

MISES' AND ROTHBARD'S INADEQUATE TREATMENT OF TECHNOLOGY

*—And why a correct understanding
of technology challenges the Austrian
theory of time preference—*

CHRISTOPH KLEIN*

Fecha de recepción: 18 de noviembre de 2019

Fecha de aceptación: 17 de marzo de 2020

Abstract: In their seminal treatises *Human Action* (1949) and *Man, Economy and State* (1962), Ludwig von Mises and Murray Rothbard deny that the rise in living standards achieved in the 19th and 20th century should be explained by technological progress and the resulting productivity increases. Rather, it is the praxeological category of time preference that allegedly explains in the increase in savings, capital accumulation and economic progress. The presented paper criticizes Mises's and Rothbard's dismissive treatment of technology and argues that time only acquires economic meaning in its reference to objects of choice. As choice implies an understanding of causal relations between means and ends, human action inevitably presupposes knowledge about the use of technology in its capacity to accommodate intertemporal plans. When people thus employ means to pursue ends, the time factor is already embodied in the feasible consumption and production patterns, which are nothing but the outcomes of the prevailing technological possibilities. When human action requires contextualization to acquire meaning, then the ideas of time and time preference cannot exist independently of the particular means-ends-framework.

Keywords: Technology, time preference, time, profit, saving

JEL Classification: B53, D46, D50, E22, O30

* Universidad Rey Juan Carlos.

Resumen: En sus tratados fundamentales *La acción humana* (1949) y *Hombre, economía y Estado* (1962), Ludwig von Mises y Murray Rothbard niegan que el aumento del nivel de vida alcanzado en los siglos XIX y XX deba explicarse por el progreso tecnológico y los aumentos de productividad resultantes. Más bien, es la categoría praxeológica de preferencia temporal la que supuestamente explica el aumento en el ahorro, la acumulación de capital y el progreso económico. El documento presentado critica el tratamiento despectivo de la tecnología por Mises y Rothbard y argumenta que el tiempo sólo adquiere un significado económico en su referencia a los objetos de selección. Como la selección implica una comprensión de las relaciones causales entre medios y fines, la acción humana presupone inevitablemente el conocimiento sobre el uso de la tecnología en su capacidad de acomodar planes intertemporales. Cuando las personas emplean medios para perseguir fines, el factor tiempo ya está incorporado en los patrones realizables de consumo y producción, que no son más que el resultado de las posibilidades tecnológicas imperantes. Cuando la acción humana requiere contextualización para adquirir significado, entonces las ideas de tiempo y preferencia de tiempo no pueden existir independientemente del marco particular de medios-fines.

Palabras clave: Tecnología, preferencia temporal, tiempo, ganancia, ahorro

Clasificación JEL: B53, D46, D50, E22, O30

I INTRODUCTION¹

In his magnum opus *Human Action* Ludwig von Mises (1949) made clear that economics is a science of means, not of ends.² Of course, the pursuit of ends implies an understanding of the means at man's disposal. An end will only stimulate action if the means

¹ An earlier version of this paper was presented at the 2nd ANNUAL MADRID CONFERENCE ON AUSTRIAN ECONOMICS, Universidad Rey Juan Carlos, on November 15th and 16th, 2018. I would like to thank Philipp Bagus and David Howden for their valuable input.

² If not indicated otherwise, all quotations of Ludwig von Mises and Murray Rothbard refer to their treatises *Human Action* (1949) and *Man, Economy and the State* (1962).

available can be employed in a way the decision-maker deems economically viable and practically feasible. The crux in our modern societies, however, is that ends are neither an isolated dimension, nor are they structurally stable. Rather, consumer ends are determined by practical, in particular technological, feasibilities available in the present and those imaginable in the future. As such, both the ends pursuable on a day-to-day basis by existing means and those perceivable to be realized by new (combinations of) means determine our plans and, thus, actions. Hence, when Mises states on page 21 that “[t]he judgments of value and the ultimate ends of human action are given for any kind of scientific inquiry; they are not open to any further analysis,” he refers to the subjective nature of value judgments from which he infers that economics takes the ultimate ends chosen by acting man as data. Economics only deals with the question of whether the means chosen are fit for the attainment of the ends aimed at. It is here where I identify an imprecision in Mises’s position: it is only the *value judgment* in its role of informing choice that constitutes data for the economist, but not necessarily the ends themselves in their causal relationship to means.

When I refer to ends in this paper, I refer to sub-ends or consumer ends which can be traced back to what Mises named “ultimate ends.” We might concur with Mises that ultimate ends are outside the realm of economics, but it is the hypothesis of this paper that it is not ultimate ends economists (ought to) look at, but consumer ends. These sub-ends are the categories on which all consumer choice and entrepreneurial action in modern capitalist societies is premised. On page one of his *Principles of Economics*, Carl Menger (1871) advances the well-known definition of the four prerequisites that have to be —simultaneously— present for a thing to be a good: “A human need; such properties as render the thing capable of being brought into a causal connection with the satisfaction of this need; human knowledge of this causal connection; command of the thing sufficient to direct it to the satisfaction of the need.”

The key term is “causal connection.” The products and services consumers buy are nothing but proxies through which they satisfy those sub-ends. Successful entrepreneurs understand these causal

connections and come up with technological ideas to deliver better, cheaper or more complementary products. Practical economics has to look at and understand sub-ends. Sub-ends crucial to human existence and happiness are to communicate; to feel secure (shelter, safety); to be healthy (nutrition, medical services, exercise); to travel (mobility, curiosity); to learn (access to information, becoming knowledgeable); to be comfortable (access to water, energy, sewerage); to belong (family, friends, clubs, social circles etc.), to name some of the important categories.

It was Lachmann who urged that the task of economics “is to make the world around us intelligible in terms of human action and the pursuit of plans” (1977, p. 261). Making something intelligible is interpreting what we observe with the aim of making sense of action in a teleological way, that is, the economist applies the method of *Verstehen* of Max Weber (on which Lachmann draws heavily). Though Mises is correct in saying that we are only able to observe action (and not motives), however, the economist cannot help but interpret the observed actors’ employment of means vis-à-vis their assumed ends. Hayek (1936) made a similar point by stressing that Misesian praxeology is unable to shed light on human interaction in the market without drawing on empirical or ideal type assumptions that make intelligible the way in which people learn (i.e. acquire knowledge) and form expectations about how to employ means to achieve ends. In a similar fashion, Selgin (1990, p. 29) argues that economics “must establish and examine the mechanisms of social causation. It must show that actors in the social world may become reasonably informed of the valuations of other individuals so that they may direct their actions well enough to achieve their desired results. Unless this is possible, the formal conclusions of economics, and of praxeology in particular, remain purely hypothetical.” It is the objective of this paper to establish the fact of people employing technology —not *how* it functions or is employed technically— as a praxeological category and analyze its role for our understanding of economics.

Mises and Rothbard have lived and published their treatises in a time of enormous increases of living standards for which few would reject the argument that technological progress played a leading role. As prosperity increases are accompanied by higher incomes, greater

saving ratios and capital accumulation, it should come as a surprise that technology is systematically subordinated as a causal factor in their edifices of thought. Instead, it is the phenomenon of time preference that is identified as the reason and originary source of increasing living standards. In the following section II, I will first analyze Mises's and Rothbard's take on technology. We will see that their understanding of technology is at odds with the action axiom as the central tenet of Austrian Economics. Without making any empirical reference to knowledge categories, —that is, an understanding of technology and its implications for increases in the use-value of consumption goods—, savings and capital accumulation cannot be made intelligible in a meaningful way.³ I then analyze what the authors (inadequate) treatment of technology implies for the explanation of the economic categories of time preference and profit to which sections III and IV are dedicated. Before reaching conclusions, section V synthesizes the categories of technology, time, and profit, of which none can be explained without the others. Not only is technology a consequence of the entrepreneurial nature of human action. It also fills the notions of time and profit with economic meaning. One of the goals of this paper is to show the great efforts that Mises and Rothbard undertake in order to prove the subsidiary nature of technology. To this end, I quote some passages from their treatises that exhibit surprisingly convoluted reasoning. In contrast to their understanding, I argue that the use of technology is the key praxeological category to explain economic development —and not time preference.

