margin (M).

Indeed, Hayek (1939a, 235-236) points out that, at the beginning, «[t]he first increase of investment, induced by the high real wages [i.e. high wages in comparison with the total cost of production], would not aim at producing a larger final output.» In consequence, there will be «an increase of the "multiplier" of the acceleration principle while the "multiplicand" remains unchanged.»

Hayek (1939a, 236) explains that, «so long as real wages and profits remain at the initial level, the tendency to produce any additional output with the use of a high proportion of capital will persist. And as in consequence of this investment [aggregate income grows and, therefore] final demand increases further, provision has to be made to produce a larger and larger output with these highly capitalistic methods. It is in this phase of the revival, before prices and profits begin to rise, that the acceleration principle operates with a constant (and very high) multiplier, that every (actual and expected) increase in the demand for consumers' goods will lead to a demand for a very great quantity of capital goods and that employment will grow rapidly in the investment goods industries.»

As we said, as long as the dynamic balance in the final markets continues, this process of growth will continue in a sustainable way. Hayek points out that there are some reasons to believe that, at the beginning of the recovery, the supply of final goods and services will be large enough to meet the increased consumer demand. There are three reasons to believe so:

— First, there will be a considerable amount of stock of final goods accumulated during the depression.
— Second, «it will be possible, by taking idle equipment into use, to increase the current output of consumers' goods not only quickly but also with an additional disbursement of working costs which will be considerably smaller than the value of the additional output (at current prices)» (Hayek, 1939a, 237).
— Third, once the recovery has begun, many people will increase their voluntary savings to improve their liquidity position. In

> this sense, many people will want to increase their cash balances (which in many cases were reduced by the crisis to an undesired level) and to use their new incomes to pay off their debts (which in many cases increased too much during the crisis).

In short, at the beginning of the recovery, it is expected that the growth of the supply of final goods and services will suffice to meet the growth of the final demand.

However, as time passes, these three forces will disappear: accumulated stock will be sold out, companies will work at full capacity and, after some time, income receivers will achieve the desired liquidity position. When all this happens, the maintenance of the dynamic equilibrium will depend on the kind of investments that are being made and their matching with the desires of the consumers. In this sense, if the rate of saving is high, entrepreneurs should start more capitalistic investment processes that will slowly contribute to the stream of final goods; and, if the rate of saving is low, entrepreneurs should start less capitalist investment processes that will quickly increase the flow of final goods. Both possibilities mean that there is coordination between consumers and entrepreneurs.

Of course, in the former case, once the new production projects are fully developed, the real flow of final goods and services will be larger than in the latter case. The reason is that the former structure of production will be more capitalistic (i.e. more productive) than the latter. But, to reach the more capitalistic structure of production, the consumers have to willingly postpone consumption long enough.

To study the degree of «roundaboutness» of the investments, Hayek defines Q (Quotient) as the relation between the current contribution of an investment to the flow of consumer goods during a year and its contribution to the current flow of income during that year. That is, if Q is 1/10 this means that that year, this investment has increased the flow of final goods in 1 and the incomes of the inputs in 10. The following year it could be the case that, in this investment project, Q will be 2/1, which means that its contribution to the stream of final goods is 2, whereas its

contribution to the income stream is 1. In any case, the more capitalistic an investment is, the lower will be Q (and vice-versa).

Hayek explains that, in the short run, the level of employment that could be created in a sustainable way depends largely on the kind and form of the investments that are being made during the revival and their relation with the level of savings. In this sense, investments with low Qs are only sustainable with high rates of saving, and investments with high Qs are only sustainable with low rates of saving.

Hayek (1939a, 247) points out that, in the short run, that is, without transferring productive resources between industries, the level of stable employment will be higher if:

— The initial rate of profits is not too low, so entrepreneurs will not try to introduce expensive labor-saving machinery that would imply very low Qs.
— Investments are made gradually and smoothly.
— The rate of savings is high (or the marginal propensity to consume is low).

