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ADVERSE SELECTION AND THE RATIONAL EXPECTATIONS CRITIQUE OF THE MISES-HAYEK BUSINESS CYCLE THEORY

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Abstract

One of the most important objections to the Mises-Hayek business cycle theory is the rational expectations critique. The debate between supporters and critics of the Mises-Hayek theory has not paid due attention to the problem of adverse selection in the market of factors of production and capital goods. I study an adverse selection process in these markets that explains how Austrian imbalances take place in the framework of rational behavior.

I appreciate comments by Anthony Evans and Šimon Bil'o. The usual caveats apply.

Introduction

One of the most important objections to the Austrian, or Mises-Hayek, business cycle theory is the rational expectations critique. According to the Austrian theory, a monetary policy that expands credit supply and lowers interest rates below the equilibrium rate results in a cluster of errors that eventually transforms the boom into a bust. The rational expectations critique sustains that it is unwarranted to base a theory on systematic errors on the part of otherwise smart entrepreneurs.

In answering this objection, the debate has not paid enough attention to the adverse selection problem that the monetary policy creates in the market of factors of production and capital goods. An exception is Evans and Baxendale (2008), who explicitly mention this issue. This situation, however, deserves further scrutiny. How is the adverse selection problem reflected in the financial calculation of the entrepreneur? Does the presence of a banking sector have an impact on this process? In addition, is the problem of adverse selection present with and without the presence of rational expectations or does it only occur in the former case? If the adverse selection problem persists in the presence of rational expectations, then the rational expectations critique may be interpreted as reinforcement, rather than as a deadly critique, to the Mises-Hayek theory.

The problem of expectations bears an important significance. The debate between the Mises-Hayek theory and the rational expectations critique does not only contribute to a better understanding on the dynamics of the theory, but it has a direct relationship to the nature and use of expectations in economic theory as well. Rational expectations is not just a part of business cycle theories, but is a cornerstone in economic theory in general. The study of the effects on the market of factors of production and capital

goods contributes to the recent literature on the Mises-Hayek theory, to the problem of business cycles in general and to the application of rational expectations in economic theory.

The article is structured as follows. The first section offers a review of the rational expectations critique. The second section develops in further detail the adverse selection problem. The third section discusses why this adverse selection problem does not take place in absence of the expansive monetary policy.

A Review of the Rational Expectations Critique

The Mises-Hayek business cycle theory posits that an expansive monetary policy distorts the capital structure in the economy. Since capital intensive and long-term projects are more sensitive to interest rate than others, the capital structure goes through structural changes when the monetary policy decreases the interest rate below the equilibrium –natural– interest rate. Since capital goods are heterogeneous, the monetary policy has non-neutral effects on the capital structure. The bust implies a costly adjustment of the distortions accumulated in the capital structure.[1]

According to the rational expectations critique, for instance as found in Caplan (1997), Cowen (1997), Tullock (1988, 1989) and Wagner (1999), the theory needs to explain how otherwise smart entrepreneurs are so easily deceived by a publicly known monetary policy.[2] Should entrepreneurs have rational expectations, then they would not produce systematic errors. Notwithstanding the importance of the rational expectations

[1] For a more detailed coverage of the Mises-Hayek business cycle theory see Ebeling (1978), Garrison (2001), Hayek (1931, 1933) and Mises (1949).

[2] For others critics see Friedman (1993), Hummel (1979) and Yeager (1986). Replies to these criticisms can be found in the references mentioned in this article and in Garrison (1996).

critique, this problem is hardly new. Lachmann (1943) argues that if entrepreneurial expectations with respect to interest rate are elastic, the business cycle does not occur. Mises (1943) acknowledges that the business cycle depends on the assumption on expectations, but does not take for granted that expectations must behave as strong as rational expectations require. In addition, Hayek (1931, pp. 83-85) asserts that if "entrepreneurs entertain correct views about the price changes," then the "new rate of interest should correspond to the system of prices which will ultimately be established" and "all extensions of production, for which additional funds would not be sufficient, will be excluded." The Mises-Hayek theory implies a "loose" sense of rational expectations where Lincoln's law holds –you can't fool all the people all of the time–, but not the strong where you can not fool any of the people any of the time (Garrison, 1989).