II TECHNOLOGY

1. Mises on Technology

In *Human Action*, Mises elaborates his views on technology in his critique of Marx who held that it is not human will and reason but

³ This paper does not deal with the effects of “too much” investment in technology and its potential role in catalyzing business cycles —as, for instance, elaborated on by Hayek (1931, 1939) and Garrison (2000).

Geist that causes man to put forward and realize the technological ideas adequate to the stage in which he lives. One would certainly think that Mises had embraced man's cognitive abilities to aim at higher technological states. But this seems not to be the case as we learn on page 37: "Magic is in a broader sense a variety of technology. ... [t]he concept of action does not imply that the action is guided by a correct theory and a technology promising success and that it attains the end aimed at." Though it might be unfair to take this too literally, relating technology to magic is certainly at odds with purposeful action. Of course, as Mises says, the employment of one or another technology —as any other action— might fail. Yet it appears that Mises entertains the idea that the emergence of new technologies is disconnected from the otherwise strictly teleological nature of human action.

The only substantial passage on technology found on pages 208 to 210 seems to corroborate the above to some degree: "Technology operates with countable and measurable quantities of external things and effects; it knows causal relations between them, but it is foreign to their relevance to human wants and desires. Its field is that of objective use-value only." The reason is that technology cannot help to solve the *economic* problem for man to find the best (economically) possible way of applying his means to alternative ends. Technology can only inform us about causal relations between external things. Indeed, technology by itself cannot inform choice. It does, however, enter people's value judgments through the backdoor since choosing, for instance, between various modes of transport, necessarily presupposes an understanding of the technological features embedded in cars or trains, which in the end determine the use-value of goods.

Mises is further correct in identifying the explanatory character of technology in the *how*, that is *how* means could be employed for certain purposes, but not in the *how to best* employ means to achieve one's ends. Accordingly, the economic problem hinges on what acting man subjectively perceives as the *best* among the means available to achieve his ends. Again it appears that Mises contemplates two distinct worlds: On the one side the vast arrays of technological possibilities, on the other side acting man's subjective goals. But, how will man ever be able to assess what is *best* without an understanding

of how this could be achieved in practical terms, that is, what technological features embedded in goods are available to attain his goals? It was Hayek who more than any other scholar stressed the importance of experience and learning. Mises seems to concur with the Hayekian view when he states that the planning of economic actors must be premised on knowing the best method and, self-evidently, that their plans if executed actually make them better off given other technically realizable projects. Mises (p. 209), however, holds that such comparisons can only be made by the use of money prices. This assertion does not seem to be correct.

First, in most cases subjective valuation is not possible without—as Mises himself states—the knowledge *of* technology. Thus, the understanding *of* technology, in a sense of feasible alternatives, in the context of the ends economic actors pursue precedes any monetary valuation. The German citizen living in Berlin knows that there are better ways of travelling to a concert in New York than by car. The desire to visit a concert in New York would not arise without alternatives that can be objectively understood in their causal ability to render the pursuit of sub-ends practically, that is, technologically, feasible. The economic consideration of assessing price and budget is subordinated to understanding the problem's nature first. Second, when the knowledge of objective use-value features informs choice, then the cognitive tasks of appraising the technically best choice and subjective valuation cannot be separated. Human action based on subjective value judgments needs the reference point of knowledge about the past, that is an understanding what has worked and what not. Selgin (1990, p. 61) makes the point that praxeology treats the category of causality, including mental and social causality, as *a priori*. Overall, matters of technology are conspicuously absent in Mises' oeuvre and one cannot help but guess that he shuns technological questions due to the prominent role they occupy in mainstream economics.

2. Rothbard on Technology

In contrast to Mises, Rothbard explicitly defines technology as a category of human action—but not of praxeology. Rothbard also

applies a much more clear-cut delineation of human action and praxeology. While Mises's brand of praxeology quite generally deals with the actions of individual man, Rothbard (p. 74) devised five categories of human action of which he defined technology as how to use means to arrive at ends and praxeology as the formal implications of the fact that men use means to attain various chosen ends. We could restate the definition of praxeology as the formal implications of the fact that men apply technological knowledge to attain their ends. Ends would simply not exist if it were not for technology to allow men to pursue them by applying means in different ways at different times. It follows that the use of technology must be a praxeological category. If now the *how* of using technology is outside of the praxeological realm, but the economist still wants to understand the implications of using technology, then a methodological question arises. How can the implications of something that we use be understood if we do not know how that something is used?

If we did not make sense of the *how* of technology in the pursuit of specific ends, the economist could only state the following: "Mr. Jones travels from Berlin to New York for which he paid US\$500. It must be the right choice for him as he could have done something else with the money." The praxeologist is not interested in whether Mr. Jones took a plane or drove with his car. He takes the ends as a given and considers the choice of means as subjectively derived. Interestingly, it becomes a praxeological matter when the state increases the tax on kerosene keeping the one on petrol stable. Now, the praxeologist uses the economic concepts of relative prices and marginal utilities to argue against the tax as an intervention which would make airfares more expensive and the use of cars relatively less expensive.⁴ And, of course, he will contextualize his critique. If praxeology takes its action axiom seriously, we have to understand what people do in their unceasing quest to attain higher standards of living. It is now interesting to see, that Rothbard's first elaboration on the role of technology on page 542 offers a completely different reading:

⁴ The praxeologist trained in arguing from the marginalist ERE perspective might come to the astute conclusion that relatively more people would now drive to New York.

“Technological inventions have received a far more important place than they deserve in economic theory. ... Technology does, of course, set a limit on production; no production process could be used at all without the technological knowledge of how to put it into operation. But while knowledge is a limit, capital is a narrower limit. It is logically obvious that while capital cannot engage in production beyond the limits of existing available knowledge, knowledge can and does exist without the capital necessary to put it to use. Technology and its improvement, therefore, play no direct role in the investment and production process; technology, while important, must always work through an investment of capital.”

The relative unimportance of technology in production as compared to the supply of saved capital becomes evident, as Mises points out, simply by looking at the “backward” or “underdeveloped” countries. What is lacking in these countries is not knowledge of Western technological methods (“know-how”); that is learned easily enough. The service of imparting knowledge, in person or in book form, can be paid for readily. What is lacking is the supply of saved capital needed to put the advanced methods into effect.”

In the first paragraph, Rothbard makes the point that while production is limited by the existing state of knowledge, capital is the narrower limit. This is to say that there are always more entrepreneurial plans, representing specific technological ideas or knowledge, waiting to be realized than available capital. Even if we were to agree for intuitive or empirical reasons, Rothbard's assertion cannot explain action. It is debatable, to say the least, whether we can or should compare technology with notions of capital (values) from an epistemological viewpoint. Rothbard himself stresses the physical notion of technology and that its eventual employment in productive processes cannot be explained by technology itself. There is no basis for the comparison of a result of a valuation exercise (as implied in the notion of capital) and the objects of this valuation, that is, technology. Hence comparing the limits of knowledge with the limits of capital is futile.

The problematic character of this contrasting juxtaposition becomes evident in the second paragraph quoted above, in which Rothbard identifies the reason for the “relative unimportance of

technology” compared to the “supply of saved capital” by way of analyzing the state of underdeveloped countries. This simply boils down to stating that knowledge could be transferred successfully if it wasn’t for the lack of capital. Here Rothbard joins the choir of those naïve post-WW2 development economists who promoted simplistic developmental ideas: If the provision of capital were complemented by the transfer of corresponding knowledge (carried out by Western experts), then higher prosperity levels could be achieved. The problem, however, is that knowledge itself is the essential foundation for building a capital base. Only if the productivity levels of societies increase income above subsistence thresholds will savings lead to the development of financial intermediation through which savings are made available to the entrepreneurs who invest in capital projects. It is learning in the form of improved technological knowledge, and the resulting (expected) prosperity gains, that makes intelligible the steadily increasing flow of savings being intermediated through financial markets to capitalists. History has shown that neither the transfer of knowledge nor capital donations to low-income countries sparked off development.