Therefore, a sustainable recovery needs as a starting point a rate of profits which is not neither too low nor too high. If the rate of profits is too low, entrepreneurs will undertake investments with high capital per worker and, therefore, too many people will be hired in the early stages of production in relation to the volume of saving; hence, in this scenario, the short run ceiling of employment will be surpassed and the structure of production will not be sustainable. If the rate of profits is too high, entrepreneurs will undertake investments with low capital per worker and, therefore, not many people will be hired in the earlier stages of production; thus, in this scenario the short run ceiling of employment will not be achieved.

Finally, following these insights, Hayek explains three recommendations of economic policy that could mitigate the abrupt industrial fluctuations:

— Public expenditure: as we said, in the final stages of the depression, the rate of profits should be prevented from falling too low.

In this sense, «there appears to be a strong case for measures designed to prevent demand for consumers' goods and prices of consumers' goods from falling too far. Since some movements in this direction is necessary, it would delay readjustment if such measures were taken too early. And as investment and incomes begin to increase again, such extra expenditure should clearly be curtailed at the same rate. But during the latter half of the decline a policy of supplementing demand by public expenditure may well be justified» (Hayek, 1939a, 250)[3].

— Wage cuts: Also, Hayek defends that during the depressions, monetary wages should be reduced, because this will improve the business profits and, therefore, the rate of profit will not fall too much. Thus, unions' resistance to wage reductions should be prevented.

— Rate of interest: As we have explained, Hayek has some doubts about the real efficacy of the rate of interest to prevent unsustainable processes of investment. Nevertheless, Hayek (1939a, 253) defends that «a prompt adjustment of the rate of interest as soon as profits begin to rise (or fall), although not involving a great change, might well be effective». For this reason, for him, a wise economic policy would be to increase the sensitivity of the rate of interest in relation to the changes of the demand of credit. This could probably be achieved by increasing the rigidity of the monetary supply.

IV
THE THEORY OF CHRONIC UNEMPLOYMENT

As we said at the beginning of this paper, Hayek did not explicitly develop a theory of chronic unemployment. However, we believe that it is implicit in «Profit, Interest and Investment» (1939a), specifically in his detailed study of the conditions for the economic recovery.

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[3] This statement might sound surprising. However, in several writings, Hayek defended that a limited expansionary demand policy could be useful in the deepest phase of the depression (cf. Hayek, 1931, 260; 1941, 340-343; 1946, 146-147; Hayek, 1974).

We believe that Hayek's position in this issue would be that chronic unemployment and economic stagnation are due to the inability of the economic activity to achieve a lasting sustainable recovery. In this section, we will explain some details about this interpretation.

As we have seen, Hayek explains that, in the short run, there is an employment ceiling, that is, without reallocating the economic resources it is very unlikely to achieve full employment. Thus, in the long run, to achieve full employment, there must be a transfer of misallocated inputs from regions and sectors in crisis to regions and sectors in expansion[4].

Also, he pointed out that economic recovery is a slow and delicate process. The required conditions can be easily perturbed. Specifically, the recovery needs, first, new investments with short maturation periods, second, high rates of saving and, third, smooth and progressive increment of the rate of investment.

Therefore, if, for example, the volume of savings is insufficient to finance the expansion of the new investments, the process of recovery will fail and a new crisis will emerge. If this happens, once the crisis has been overcome, once again, the economy will be ready to start the recovery process. Again, the economic recovery will need the same ingredients, that is, prudent, gradual and smooth investment and high rates of savings. If these ingredients are not given, the process of unsustainable growth will be repeated and the economic activity will again face a process of crisis and contraction.

Thus, as long as there is not a proper and sound recovery, the economy will fluctuate between the lowest point of employment and the short run employment ceiling. Thus, the economic activity will be stagnated in a situation of chronic unemployment for many periods.

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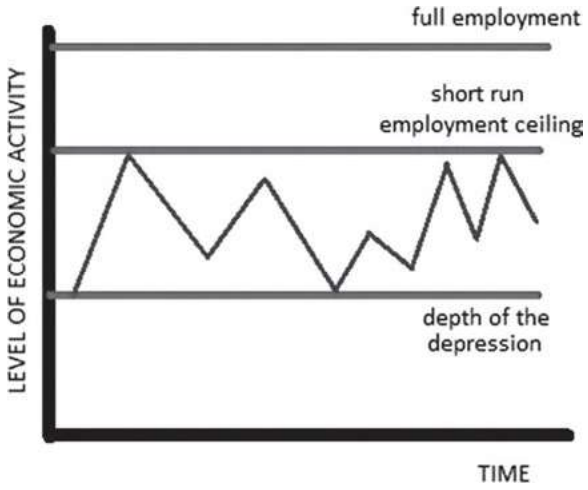
[4] In any case, Hayek (1939a, 250, fn 64) acknowledges that demand policies could succeed in reaching full employment temporarily if they are pursued stubbornly: «it has, of course, never denied that employment can be rapidly increased, and a position of "full employment" achieved in the shortest possible time by means of monetary expansion (…). All that has been contended is that the kind of full employment which can be created in this way is inherently unstable, and that to create employment by these means is to perpetuate fluctuations.»

As it is shown in Figure 1, in each fluctuation, the economic activity does not need to reach the boundaries established by the lowest and highest employment level. The economic activity can fluctuate within those limits. Each fluctuation depends on the type of investments undertaken and the rate of saving in each period.

FIGURE 1
CHRONIC UNEMPLOYMENT AND ECONOMIC STAGNATION. PREPARED BY THE AUTHORS



The question to answer is why these unsustainable recovery processes can be reproduced continually in the different periods.

One possible explanation is to blame entrepreneurs. In this sense, the dynamic equilibrium could be disturbed by the miscalculation and failure in the expectations of the entrepreneurs. Of course, as we said, entrepreneurs quite often make mistakes in their predictions. However, a theory of chronic unemployment and economic stagnation cannot be based in a systematic lack of foresight of the entrepreneurs.

Following Rothbard (1963, 8): «Entrepreneurs are largely in the business of forecasting. They must invest and pay costs in the

present, in the expectation of recouping a profit by sale either to consumers or to other entrepreneurs further down in the economy's structure of production. The better entrepreneurs, with better judgment in forecasting consumer or other producer demands, make profits; the inefficient entrepreneurs suffer losses. The market, therefore, provides a training ground for the reward and expansion of successful, far-sighted entrepreneurs and the weeding out of inefficient businessmen. As a rule only some businessmen suffer losses at any one time; the bulk either break even or earn profits. How, then, do we explain the curious phenomenon of the crisis when almost all entrepreneurs suffer sudden losses? In short, how did all the country's astute businessmen come to make such errors together, and why were they all suddenly revealed at this particular time? This is the great problem of cycle theory.»

Hayek (1933b, 141-144) would agree with this analysis. Indeed, as we have seen, the Ricardo effect and the rate of interest will orientate the entrepreneurs. Thus, the main cause of chronic unemployment and economic stagnation cannot be found in the errors of the entrepreneurial predictions. Therefore, this systemic failure has to stem from another source.

Following Hayek's theoretical developments, we can say that the imbalance in the final markets is produced by the banking system, by the government policies and by the trade unions which are able to systematically manipulate and inflate the final demand. As we are going to defend, these manipulations are prone to happen in the onset of the recovery:

— Banking system: In modern societies, the elasticity of the bank credit is very high and it tends to provoke investments that are excessively capitalistic (low Qs). In the onset of recovery, banks usually have a lot of loanable funds hoarded and they will probably expand the credit while the economic expectations improve; thus, in this context, they might lend beyond the savings that are being generated.
— Governments can manipulate the aggregate demand through the expansionary monetary policy and through the expansionary tax policy. Usually, during the depression, there will be many frustrated social demands: public employment,

pensions, public salaries, expenditures in infrastructures, subsidies, etc. will have been frozen or reduced. Therefore, at the onset of the recovery, many politicians will like to please lobbies and voters with enlargements in the Welfare State. These policies will, usually, increase the final demand without increasing the final output.