A few paragraphs further, in the sub-section named “The Adoption of a New Technique” on page 544, Rothbard states that at all times firms use old production methods while a shelf of available and more productive techniques will be available. One of the reasons for this could be that legacy investments and the resulting capital structure impose constraints on the extent to which the entrepreneur can adopt new techniques. The employment of a new technique might not be a feasible option for the firm due to constraints imposed by its existing structure of production. Of course, as Rothbard points out, investors are prone to entrepreneurial error. It might turn out that the productive setup, which may have yielded handsome profits for x periods in the past, turns out to be loss-making when the past productive setup is unable to churn out the products in the following y periods in a profitable way. This, however, can only happen if consumers demand products which are different: they might be able to buy the same goods at a lower price; they may buy better quality products; they may be able substitute the product of one productive branch for an alternative

from an entirely different branch, for example using cars instead of carriages, boarding a plane and not a ship, using Uber instead of purchasing or leasing cars.

Rothbard states that many entrepreneurs are not innovators but simply use existing technologies. However the fact that innovation is only one of the activities performed by the entrepreneur does not justify his jump to the conclusion that production output is limited by the “supply of capital goods rather than by available technological know-how” (p. 546). Indeed, it does not matter for our understanding of economic progress which entrepreneur invents or first implements a market-ready technological idea and which ones follow suit. The employment of technologies can only be seen in the context of each entrepreneur’s specific line of production and as such has to be subjectively assessed by performing a forward-looking cash-flow analysis. Rothbard would certainly agree. Yet it appears that both Rothbard and Mises are desperately trying to separate matters of technology from economics. As a result, their economic analysis – often assuming an ERE (evenly rotating economy) equilibrium concept – takes technology as a given that can be readily applied. Though recognized as a category of human action, the *how* of technology is said to be irrelevant for the analysis of the implications of (applying) technology. The problematic character of sidelining technology from economics reveals itself in one of the Austrian School’s core praxeological categories: time preference.

III TIME PREFERENCE

1. Mises on Time Preference

While the concept of time preference as the determining factor of capital investments and, thus, the phenomenon of interest rates, has been ubiquitous in Austrian literature up to the present day, it is hard to find scholarly pieces that make an effort to explain the phenomenon of time preference in rigorous terms. In *Human Action*, Mises uses the concept of ‘time preference’ on page 293,

326, 332, 336 and 380, each time referring to “due allowance being made for time preference.” In XVIII, “Action in the Passing of Time”, Mises introduces the second sub-chapter “Time Preference as an Essential Requisite of Action” as follows: “Satisfaction of a want in the nearer future is, other things being equal, preferred to that in the farther distant future. Present goods are more valuable than future goods” (p. 482f). As true as this is, his treatment lacks a deeper elaboration of what could explain the underlying reasons for consumers to come to the conclusion that the expected satisfaction associated with goods consumed in the future is more highly valued.

In sub-chapter 3, “Capital Goods”, where he states that “[t]he sine qua non of any lengthening of the processes of production adopted is saving, i.e., an excess of current production over current consumption. Saving is the first step on the way toward improvement of material well-being and toward every further progress on this way” (p. 487). Here Mises looks at man as the ambitious being who directs his actions towards achieving higher prosperity in future periods. Technology, however, is ruled out as the explanatory factor for the postponement of consumption and the accumulation of goods as later consumption would also occur without the introduction of new technologies. Mises explains that “[t]he higher productivity of such processes consuming more time strengthens considerably the propensity to save.” In other words: the higher productivity of postponing explains the propensity to postpone (= saving). Miraculously, in Mises’s world postponing itself becomes productive. He then jumps to the conclusion that “[i]f acting man, other conditions being equal, were not to prefer, without exception, consumption in the nearer future to that in the remoter future, he would always save, never consume. What restricts the amount of saving and investment is time preference” (p. 487).

Let’s restate what Mises says here: The levels of capital accumulation responsible for the prosperity levels achieved in Western market economies are to be attributed to time preference (alone). This is an odd way of reasoning. Mises seems to carefully navigate around the cliff of the pending question, not only of what the concept of time preference is, but even more so of what brings about a lowering of the rate of time preference and how this rate relates

back to technological progress. Mises approaches human logic in the following way: "If that if acting man, other conditions being equal, were not to prefer, without exception, consumption in the nearer future to that in the remoter future, he would always save, never consume. What restricts the amount of saving and investment is time preference" (1949, p. 487). I would rather formulate that once man has satisfied his subsistence needs (the judgment of which by itself is subjective and requires knowledge) he applies more advanced means to satisfy ever more sophisticated ends. From which angle do we approach the logic of human action? By shedding light on the relationship of means and ends as *the* praxeological categories of purposeful behavior or by introducing subsidiary assumptions such as time preference from which we infer back? We now have a look at what Rothbard has to say about time preference.

2. Rothbard on Time Preference

Firstly, in the introductory part of *Man, Economy, and the State*, Salerno correctly observes that Mises avoided an in-depth analysis of the role of time in the structure of production. In contrast, Rothbard goes at great length to flesh out the implications of time for human action concerning consumption and production. Time preference is mentioned as early as on page 15 in chapter 1, "Fundamentals of Human Action": "This universal fact of time preference at any point of time, and for any action, the actor most prefers to have his end attained in the immediate present." In chapter 1.9, "The Formation of Capital", he introduces Mr. Crusoe who upon his arrival immediately begins to think about how to make his life better, that is he searches for productive techniques to enable him to consume more while working less (relatively). So Crusoe invests some of his valuable leisure time producing the stick which ramps up his berry harvest. Crusoe has somehow figured out that the role of capital is to improve the lives of men by producing ever-better consumer goods (p. 52).

For human action to exhibit not just instinctive but purposeful behavior, Crusoe's action must have been a conscious decision

taking into account the cause and effects of his actions. He must have had an *idea* (from his previous life) of how to employ the scarce means on his island, including his labor, in a way that could make him better off. Hence, if time preference is universal, then certainly figuring out the specific means-ends-relationships in men's natural habitat —that is, understanding technology— is, too. If the economist now asks the question why men behave in such a way in the first place, and how means and ends interrelate, the keen praxeologist is quick to call him to order: "Praxeology and economics deal with given ends and with the formal implications of the fact that men have ends and employ means to attain them" (p. 73). So, yes, indeed economics does not deal with psychological processes that may or may not inform the way we act, but it ought to make human action intelligible in the respective means-ends-frameworks. Therefore I contend that it is neither a psychological nor a subjective question to ask why man economizes. It is rather an anthropological (or evolutionary) matter that man —in contrast to all other living creatures— purposefully applies means to ends in time. In the same breath, we can then say that only human creatures understand the implications of time for their actions.

The pertinent question to ask is what the constituent elements of human action are that are relevant to the praxeological edifice. In contrast to animals, the acting man knows: "Time is on my side, yes it is."⁵ He purposefully uses *his* time as a *meta-production factor* whereas animals follow their instincts. Every man owns *his* time and employs it inevitably in the course of action. Consequently, purpose implies time as the application of means requires a time lapse, however short, before ends can be achieved. The social scientist knows that the concept of time is subjective and must not be confused with Newtonian time. For humans, a year in his twenties is different from one in his fifties or nineties, not because it would not have 365 days but because we exhaust time while living which explains its fundamentally relative, non-linear character. It follows that without the conscious understanding and employment of (the

⁵ Song written by Norman Meade made popular by Rolling Stones in 1964.

production factor of) time, human behavior cannot be purposeful in the first place. Employing time, I contend, is employing technology.

As early as page three Rothbard states that for an action to be initiated, it is not sufficient for man to have unachieved ends he seeks to fulfill. An idea or some know-how is required to explain action. Rothbard refers to an image of a desired end and "technological ideas" of how to get there. He further explains that man prefers his ends to be achieved in the shortest possible time due to the fact that time is always scarce and thus is a means to be economized (p. 15). The problem with this assertion is that it is tautological and does not explain time preference. Time preference cannot be logically traced back to the first purposeful actor by referring to scarcity of time, but only by introducing the advent of precisely a "technological idea." Instead of putting the cart before the horse, the question is what actually makes time scarce in the first place. Or asked differently, why do men not exhibit a time preference of hundred percent? The answer, obviously, is because it is a basic feature of human nature to aim at a better state of being at any given point of time in life. Only with this in mind can the concepts of both time and means be made intelligible as categories of economic action. Without employable means across time, no economic end is conceivable, and thus no purposeful action. Now putting the horse before the cart, it is "technological ideas" that underpin any action. An end can only become a trigger for action if means for achieving a specific end are available and can be perceived in a causal way.