— Trade unions: By achieving increases in the monetary salaries, trade unions could create excess of demand in the final markets (cf. Hayek, 1932, 53-55). In this sense, during the recovery, trade unions will probably seek to regain lost purchasing power by bidding up wages. This, of course, could endanger the sustainability of the capital structure. Hayek (1941, 318) explains that «[i]nsofar as it [the trade union activities] leads to an increase in the aggregate demand for consumers' goods it tends to bring about a consumption of capital. But insofar as labor succeeds in securing for itself a larger share of the output and in raising real wages it will tend to bring about a substitution of capital for labor or a transition to more capitalist methods of production. The net effect would probably be that fewer workmen would be employed with more capital per head».

As we can see, at the onset of the recovery, the final demand could be easily manipulated by trade unions, government and banks. If this happens, these institutions would probably be blocking economic recovery. For this reason, chronic unemployment and economic stagnation could be explained by the failure of some social institutions to promote the entrepreneurial coordination. In that case, we can follow Huerta de Soto (2009) and determine that these institutions are dynamically inefficient[5].

In this situation, the only way to overcome chronic unemployment and economic stagnation is to change the institutional framework to one that encourages entrepreneurial coordination. Banks, trade unions and governments should be reformed in order prevent systematic manipulations of the aggregated demand.

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[5] «From a dynamic standpoint, an individual, a company, an institution or an entire economic system will be more efficient the more it fuels entrepreneurial creativity and coordination as we have explained them» (Huerta de Soto, 2009, 10).

How should the institutional framework be reformed? Even though Hayek did not analyze the optimal institutional conditions for a sound and smooth economic recovery, he did devote many intellectual efforts to study how the institutional framework of a free society should look like.

He published his main conclusions in *The Constitution of Liberty* (1960) and in *Law, Legislation and Liberty* (1982). There, he dealt with the problem of unlimited democracy, the question of social justice and with the role of trade unions. Also, in *Denationalization of Money* (1978) Hayek tried to provide an answer to the monetary problem.

The analysis of the impact of his proposals in relation with the economic recoveries goes beyond the aims of this paper. We believe that this is a promising field of study for future research.

V
CONCLUSIONS

In our view, in «Profit, Interest and Investment» there is an implicit theory of chronic unemployment.

As we have explained, for Hayek, any economic recovery is a very delicate process that could be easily disrupted. The key of the recovery is, as we have explained, the matching between saving and investment. The market system usually has its own mechanisms that tend to match the desires of investors and consumers. Hayek explains that sound recoveries need smooth and gradual increases of the volume of investment and a high rate of savings.

However, at the beginning of the recovery, some institutions, such as the government, the trade unions and the banking system, could (and are prone to) disrupt the dynamic balance between saving and investment. If this is the case, a situation of chronic unemployment and economic stagnation could emerge. If this happens, it could be said that these institutions are inefficient in a dynamic sense. The solution for chronic unemployment will be, therefore, to change the institutional framework to a more efficient one, in a dynamic sense.

In any case, according to Hayek, a long run economic recovery will need, in addition to a smooth and gradual increase of the volume of investment and a high rate of savings, a reallocation of part of the economic resources. This can only be achieved in the long run by a real transfer of resources among different sectors and regions. To do so, the government should liberalize the economy and avoid implementing demand policies. It cannot be forgotten that recovery takes time. Typically, some of the unemployed inputs will look for employment in other sectors and regions. Some of them may need some training in order to improve and update their human capital. Entrepreneurs will need some time to end certain business and to start new ones. Also, uncertainty could delay the process of investment.

Finally, we need to address one question. If we are right, this theory of chronic unemployment might explain one of the most pressing economic questions of the time. Why Hayek did not make this theory explicit? It is hard to know for sure. Probably, the reason is to be found in Hayek's research agenda. «Profit, Interest and Investment» was published in 1939. By that time, he was also working in his most important project, *The Pure Theory of Capital* (1941). He thought that in this book he would be able to restate his own model and to address the main business cycle problems. However, as it is well known, Hayek was not able to achieve successfully his goals. After that, his research interests turned to other issues, like the problem of information in the market and political, philosophical and social questions, among others. This might explain why he abandoned his promising works in business cycle theory. In any case, we believe that the economic recovery theory is one field that should be studied with deeper attention by the scholars.

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KEYNES AND FRACTIONAL RESERVE BANKING: THE NPV VS. MEC

EDWARD W. FULLER*

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Abstract: This paper develops a framework for the economic analysis of fractional reserve banking. After introducing the loan market theory and the net present value, the paper shows how fractional reserve banking causes the business cycle by systematically falsifying net present value rankings. Next, the paper demonstrates that Keynes's IS-LM model and marginal efficiency of capital rule out fractional reserve banking as the cause of the business cycle. Finally, the paper shows that Keynes's theory is fundamentally flawed because his theory of investment in incorrect.

Keywords: Fractional reserve banking, Austrian business cycle theory, John Maynard Keynes, Keynesian economics, net present value, marginal efficiency of capital.

JEL Classification: E12, E22, E32, E43, E51, E58, G30.

Resumen: Este trabajo desarrolla un marco para el análisis económico de la banca con reserva fraccionaria. Después de presentar la teoría del mercado de préstamos y el valor presente neto, el documento muestra cómo la banca con reserva fraccionaria causa el ciclo económico al falsificar sistemáticamente las clasificaciones del valor presente neto. A continuación, el documento demuestra que el modelo IS-LM de Keynes y la eficiencia marginal del capital descartan la banca con reserva fraccionaria como la causa del ciclo económico. Finalmente, el artículo muestra que la teoría de Keynes es fundamentalmente defectuosa dado que su teoría de la inversión es incorrecta.

* MBA. Graduate of the Leavey School of Business at Santa Clara University. Email: Edward.W.Fuller@gmail.com

Palabras clave: Banca con reserva fraccionaria, teoría austriaca del ciclo económico, John M. Keynes, economía keynesiana, valor actual neto, eficiencia marginal del capital.

Clasificación JEL: E12, E22, E32, E43, E51, E58, G30.

> «A sound doctrine can win only by exploding the delusions of its adversaries».
>
> Ludwig von Mises

I
INTRODUCTION

Many critics of John Maynard Keynes attribute the success of his ideas to political appeal. No doubt, politicians are attracted to Keynesian economics because it can be used to justify profligate government spending. While important, political appeal alone cannot totally explain his triumph. Since Keynes's theory is purportedly an economic theory, it could have never prevailed without the economists. So why does Keynes's theory attract so many economists, and the most influential economists in particular? The answer is that influential economists in the banking system are attracted to Keynesian economics because it can serve as an economic justification for fractional reserve banking. The Keynesian interpretation of fractional reserve banking is an important reason Keynes's theory conquered the economics profession.

Economists were becoming increasingly critical of fractional reserve banking in the years before Keynes published his theory. Even Alfred Marshall, the founder of the Cambridge school of economics, argued fractional reserve banking amplifies the business cycle (Marshall 1879, 150-57). In 1912, Ludwig von Mises showed that fractional reserve banking is the fundamental cause of the business cycle (1912, 396-404). The Great Depression led many eminent American economists, including Irving Fisher, Frank Knight, Henry Simons, and Jacob Viner, to advocate abolishing fractional

reserve banking. In fact, it was the American backlash against fractional reserves in the early 1930s that led directly to the formation of the Chicago school of economics (Emmett 2002, ix). During the Great Depression, Senator Bronson Cutting and other politicians in the United States introduced legislation to abolish fractional reserve banking (Phillips 1992).

Keynes's theory was a godsend for the defenders of fractional reserves. Pre-Keynesian economics showed fractional reserve banking causes the business cycle and thereby makes society poorer than it otherwise would be. Before *The General Theory of Employment, Interest and Money* (1936), the defenders of fractional reserve banking had no answer to the pre-Keynesian analysis. But Keynes gave defenders of fractional reserves a weapon with which to combat the pre-Keynesian analysis. While the pre-Keynesian theory shows fractional reserve banking destroys wealth, the seemingly scientific New Economics purports to show that it is good for the economy. Rather than impoverishing society, fractional reserve banking actually creates prosperity in Keynes's system. In short, Keynes transformed fractional reserve bankers from economic villains who cause depressions into economic heroes who enrich society.[1] It is no wonder so many influential economists in the banking system have enthusiastically adopted Keynes's theory.