This is a fundamental point: the existence of time preference, meaning that it is lower than one hundred percent, implies that man knows about and employs technology. Rothbard's idea of the developmental process, however, starts the other way round: "Lower time preferences will increase capital investment and thereby lengthen the structure of production" (p. 626). In their role as the necessary way stations on the road to higher total production and civilized standards of living, capital investment play the important role to explain increased production and "not so much technological improvement." As already discussed in the technology section, according to Rothbard, capital is the scarce factor because there is never enough to exhaust all technological opportunities

available. Otherwise it could not be explained why many firms still use old or simple technologies. He argues that these entrepreneurs would know how to improve their production if they had the capital resources. While Rothbard acknowledges that technology is very important “at no given time does it play a direct role, since the narrower limit on production is always the supply of capital” (p. 626). Again, this is a curious way of economic reasoning, not least because when companies optimize their production processes and supply chains, they by and large do so with given means of (finance) capital.

To finish off this section, let us analyze Rothbard’s claim that lower time preferences increase capital investment and thereby lengthen the structure of production. Surely this is an empirical fact looking at capital accumulation levels that happened historically in the Western world from the 18th century onwards. The curious fact about Rothbard’s causal chain is that it reads as if lower time preferences preceded capital investment. Without positive expectations about the future, which must have been premised on technological ideas that entrepreneurs expected to increase people’s living standards, however, no additional capital would have been made available. Hence, the lowering of time preference as a precursor to capital investment inexplicably happens without recourse to plans and expectations associated with purposeful acting. Like Mises, Rothbard contrasts technology with savings aka time preference, the latter of which accounts for the limits of capital (and savings). If technology does not play a *direct* role, then we might well read this to say that technological ideas are a mere corollary of time preference.

But even without challenging the above: are lower time preferences a necessity for further prosperity? Or to pose the question in a different way: is it not imaginable (and desirable) that increasing capital levels should occur in lockstep with unchanged or shortened roundabout structures? The problem in Rothbard’s analysis is that his line of reasoning, again, is not premised on individual human action but on taking the end result ‘lengthened capital structure’ as a given (historically observed result) from which he infers back to the logically matching explanation in the assumed

ERE world.⁶ In real markets, it is not so much the saving consumer who by lowering his time preference determines the path to his own higher prosperity levels; instead investors must be convinced by entrepreneurs that the suggested technological ideas embedded in their business proposals are conducive to achieving consumer goals. The entrepreneur's function is to envision consumer wants and convince investors of the merits of their value proposition. In the end, the investors are the same people that consume the services.

The question whether or not our future prosperity hinges on an ever-lengthening structure of production is impossible to answer. It is perfectly in line with economic theory to imagine higher prosperity levels coinciding with shorter average production periods, for instance due to better techniques of recourse utilization, and relatively lower savings rates while still more capital—in absolute terms—is employed. How this plays out exactly hinges on the nature of technological progress and its implications for the capital structure in terms of amortization periods and levels of capital intensity.⁷ Like Mises, Rothbard entertains the curious notion that economic progress is a result of time preference, somehow compelling people to start saving without looking at anything else, and not, as common sense might suggest, that entrepreneurship and the possibility of technological innovation motivate saving in the first place.

3. The Difference between Time and Time Preference

What has not yet been addressed is what *time* itself is and what its understanding entails for praxeology. For the purposes of this paper, I only touch lightly on the complex phenomenon of time. The key question is whether time can be thought about independently of

⁶ In this respect, any model world, whether Walrasian or the Austrian ERE, is prone to deliver results already implied in the assumed structure of the model.

⁷ In his critique of the Austrian theory of time preference, Hülsmann (2012) advances similar points, in particular that Rothbard fails to distinguish between the width and length of the structure of production.

consciously acting man. Mises's (p. 99) view is that the concepts of change and of time are inseparably linked together. As action aims at change, it is in the temporal order. Mises advances a somewhat peculiar idea that it is man's acting itself that provides him with the notion of time. Thus, in Mises's eyes action makes man *aware* of the flux of time and not, as one might think, the other way around: time as a means and motivational force of action. Man only becomes *aware* of time. In the same chapter, man economizes on time because it is as scarce as other factors. This is a much clearer exposition where Mises establishes time as a (production) factor. Yet, he concludes with the curious (apodictic?) assertion that when man economizes on time he does so independently from his economization of goods and services. This can only be interpreted saying that when man decides how to choose among various ends there are two different processes taking place in his mind: he is able to perform the valuation of the employment of production factors without taking into account the results of the valuation of (how to use) his time. Mises does not further elaborate on why such a curious dichotomy could or should be assumed, probably for good reasons since time is a non-isolable feature of production and consumption. How would one make sense of time without specific reference to consumptive and productive processes, that is, without reference to purposeful action? A good is a particular good also because it comes with time features specifying its consumptive and productive properties.⁸

In the Austrian School time preference is an apodictic category derived from praxeological reasoning and thus considered as a category of human action (Mises, 1949). Whereas preferences such as higher prosperity, more fairness or better security are necessarily contingent on objects of choice, which can be realized at

⁸ The consumption profile of a particular good, thus its use-value, has many time-related dimensions such as quality, quantity, intensity, recurrence or its combined consumption with other goods. Think of an iPhone: it is more expensive than other phones, hence one has to work more hours to afford it. One iPhone is enough and most people upgrade it every two years. It is used very intensely and interfaces with other products such as wireless speakers or the TV. Furthermore, it enables the consumption of other services such as Uber, banking, social platforms and car navigation, to name a few, through specific applications that in one way or another change the time-structure of consumption.

different points in time, Mises' notion of *time preference* seems to suggest an understanding of a self-recursive stand-alone category: the economic meaning of time emerges due to the fact that time is finite resource. Everything else being equal, we economize on time because we always strive to achieve our goals rather earlier than later. One of the remarkable aspects of the discussion about time preference is that few scholars have tried to illuminate time preference by differentiating between *time* and *time preference*. From the title of the widely read book *The Economics of Time and Uncertainty* by O'Driscoll and Rizzo (1985) the reader would expect to see the notion of *time* at the center of the authors' expositions. This, however, is not the case. Like Mises, they make the important distinction between the concepts of Newtonian and subjective time, but this does not bring us closer to understanding *economic time* or time as an element of human action. Instead, the authors jump straight to the phenomena uncertainty and ignorance, which they understand as derivatives or corollaries of time, and elaborate on how institutions and entrepreneurial discovery cope to make life predictable.

We now enter the discussion about the Austrian notion of time preference, Mises (p. 480f) arguably providing the understanding most widely shared. In —to my knowledge— the only monograph dedicated to *time preference*, edited and introduced by Jeffrey Herbenner in a fifty-page essay, time preference is brought in through the phenomenon of the interest rate. No stand-alone definition is advanced. Time preference is explained as “implied by his [man's] temporality” (2011, p. 14). He furthermore quotes Menger's assertion that “the restraint on economic progress comes from a phenomenon ‘deeply embedded in human nature,’ which is the desire to have present desires satisfied over future desires” (ibid, p. 16). Again, time preference as a human condition is derived from the fact that we are humans. In the economic context, however, to make any action intelligible, we need to introduce the additional categories of plan and choice.

The choice of goods is contingent of an acting person's time, his or her time. And *his* or *her* time is implied in the choice of consumer goods which carry time as a feature, both in terms of the technological nature of the good itself, for instance the lifetime of

a car, and the ‘technological’ nature of man at a given point in time, for instance most people will not be able to climb the Mount Everest with 87 years. The conclusion is that consumers own, use, mold and exhaust time (quite similar to a capital good) through the choice of goods, which is in sharp contrast to Mises’s idea of becoming aware of time. As a consequence, time preference is *not* the preference of *earlier* or *later* time, but refers to goods that can be consumed at earlier or later points in time. Time itself cannot be preferred. Man prefers certain goods to others. And he may prefer the *same* goods earlier rather than later. The conscious notion of time only emerges in the context of alternative courses of action.