The purpose of this paper is to show how Keynesian economics represents a justification for fractional reserve banking and why this justification is fundamentally flawed. In contrast to other examinations of Keynes's theory, this paper will highlight the marginal efficiency of capital. Like Ludwig von Mises, Keynes was a financial economist who gave economic calculation a central role in his theory. But Mises and Keynes adopted different approaches to economic calculation: Mises used the net present value and Keynes used the marginal efficiency of capital. Importantly,

[1] It is worth noting that Keynes became a director of the Bank of England on September 18, 1941. At the Bretton Woods conference in 1944, Keynes refused to endorse Irving Fisher's 100 percent reserve plan and he was responsible for preventing the liquidation of the Bank for International Settlements (Keynes 1944). He was appointed British governor of the World Bank on February 19, 1946.

Keynes argued that the marginal efficiency of capital and the net present value yield identical results. Keynes was wrong: the marginal efficiency of capital contradicts the net present value, and, therefore, it is a logically defective approach to economic calculation. Consequently, Keynesian economics is not a viable justification for fractional reserve banking.

II
THE LOAN MARKET AND FRACTIONAL RESERVE BANKING

Important aspects of the pre-Keynesian theory and the Keynesian theory can be illustrated with the loan-market framework. Ludwig von Mises, Friedrich Hayek, and Murray N. Rothbard used the loan market to analyze fractional reserve banking.[2] Also, the loan-market diagram is the only diagram in *The General Theory* (CW 7, 180). This makes the loan market the natural starting point for any comparison of the pre-Keynesian and Keynesian interpretations of banking.

According to the loan-market theory, the interest rate is determined in the loan market by the supply and demand for loans. The interest rate is the price of a loan, and, just like all other prices, the interest rate is determined by supply and demand. Hence, the loan-market theory holds that the price of a loan—the interest rate—is determined by the supply and demand for loans.[3] Now, in a totally private economy with 100 percent reserve banking, the

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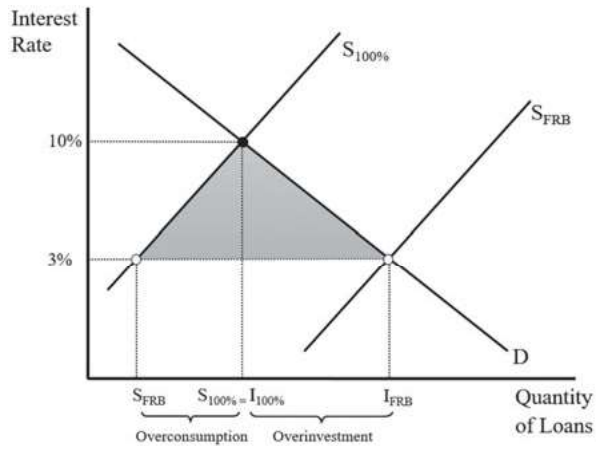
[2] Murray N. Rothbard (1962, 420-26) criticized the loanable-funds framework, but Mises, Hayek, and Rothbard himself used the loan market to explain the economic effects of fractional reserve banking. See Mises (1912, 307, 344, 388-401; 1928, 107; 1933a, 188; 1946, 194, 200; 1949, 524, 535, 544-50, 568, 579), Hayek (1931, 218, 264-65; 1941, 57, 324-25), and Rothbard (1963, 10, 77, 80; 1969, 83; 1973, 224, 233-34).

[3] A loan means «present goods are exchanged for future goods,» and the interest rate is the «price of present goods in relation to future goods» (Huerta de Soto 1998, 19, 285). Thus, the interest rate is the price of a loan. Moreover, the loan market is the time market used by Rothbard (1962, 388) if every exchange of present goods for future goods is included in the loan market. The only exception here is that consumer loans net out because the saving by the saver is offset by the consumption of the borrower. This means the loan-market framework excludes consumer loans (Garrison 2001, 36-37; 2005, 489). Otherwise, the loan market used here is the entire time market.

supply of loans equals saving and the demand for loans equals investment. Therefore, in the loan-market theory, the interest rate is the price that adjusts to bring saving and investment into equilibrium.