Herbener skips such elaborations, dealing rather with one of the central implications of time preference, namely that man discounts: “The discount of future money relative to present money is interest and determines the pure, or time preference, rate of interest” (2011, p. 15). Here time preference is now equated with an observable market price, the interest rate. Herbener refers to Böhm-Bawerk who saw interest as a phenomenon that allows for both time preference and value productivity. While Herbener agrees, he makes an important distinction: “The pure time preference theory, in contrast to the simple version of time preference makes no claim about the amount of goods being generated in production, but only about the net (monetary) income earned from trading present money for future money” (2011, p. 21). As a consequence, the capitalist’s function is merely a time function for which he receives an *agio* aka interest income; “this interest income is not derived from concrete heterogeneous capital goods, but from *the generalized investment of time*” (2011, italics added).⁹

⁹ Note that in the ERE world, no capital markets can exist as all future cash flows of an imaginary investment are discounted with a pure rate of interest that exactly equals the expected rate of profit as represented by the discount factor. Consequently, the net present value of those investments is zero. To save the concept of the capitalist, he does not receive income from his investment but from the “*generalized investment of time*” (whatever that mythical thing is supposed to be). As this income does not constitute profit, one wonders how purposeful action could be perceived at all. If the action axiom stands at the beginning of economic theory, then economic theory must not rest on an equilibrium concept that cannot account for action in the first place.

This construction, of course, is only tenable in the ERE where all entrepreneurial profits are competed away and, thus, former entrepreneurs cease to be entrepreneurs. As action is difficult to conceive without actors, i.e., entrepreneurs, is it equally difficult to figure out how the economic system progresses from one stage to the next. Even more puzzling is the question of what actually compels man to act in the first place when the pure rate of interest is simply a relationship between the present and the future, hence explicitly *not* a profit that, according to Mises's and Rothbard's own definition, is exactly what inspires man to act purposefully in the first place. Without profit, then, the pure version of time preference seems to suggest that time itself is sufficient to establish action. This, however, is nonsensical as people necessarily effect exchanges of goods, i.e., means for ends, at different points of time (even when their preferences do not change). It follows that the time factor is an integral feature of any consumer good, which cannot be isolated even if we could assume two physically identical goods.

In his paper challenging time preference and the Austrian theory of interest, Hülsmann (2002) argues along similar lines: "The very fact ... that two goods exist at different points of time makes them heterogeneous goods." Hülsmann suggests that two identical chocolate bars become different *economic* goods when I can eat one today and the other next month because of the time factor. I would argue exactly the other way round: chocolate is chocolate because I can choose between eating it either today or next month. Since choice implies the existence and understanding of alternatives at our disposal, then choice is a result of knowing about technological features in their ability to satisfy our sub-ends—including their specific time-related features. As time is finite for each of us for biological reasons, it can be said that biology imposes a technological constraint on what we can do when, where, for how long, how often, at what intensity and so on. Biology, then, in combination with the scarcity of means and limits of knowledge, constitutes the bundle of constraints that opens up the space for opportunity in the first place.

Lachmann (1959) stressed that: "Time and knowledge belong together. The creative acts of the mind need not be reflected in

changing preferences, but they cannot but be reflected in acts grasping experience and constituting objects of knowledge and plans of action. All such acts bear the stamp of the individuality of the actor." Hence, the economic meaning of time arises as a corollary of want-satisfaction. As a logical result, the objects of choice bear the imprint of time through their particular technologically-determined use features. Consequently, there cannot be a preference of time without individuals having knowledge and holding expectations about their future choices. The notion of time preference, as understood by Mises and Rothbard, cannot make intelligible economics.

4. Why is the 'Time Preference' not Hundred Percent?

For purposes of the following discussion, I define a *'time preference' of hundred percent* as the preference to instantly consume all goods provided by nature. When until up a certain stage of human evolution the notion of time had no economic meaning due to the fact that our precursors were driven by instinct as opposed to purpose, then we might hypothesize a specific cognitive event at a specific point in time from which onwards people began to plan and act in a conscious manner. Consider the following experiment of thought in the fashion of Menger's regression theorem of the origin of money and assume the first *purposeful* actor to appear on the scene some ten thousands years ago. Our man might well consume hundred percent of what he hunts and gathers and still would be considered a purposeful actor in that he economizes on his own productive resources and its 'maintenance' requirements, for instance hunting to eat and resting to recover. Even without production in a sense of foregone consumption, the conscious use of time is already an outcome of man's implied productivity. Thus a preference of time the actor exhibits in certain situations is necessarily a preference of doing A and not B by economizing on his resources. For sure, this man knew that he cannot hunt twenty-three hours and eat for the remaining hour, which is nothing else than knowing about his body's productive capabilities and constraints – technology in its most simplified form.

Now consider our man to become the first grain farmer who started to save some of his harvested seeds to increase output. Did the actor forego consumption because *of* the scarcity of time alone or because he understood that his productive knowledge allowed him to better economize on his available resources *in* time? The fact that only applied knowledge can explain economizing action, implies the possibility of alternatives of choice. Consequently, the economization of time, in a sense of the (time) preference of consuming less than hundred percent of consumable goods, is a result of productive knowledge consciously applied by actors with the expectation of achieving higher levels of prosperity. In other words: if we talk about time preference at all, then we can only do so by assuming the existence of a plan B for the pursuit of an end, which is nothing else than an alternative technological approach to achieve one's goals.

Hülsmann's (2002) theory of interest is premised on the Böhm-Bawerkian understanding that human action necessary implies a value spread between chosen ends and means: originary interest. Because all people act all the time, originary interest pervades the market from which he infers that there must also be a monetary spread between selling prices and factor costs (allowing entrepreneurs to pay money interest). Here Hülsmann's analysis ends. In typical praxeological fashion, he accepts the ends underpinning human action as a priori. Means, for him, is merely the thing or the action that stands between the pre-action present state and post-action realized state. Furthermore, he states that originary interest is "a structural feature of human action itself," but "not a manifestation of human action in the world of physical things."

It is easy to agree with the first part as it merely says that people act purposefully. In the second part Hülsmann seems to say that the concrete physical nature of means is not an end in itself and as such cannot explain originary interest. On the one hand, this is self-evidently correct since in the end well-being refers to psychic states and not physical things we use. On the other hand, he appears to pursue the same attempt to delineate technology from economics we have seen in the works of Mises and Rothbard. The point to make is that action cannot be explained in the first place

without an understanding of the means-ends framework —the causal connections between means and ends— within which people act. The state of technology around us, for instance in form of the computer I'm typing on, cannot but be the manifestation of the expected psychic gains (or losses) as a result of past purposeful actions —what else could it be? Hence, the (expected) value spread, or profit, that informs action is firmly rooted in the way we apply means given alternative ends taking into account what we achieved in the past.¹⁰ The conclusion of this section is that —praxeologically speaking— the preference of time manifests itself in the preference of one thing over another.

IV PROFIT

1. What is Profit?

The Online Etymology Dictionary traces the term profit back to the Latin *profectus* “profit, advance, increase, success, progress,” which is the noun use of past participle of *proficere* “accomplish, make progress; be useful, do good; have success, profit.” *Proficere* is made up of *pro* “forward” and *facere* “to make, do.” It is well worth stressing that the etymological notion of profit is strictly rooted in forward-looking human action whereas today's meaning is mostly limited to categories of accounting surplus. In other words: action implies a profit motive. Though the content of what constitutes happiness or a good life will always remain an endeavor to be appraised subjectively, any meaningful interpretation of purpose has to be rooted in attainable states of being which we call goals or objectives. For purpose and goals to exist, humans have to dispose of means not perfectly specific to their ends; means are

¹⁰ An exception to this interpretation could be a situation in which an actor is impeded to take a decision due to insufficient information or major uncertainty. As such situations, however, increase the risk of taking wrong decisions, we apply (heuristic) tools such as to “sit out” a problem or to procrastinate in order to optimize the costs and benefits of actions.

usually employable in many ways. Only now the actor is compelled to devise a plan whereby he operationalizes purpose, not simply by realizing attainable goals, but by pursuing those attainable goals with a combination (or quantity) of means that exhibits the most advantageous cost-benefit-ratio.

All men are profit seekers by virtue of the fact that they understand how means can be used to arrive at specific productive outcomes given their individual, subjective ends. This is Rothbard's technological idea quoted further above. Accordingly, the possibility of profit presupposes the knowledge of technology, or simply knowledge. As humans continue to act even under the most adverse circumstances, there is always room to achieve states of higher satisfaction. The fact that actions in the past resulted in losses never changes this law of human behavior. Bygones are bygones and tomorrow is another day. Neither the severest psychic losses nor the highest numerical losses reported in financial statements (e.g. associated with widespread bankruptcies) can reduce profit *expectations* to zero. The only thing that can be reduced to zero is the asset value of productive means on the balance sheet. In contrast, men do not depreciate psychic means to zero as they inevitably continue to act. They cope with psychic and monetary losses, learn from the past, correct expectations but inevitably continue to pursue profit – albeit the springboard of action might feel more rigid than before. Keeping the fundamentally teleological nature of profit in mind, in the next section I review what Mises and Rothbard thought about the profit phenomenon and what the role of the entrepreneur entails.