Figure 1 is the loan-market diagram. The supply curve, S100%, represents the supply of loans (saving) in an economy with 100 percent reserve banking. The demand curve, D, represents the demand for loans (investment). In an economy with 100 percent reserve banking, the equilibrium interest rate equalizes the amount of saving and the amount of investment. In figure 1, the x-axis shows the amount of saving equals the amount of investment, S100% = I100%, when the interest rate is 10%. Thus, 10% is the equilibrium interest rate.

FIGURE 1
THE LOAN MARKET WITH 100%
AND FRACTIONAL RESERVE BANKING



Savers are the only source of loans in an economy with 100 percent reserve banking. Importantly, however, an economy with a fractional reserve banking system has two sources of loans: savers and fractional reserve banks. According to the theory of multiple

deposit creation, fractional reserve banks increase the supply of loans by creating new money out of thin air. To demonstrate, imagine that the money multiplier is ten and the central bank makes a $100 open-market purchase. The central bank initiates the process of multiple deposit creation by injecting new reserves into the banking system. T-account 1 shows how multiple deposit creation affects the banking system's balance sheet. The left-hand side of T-account 1 shows that the supply of loans increases by $1,000. The right-hand side of T-account 1 shows that the $1,000 increase in the supply of loans is matched by an increase in the money supply (deposits) of $1,000.[4] In short, fractional reserve banking causes an increase in the supply of loans and an increase in the money supply.[5]

Banking system			
Assets		*Liabilities & Equity*	
Securities	–100	Deposits	+1,000
Reserves	+100		
Loans	+1,000		

T-account 1: Multiple deposit creation.

T-account 1 illustrates an important point: in addition to savers, banks are a source of loans in an economy with fractional reserve banking. This means the supply of loans is always greater under fractional reserve banking than under 100 percent reserve banking. In figure 1, the supply of loans with fractional reserve banking

[4] This paper focuses on the increase in the supply of loans on the left-hand side of the balance sheet. However, the increase in the money supply (deposits) on the right-hand side is also important. The right-hand side of the balance sheet shows that fractional reserve banking is inflationary. Thus, fractional reserve banking «exert[s] harmful effects on almost all third-party participants throughout the economic system» (Huerta de Soto 1998, 709).

[5] On multiple deposit creation, see Abel and Bernanke (2005, 523-26), Huerta de Soto (1998, 217-31), Krugman and Wells (2006, 730-32), Mankiw (2007, 510-15), Mishkin (2004, 366-71), and Rothbard (1983, 161-76).

is represented by the supply curve SFRB. Fractional reserve banking adds to the supply of loans from savers, so SFRB equals S100% plus the amount of loans from fractional reserve banks. Notice that SFRB is located to the right of S100%. This indicates that the supply of loans with fractional reserve banking is always greater than the supply of loans with 100 percent reserve banking.

The equilibrium interest rate under 100 percent reserve banking equalizes saving and investment. By contrast, fractional reserve banking prevents the interest rate from adjusting to bring saving and investment into equilibrium. The greater supply of loans under fractional reserve banking artificially reduces the interest rate below the equilibrium (natural) interest rate established under 100 percent banking. In figure 1, fractional reserve banking artificially reduces the interest rate to 3%. An artificially low interest rate necessarily affects the amount of saving and investment. First, the x-axis shows that fractional reserve banking crowds out saving so that the amount of saving falls from S100% to SFRB. Since people save less by consuming more, the amount of consumption rises. The distance between SFRB and S100% is called overconsumption. Second, the x-axis shows that fractional reserve banking increases the amount of investment from I100% to IFRB. The distance between I100% and IFRB is called overinvestment. In summary, the loan-market framework shows that fractional reserve banking artificially reduces the interest rate and thereby causes overconsumption and overinvestment.[6]

III
DISCOUNTED CASH FLOW ANALYSIS

Discounted cash flow analysis is the most important concept in finance. According to the theory of discounted cash flow (DCF)