2. Mises on Profit

In his essay *Profit and Loss* Mises (1966) argues that interest is not be understood as profit.¹¹ In order to save the entrepreneur, Mises introduces the concept of a quasi-wage rent which is attributable to

¹¹ "Interest on the capital employed is not a component part of profit. The dividends of a corporation are not profit. They are interest on the capital invested plus profit or minus loss. The market equivalent of work performed by the entrepreneur in

idiosyncratic technical and organizational entrepreneurial abilities. Mises is aware of the fact that this income is not analytically separable from (pure) entrepreneurial profit and loss (and likewise can become negative). What he wants to achieve is the creation of an analytical framework to dissect the three different functions of what Salerno (2008) calls the ‘integral entrepreneur’: capitalist, owner and entrepreneur (in the narrow sense). The capitalist earns interest on his funds, the entrepreneur makes (pure) profit (or loss) for bearing uncertainty and the owner gets a quasi-wage for his technical skills. If even we accepted this —as Mises himself calls it— methodological makeshift, we would still have to explain how the profit of the entrepreneur differs from the quasi-wage of the owner. Salerno (2008) reduces the entrepreneurial function to that of an uncertainty-bearer of general market risk.¹² Managers assume the task of production, investment and organizational planning.¹³

Given the uncertain state of the world, it seems the integral entrepreneur first sounds out the market given the ineradicable profit-loss-uncertainty. The rest of the entrepreneurial function then consists merely of the technical task of assigning the right heads to the right productive processes, which is more of a managerial task for which he is compensated with a quasi-wage. Though Mises

the conduct of the enterprise’s affairs is entrepreneurial quasi-wages but not profit (1949, p. 9).”

¹² True, the entrepreneur bears uncertainty as a matter of fact as he cannot know for sure whether his offering will resonate with consumers. But uncertainty bearing is not the true – not even narrowly – entrepreneurial function. The true function of the entrepreneur is to anticipate or envision products with higher consumer use-value. Entrepreneurial uncertainty only arises as a consequence of putting new value propositions on the shelf, thereby showing them to the people (Steve Jobs). The uncertainty associated with anticipating consumer wants, thus entrepreneurial success, is irremediable. Hence, uncertainty is a corollary of entrepreneurship in particular and human action in general. We bear uncertainty in our quest to achieve higher levels of prosperity, which is when profits occur.

¹³ “The narrowly entrepreneurial function is to bear uncertainty, to forecast and appraise market conditions yet to emerge. In contrast, there is no irremediable uncertainty involved in estimating the (physical) output of production processes, assessing physical productivities of technical personnel and capital goods in different uses, evaluating and choosing managers, designing an efficient organization” (Salerno, 2008, p. 202).

allows for some idiosyncratic entrepreneurial elements, we again learn that technological ideas and knowledge are not the market-making elements. To recap: for Rothbard savings constitute the bottleneck to achieving economic development and not technologies (since there are always abundant ideas from which to choose). In the same vein, here technology is now a matter of picking the correct production function for which the – more employee than – entrepreneur is rewarded with a quasi-wage if he does his job.

It appears that this separation, rather than serving as a methodological makeshift to shed light on the functions of real entrepreneurship, is in actual fact more of a sleight of hand to rescue the zero-profit prescription of the ERE practitioner. As profits are still competed away due to the market's inherent ability to reduce uncertainty, now the best owner-entrepreneurs get higher quasi-wages than others for which, however, there have to be a tangible reason, such as better product features, as otherwise nobody would ask for those skills. Since profits in the ERE world are zero, the focus of market analysts—and the ambitions of the best entrepreneurs—will shift to the quasi-wage as expression of entrepreneurial capability. But why would markets in that ideal world not reduce uncertainty and spread the knowledge to eliminate bad entrepreneurs or, for that matter, produce only capable ones? When technological ideas and management are more of an objective and learnable matter, then the difference in quasi-wages should likewise be eliminated. One cannot but help but think that we are confronted with highly artificial reasoning for which Mises himself provides compelling support in his example of the champagne producer.

“The entrepreneur’s technological ability does not affect the specific entrepreneurial profit or loss. As far as his own technological activities contribute to the returns earned and increase his net income, we are confronted with a compensation for work rendered. It is wages paid to the entrepreneur for his labor. ... The fact that the bursting of bottles reduces the output of champagne does not affect entrepreneurial profit and loss. It is merely one of the factors determining the cost of production and the price of champagne” (p. 288).

If the entrepreneur reaps profits, then this is purely a corollary of his role as uncertainty-bearer, i.e., he did not have a hand in the matter. It somehow just happened on the way toward the ERE where pure profits are wiped out. When he succeeds with his *own* technological activities, then he has done his job. When not, he failed. Indeed, Mises's way of reasoning may hold water in cases of non-controllable environmental factors such as climate and rain patterns. But haven't we invented fertilizers and drip irrigation? The condition of the profit-seeking human actor and Mises' fatalistic notion of how market results come about are fundamentally incommensurable. The equilibrium aficionado may now be tempted to open Pandora's box and explain progress based on the idea that monetary profit equates to a (quasi-automatic) long-term return on capital imposed by the market which is independent of entrepreneurial action. We then come back to the idea that some economic phenomena can be explained without recourse to human action. Böhm-Bawerk (1890, p. 1), for instance, understood interest as a permanent net income that involves no human activity and flows to the capitalist "even where he has not moved a finger in its making." He concludes "that the phenomenon of interest, as a whole, presents the remarkable picture of a lifeless thing producing an everlasting and inexhaustible supply of goods."

Here Böhm-Bawerk infers from the empirically observable existence of an interest rate that no action on the part of the capitalist is required for him to reap the return on capital. On a practical note, the decision of the entrepreneur to leave his capital structure unaltered is a deliberate investment decision that—in a world that cannot be thought of as not continuously producing new knowledge—does affect his and the market's return on capital. He may indeed not move his finger while he leaves the composition of his asset base unchanged, but given his knowledge that always some fingers do move, this entrepreneur acts (and possibly quite smartly). The conclusion of this section is that interest cannot be separated from human action. It might not be regarded as identical to entrepreneurial profit. Yet, both concepts must belong to the realm of profit phenomena if they emerge as a consequence of human action.

3. Rothbard on Profit

Like Mises, Rothbard is clear that the aim of the actor is always to reap a psychic profit from an action. In the ERE of the Rothbardian monetary economy, however, all interest rates and rates of return are equal and no entrepreneurial profits or losses prevail. Rothbard acknowledges that in the real world matters are different due to the complexities caused by uncertainty, but holds that for to separate (what he calls) the *time market* from the entrepreneurial elements, we must take recourse to the certain world of the evenly rotating economy (p. 376) as an intellectual starting point: “Continual changes in tastes and resources, however, constantly shift the final equilibrium goal and establish a new goal toward which entrepreneurial action is directed —and again the final tendency in the ERE will be the disappearance of profits. For the ERE means the disappearance of uncertainty, and profit is the outgrowth of uncertainty” (p. 511f).

Here we notice that the Rothbardian entrepreneur at least seems to be doing something. But the goals towards which entrepreneurial action is directed are imposed upon him by external data, i.e., changes in tastes and resources. We note that technology, again, plays no role. The following quote might best illustrate how Rothbard viewed the profit phenomenon:

“Yes, profits are an index of maladjustment, but in a sense precisely opposed to that usually meant. As we have seen above, *profits are an index that maladjustments are being met and combatted by the profit-making entrepreneurs*. These maladjustments are the inevitable concomitants of the real world of change. A man earns profits only if he has, by superior foresight and judgment, uncovered a maladjustment —specifically an undervaluation of certain factors by the market. By stepping into this situation and gaining the profit, he calls everyone’s attention to that maladjustment and sets forces into motion that eventually eliminate it. If we must condemn anyone, it should not be the profit-making entrepreneur, but the one that has suffered losses” (p. 514f, italics original).

It would be interesting to present this narrative to aspiring managers enrolled in an Executive-MBA and ask them what they

think about it. First of all, they are unlikely to understand what Rothbard is actually talking about as his particular way of reasoning might not be the most intuitive way to explain the role of entrepreneurs and profits. The scholar now facing the task to explain this reading of profit to the students would have to explain that the successful entrepreneur's profit is the sole result of spotting maladjustments in the market and not, as one might think, a result of entrepreneurial innovation. He had to explain that Steve Jobs saw a huge maladjustment in the market due to all the other entrepreneurs' grave error of not spotting the consumers' imminent need for iPhones. So Apple went on to eliminate the consumers' needy state of being (though egregiously continuing to make juicy profits) and it falls upon our Austrian scholar to correct the students' intuition of what they wrongly perceive as entrepreneurial ability, i.e. a superior grasp of technology and an idea of what people want, actually does not play a role in explaining profits.¹⁴ The scholar had to explain that Steve Jobs and Bill Gates just corrected errors, while his students would probably regard them as Schumpeterian entrepreneurs who upset the prevailing industrial structures by producing what consumers like.¹⁵ In Rothbard's economy it remains impossible to explain what separates a successful from an unsuccessful entrepreneur in a praxeologically fruitful fashion. This paper contends that the reason lies in the systematic neglect of the technological root of human action and, as a consequence, in a castrated understanding of entrepreneurship. The image of the Austrian

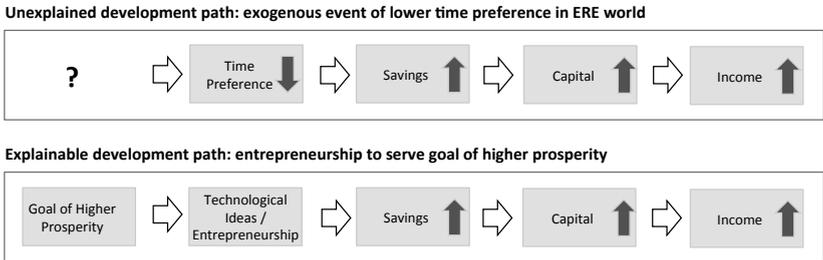
¹⁴ Many prominent Austrians, notably Kirzner (1973), argue along 'lines of error,' probably because they were worried they could not find their way back to equilibrium. It is dispiriting to approach economics from the vantage point of errors – for not to mention that it is absurd to claim that Steve Jobs or Mark Zuckerberg corrected past entrepreneurial error. Klein (2008) and Foss & Klein (2002, 2010, 2012) have advanced a more refined Austrian understanding of entrepreneurship. Klein (2010, p. 102) criticizes Kirzner's concept of alertness for not being able to explain how entrepreneurial opportunities come to be identified in the first place.

¹⁵ The phenomenon of market saturation through later entrants might be closer to Rothbard's idea of markets moving towards equilibrium. During the saturation phase into which products enter when they achieve mass-market status many product errors are wiped out by new entrants, supply chains stabilize and prices decrease.

entrepreneur —certainly in the ERE— is a sterile caricature of the Steve Jobs and Bill Gates of our world.¹⁶

V
A SYNTHESIS: TECHNOLOGY, TIME AND PROFIT

The following graph contrasts the static-exogenous view in which higher incomes fall from sky with a dynamic-endogenous view of prosperity increases that emanate from technology-driven creative entrepreneurial actions.



In the upper causal chain, the path to prosperity remains unexplained. Certainly Rothbard and Mises would concede that the lowering time preference is triggered by the expectation of higher incomes, which in turn presuppose achieving higher levels of productivity. Yet, this sequence of reasoning puts the cart before the horse. The important point is that technological ideas are systematic responses to our incessant desire of achieving higher prosperity levels. The starting point of the lower causal chain illustrated above is human action in the form of desire and ideas. The question of whether the provision of capital required for the execution

¹⁶ I hold that the existence of profits can be regarded as a dynamic equilibrium phenomenon in so far as the equilibrating nature of the market process is seen in its coordinative (thus teleological) character to shift resources where they serve best. If it were not for profits as a guiding device, no rational coordination of plans would be imaginable. It is commonly accepted that profits tend towards zero. To explain coordination, however, the more important point is that profits are relatively higher in those sectors where higher prosperity in form of increasing use-values is expected.

of entrepreneurial plans goes along with a lower time preference is hypothetical in any case. By and large, it seems that people are willing to forego consumption if the expected increases of future income are attractive. That said, as mentioned earlier in this paper, productivity increases may even free up sufficient capital so as to achieve higher prosperity levels without the need of higher saving ratios (or a more roundabout structure of production).

As discussed, from a praxeological perspective technological ideas in a sense of *how* to do something feature outside the realm of economic theory, narrowly understood. However, we know that the application of means to achieve ends, thus the employment of technology, is a factual constituent of human action, thus an a priori category in a praxeological sense. It is then the progression of technological ideas that explains savings and capital accumulation. Even the most theoretical economist asks himself how something works. Hence, he is very likely to infer from practical observations to theoretical understanding. For the consumer, prosperity can only increase if he holds positive expectations about the future and he is able to act accordingly. Action implies an understanding or, as mentioned above, *Verstehen* of the benefits new products may render to the consumer.

The investor or capitalist-entrepreneur, understood as a flesh-and-blood person and not an abstract entity such as a firm (with their boundaries), is able to anticipate future consumptive wants, not only because he communicates with his customers but also because he himself is a consumer. Thus, he has to think of technological features in terms of their impact on customer experience. This does not shield him from failure, but in all likelihood most technological breakthroughs would not have occurred had the investor not put on his consumer hat. It was Steve Jobs, the former CEO of Apple, who famously stated: "A lot of times, people don't know what they want until you show it to them" (*Business Week*, July 1997). If one shows something novel to people, they inevitably start investigating how the new thing works and how well it works vis-à-vis products they have used before. The consumer might arrive at the conclusion that the new device works far better than what he currently uses—irrespective of the price tag. By assessing affordability the consumer then puts the possibility of the new

product's increased use-value into his personal economic perspective. As a consequence, for us to be able to conclusively assess means in the pursuit of our ends, the objective understanding of technology (from a consumer usage-perspective) precedes subjective valuation. Without a grasp of the causal relationship between means and ends, i.e. *das Verstehen* of technological ideas, neither the idea of choice nor that of a valuation exercise would exist.

This paper is an appeal to embrace the teleological —profit-seeking— nature of technology as the root cause of economic progress and to recognize its central role in making human action intelligible. In actual fact, the use of technology implies entrepreneurship and vice versa. The application of technological ideas to better our lives constitutes the very foundation of the action axiom. Purpose presupposes know-how about applying means towards achieving ends. We have to make clear here that this result in no way invalidates the central deductions of Austrian praxeology such as the strictly subjectivist notion of consumer value and capital valuation. Yet members of our current society tend to agree to specific objective features of technology directly associated with the use-values that in turn informs whether these features are conducive to achieving their sub-ends. If that were not the case, investors would have no yardstick to assess their investment cases. From an entrepreneurial perspective, past monetary profits and capital values as traded on stock exchanges, then, can only be understood as a result of consumers appreciating certain objective features of use-value embedded in goods brought about by a conducive productive structure. In the course of the market process technological and economic data is communicated to both consumers and entrepreneurs based on which they perform their subjective valuations.