[6] Figure 1 shows that fractional reserve banking suspends Say's law: «The entire Austrian theory of the economic cycle merely explains why, under certain circumstances, and as a consequence of credit expansion, Say's law repetitively fails to hold true» (Huerta de Soto 1998, 545, 580). On figure 1, see Garrison (1996; 2001, 36-40; 2005, 489-92).

analysis, the price of an investment project tends to equal the present value of the project's future cash flows. The present value of an investment project is completely dependent on three factors: (1) the size of the future cash flows, (2) the timing of the future cash flows, and (3) the interest rate. An example is the easiest way to illustrate the present value, and the classic guide to Keynes's economics uses the following example: «Consider the case of a [wooden bridge] costing $2,000 whose life is only three years and which offers the prospect of a series of yields of $1,000 in each of three years» (Hansen 1953, 118). The size of the cash flows is $1,000 and the timing of the cash flows is one cash flow each year for three years. Figure 1 shows the equilibrium interest is 10%. If the cash flows are discounted at the 10% interest rate, then the present value (PV) of the wooden bridge is $2,486.85.

Table 1
NPV OF WOODEN BRIDGE AT 10% INTEREST RATE

Time	*Cash Flow*	*Discounted Cash flow*
0	–2,000	–2,000
1	1,000	909.09
2	1,000	826.45
3	1,000	751.31
Present value (PV)		2,486.85
Net present value (NPV)		486.85
Marginal efficiency of capital (MEC)		23.38%

Investors make investment decisions by comparing the price of the investment to the present value. A project's net present value (NPV) equals the present value minus the price of the investment. As Mises wrote, the NPV is «the difference between the price paid … and its present value» (1952a, 156).[7] The NPV of the wooden

[7] Eugen von Böhm-Bawerk, Ludwig von Mises, and Murray N. Rothbard are the leading Austrian exponents of the NPV approach. The modern theoretical idea of the

bridge equals the present value ($2,486.85) minus the price ($2,000). The NPV of the wooden bridge is $486.85.

The basic NPV criterion holds that investors accept positive NPV projects and reject negative NPV projects. The NPV is a direct estimate of profit, and it shows how much an investor's wealth is expected to change by investing in the project. A project with a positive NPV is expected to increase wealth by the amount of the NPV, but a project with a negative NPV is expected to reduce wealth by the amount of the NPV. In the example above, the investor will invest in the wooden bridge because it is expected to increase wealth by $486.85. Since investors seek to enhance wealth, the basic NPV criterion states that investors must only invest in projects with positive NPVs.

Many economists have failed to recognize that the basic NPV criterion is incomplete. The basic NPV criterion alone does not give investors a rule for ranking mutually exclusive projects. In an advanced economy, there are almost always many different ways to produce the same good. Almost every investment project will have mutually exclusive alternatives because there are always short-term and long-term methods of production: «The alternatives constantly presented to most business men are between policies which may be distinguished as temporary and permanent» (Fisher 1907, 192).[8] Investors must only invest in projects with positive NPVs, but the essential decision facing investors is short-term or long-term investment.

The example above can be extended to illustrate the importance of short-term versus long-term investment. There are many different ways to build a bridge, so imagine the investor above can use steel instead of wood to build a more durable bridge. Table 2 is the

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NPV was originated by Eugen von Böhm-Bawerk and Alfred Marshall. But Irving Fisher deserves special recognition for his enormous contributions to the development of the NPV. On the origins of the NPV, see Böhm-Bawerk (1891, 304, 339-57; 1903, 35n1), Fetter (1904, 121; 1915, 235-313, 275n1), Fisher (1907, 25, 140, 148-64, 175, 190, 290, 409), and Marshall (1890, 516). See Rothbard (1962, 62-63, 297, 489) for a modern Austrian exposition of the NPV.

[8] On the importance of mutually exclusive projects, see Mises (1922, 123; 1933b, 142-43; 1949, 694-95, 926), Hayek (1941, 80, 89-90, 160-61) and Huerta de Soto (1998, 560-61).