As shown in this paper, there are serious flaws in Mises's and Rothbard's edifice which are directly attributable to their neglect of technology and technological ideas. To explain capital accumulation as a result of time preference is not only theoretically non-tenable but simply counter-intuitive. Likewise, separating time from objects of choice immediately invalidates the action axiom. Time is indeed *a* category of action, but without reference to objects of choice time cannot account for action. Man never thinks

of *time now* versus *time tomorrow*, but of consuming or doing something today or tomorrow. It is important to understand that the prosperity levels economists observe in different regions of the world are ultimately a result of applying technological ideas, viz. knowledge. The process of capital accumulation that many scholars equate with economic development is a result of embodying ever more knowledge in our productive efforts. Increasing income levels along with the creation of a diversified capital asset base is neither a function of time preference nor a direct result of savings (as these could be donated). It is the ability of people to increase their productive knowledge and apply technological ideas in such a way that income levels increase so as to allow for ever-higher savings and investments. The virtuous cycle of economic development based on technological ideas is neither magic nor does it happen without moving a finger. It is premised on purposefully, that is knowledgeably, acting men who always, everywhere and at each point in time aim for a better life.¹⁷

If we accept the teleological role of the profit mechanism and the meaningfulness of the market process, then profits accumulate in those branches where investors expect the highest use-values to be reaped by consumers. Capital values are constantly validated by consumers' purchase decisions. It would be interesting to understand what Mises and Rothbard had to say about the tremendous market capitalizations of Amazon, Google, Apple or Microsoft in 2020. Based on their profit theory, they would have had to conclude that we always witness temporal disequilibrium phenomena (or maladjustments) on our way towards equilibrium. This is not a convincing way of explaining what happens in markets. From an investor perspective it is exactly the other way around: equity is injected into those production lines that promise to be of highest use-value to consumers. Profits in one sector might eventually be competed away to a significant extent —only to reappear as monetary value attributed to newly established ventures and product lines in other sectors. As long as people aim for a better life, profits show up where investors expect outcomes to be

¹⁷ Of course, this is not to deny the crucial role that institutions play in the process of economic development.

conducive to consumer goals. The understanding of the *function* that profit assumes in the free-market system, then, is not to be sought in its assumed equilibrative property of driving prices down to average cost— though in the end this might also be the beneficial *result* of the competitive process. It lies in its teleological function of guiding investors where to employ their capital for the sake of increasing consumer prosperity.

VI CONCLUSIONS

The conclusion of this paper is that the artificial separation of time and time preference, on the one side, and technology and profit, on the other, prevents us from making human action intelligible. I started off to review Mises's and Rothbard's rather dismissive views of technology. Possibly, this was their way of contesting Knightian capital concepts and economic-growth models à la Harrod-Domar (1939, 1946) and Solow (1956)—widely embraced by the economic discipline during the time Mises and Rothbard wrote their treatises—that entertained overly simplistic notions of technological progress and capital stocks. However, as I argue in section III, by expunging technology from the economic discourse and coupling savings directly to time preference, they throw out the baby with the bathwater. The absence of technological development and of the entrepreneurial role in it may also explain Mises's and Rothbard's anemic treatment of profit, as discussed in section IV. By reducing the function of profit to a device for detecting error, they do a disservice to the economic explanation of the crucial role of profit in dynamic economic systems. In section V, I argue for understanding purposeful human action as the synthesis of the concepts of technology, time preference, and profit: technology means applying means to ends; time is a crucial factor in determining the technologies we adopt; profit solves the economic problem of determining the adoption of the most worthwhile production techniques. When companies reap high profits by selling consumer products, they seem to make good use of the scarce human means of knowledge and time.

What has been presented in this paper, I trust, is fully in line with the tenets of the Austrian School of Economics, in particular those of Carl Menger. We might, however, want to dispose of time preference as a praxeological category and apply utmost care when using the imaginary concept of the ERE for praxeological reasoning. Menger's great achievement was to recognize the fundamentally subjective character of economics while at the same time assuming an eminently practical —causal-realistic— approach to economics which led him to embrace the fundamental importance of knowledge for economic progress.¹⁸ The value judgments of Menger's economic actors are premised on an objective state of affairs. But as the value of goods emerges from their relation to our needs, the individual necessarily gauges the cause-and-effect relationship between a consumption good and the capability of this good to satisfy a need. Entrepreneurs understand these causal connections, that is, technology. The lowering of time preference is a *result* —not a determinant— of our trust in and success of increasing our levels of prosperity by employing technological ideas. There is ample space for further research on the economic role and impact of technology, for instance the catalyst role of technological leaps for the emergence of capital markets or the impact institutions such as religion and culture have on technological progress.

Human action is the employment of technology utilizing the understanding of our biological and the world's constrained nature. In essence, the intensity of constraints perceived by men is related to the time and energy we own for to invest in achieving our goals. The fact that man's resources are finite and that the duration and quality of our lives is contingent on the careful use of our biological resources, accounts for the fact that time and energy stand in a delicate balance. In pursuing our ends, most of our technological progress is dedicated to find less time-consuming as well as biologically less energy-intensive solutions. The fact that knowledge is the only infinite resource lets us hope that our pursuit of material prosperity aligns with the extent to which we

¹⁸ "Nothing is more certain than that the degree of economic progress of mankind will still, in future epochs, be commensurate with the degree of progress of human knowledge" (1871, p. 74).

exhaust principally finite global resources. Bearing in mind that in took 200,000 years of human history for the world's population to reach one billion, but only 200 years more to reach seven billion (Wikipedia), our technological ingenuity will show whether this hope is justified.

BIBLIOGRAPHY

- Böhm-Bawerk E (1890) *Capital and interest, a critical history of economical theory*. London, New York: Macmillan and Co.
- Domar E (1946). "Capital expansion, rate of growth, and employment." *Econometrica*, vol. 14(2), 137–47.
- Foss N, Klein P (2002) *Entrepreneurship and the firm - Austrian perspectives on economic organization*. Edward Elgar Publishing Ltd, UK.
- (2010) "Entrepreneurial alertness and opportunity discovery: Origins, attributes, critique." Foss, N. J., & Klein, P. G. (2010). In H. Landström, & F. Lohrke, *The Historical Foundations of Entrepreneurship Research* (chapter 5). Northampton: Edward Elgar.
- (2012) *Organizing entrepreneurial judgment: A new approach to the firm*. Cambridge University Press.
- Garrison R (2000) *Time and money: The macroeconomics of capital structure*. Routledge.
- Harrod R (1939). "Essay in dynamic theory." *The Economic Journal*, Volume 49, Issue 193, 1 March 1939, 14-33,
- Hayek FA (1931) *Prices and production*. A. M. Kelly, New York
- (1936) "The mythology of capital." *The Quarterly Journal of Economics*, no. 50, 199-228
- (1939) "Price expectations, monetary disturbances, and malinvestments." In: *Hayek, Profits, Interest, and Investment*. Reprint (1975). New York: A. M. Kelley.
- Herbener J (editor, 2011) *Introduction. The pure time preference theory of interest*. Auburn, Alabama: Ludwig von Mises Institute
- Hülsmann G (2002) "A theory of interest." *Quarterly Journal of Austrian Economics*, vol. 5, no. 4, 77-110
- (2008) "Time preference and investment expenditure." *Procesos de Mercado: Revista Europea de Economía Política*, vol. V, no. 2, 13-33

- Kirzner I (1973) *Competition and entrepreneurship*, University of Chicago Press
- Klein P (2008) "Opportunity discovery, entrepreneurial action, and economic organization." *Strategic Entrepreneurship Journal*, 2, 175-190.
- (2010). *The capitalist and the entrepreneur*. Auburn: Ludwig von Mises Institute.
- Knight F (1921) *Risk, uncertainty, and profit*. The University of Chicago Press, Chicago
- Lachmann L (1959), "Professor Shackle on the economic significance of time", *Metroeconomica*, Vol. XI, no. 1-2, 64-73.
- Lachmann LM (1977) *Capital, expectations and the market process*. Sheed Andrews and McMeel Inc., Subsidiary of Universal Press Syndicate Kansas City
- Menger C (1871/2007) *Principles of economics*, Ludwig von Mises Institute, Auburn
- Mises L (1949/1998) *Human action*. The Scholar's Edition, Ludwig von Mises Institute, Auburn
- (1962) *The ultimate foundation of science*, D. Van Nostrand Company, New York
- (1951/2008) *Profit and loss*. Ludwig von Mises Institute, Auburn
- O'Driscoll GP Jr., Rizzo M Jr. (1985) *The economics of time and ignorance*, Routledge
- Rothbard M (1962/2009) *Man, economy and the state*. The Scholar's Edition, 2nd Edition, Ludwig von Mises Institute, Auburn
- Salerno JT (2008) "The Entrepreneur: Real and Imagined." *The Quarterly Journal of Austrian Economics* 11, No. 3 and 4, 188-207
- Selgin GA (1990) *Praxeology and Understanding*. Ludwig von Mises Institute, Auburn
- Solow R (1956) "A contribution to the theory of economic growth." *The Quarterly Journal of Economics* 70(1), 65–94.