Broadly speaking, the answers to the rational expectations challenge can be divided into two groups: (1) A friendly approach to the rational expectations critique acknowledging the need of revision, but concluding that the theory still holds and (2) a less friendly approach that maintains that the problem is not on the theory, but on the rational expectations assumption in the first place.

The first group can be represented by Carilli and Dempster (2001) and Evans and Baxendale (2008), who treat the rational expectation critique as a "valid challenge and accept the fundamental claim that in its present form the Austrian theory requires revision."[3] Carilli and Dempster's (2001) argument is that the expansive monetary policy of the monetary authority places the entrepreneurs and banks into a prisoners dilemma. In a nutshell, there is a rational behavior in seizing capital gains during the

[3] Evans and Baxendale (2008, pp. 83-84).

boom by investing in long-term and capital intensive projects and in selling them to other investors before the boom ends. Since this exposition is under the framework of a prisoner's dilemma, the rational behavior is implicitly embedded in the exposition.

Evans and Baxendale (2008) accept the rational expectations challenge, but point to the fact that since entrepreneurs are heterogeneous, the cluster of errors is driven not by a representative entrepreneur, but by those in the margin. For Evans and Baxendale (2008) the critic still needs to offer a convincing argument of why entrepreneurs can be assumed to be homogeneous. Even if the entrepreneurial heterogeneity argument may put Evans and Baxendale (2008) in between the two groups, they still offer a friendly reception to the rational expectations challenge.

Rationality is a key aspect in economic theory. If decisions are irrational, then economic agents cannot optimize the outcome of their strategies. The assumption of rational expectation, therefore, becomes to be almost unquestionable. Rational expectations, however, is an assumption, not a fact. To use an assumption to criticize a theory is not more valid than using the theory to criticize the assumption. This is where for the Austrian theory the rational expectations critique falls short. This debate offers an example of differences in the 'hard core' of two research programs as described by Lakatos (1978, chapter 1).[4] It is this role of rational expectations that makes this debate so important for supporters and critics, and why the critics see their objection on strong grounds even if it is built over a non-observable assumption as is the case of rational expectations. The debate is not just in relation to the consistency of a theory, but regarding the validity of a foundational piece in the context of a particular business cycle theory.

[4] See Buchanan (1964), Caldwell (1984), Kirzner (1965), Kohn (2004) and Kuhn (1962).

It is in this context that a more plain rejection of the rational expectations critique can be found, for instance in Barnett II and Block (2005, 2006), Block (2001), Callahan and Horwitz (2010), Garrison (1991, 2001) and O'Driscoll and Rizzo (1985, pp. 213-226), on the basis that such objection is "unrealistic in a way that vitiates their analysis."[5] For this position, the center of the disagreement is not in the consistency of the theory *given* rational expectations, but on the *plausibility* of rational expectations in the first place. Theoretical consistency is not enough if the underlying assumptions are not a credible reflection of the problem to be explained. This position should be understood from at least three points of view.

First, the construction of expectations is not a mechanical process, but the outcome of the entrepreneur's interpretation of data and information that is transformed into subjective knowledge in the form of expectations. Different entrepreneurs can produce different expectation using the same information as input. Radical uncertainty, for instance, has to be subjectively assessed since they are unique events. By construction, this problem is not captured by the use of a representative agent with rational expectations. The Mises-Hayek exposition is more close to the Evans and Baxendale (2008) clarification than to Lachmann's (1943) elastic expectations.

Second, expectations are neither entirely endogenous nor exogenous. Given that agents use market information –i.e. prices– to form expectations, the latter are not independent of a monetary policy that distorts relative prices. Therefore, rational expectations cannot be assumed to be independent of monetary policy.[6] More specifically, the knowledge that a Mises-Hayek business cycle theory is taking place

[5] Callahan and Horwitz (2010, p. 212).

[6] See Butos (1997), Garrison (1986, 2001, chapter 1) and Lachmann (1977).

does not help to solve the signal extraction problem. Namely, it is not enough to know that there is an expansionary monetary policy without perfect knowledge of how and when are prices distorted to avoid the bust. This perfect knowledge, however, is not feasible and is the reason why there are prices in the first place.[7]

Third, while the rational expectations assumption may be plausible in a simple framework, this is not the case in the context of a complex phenomenon. If complex phenomenon, as studied by Hayek (1967, chapters 2, 3 and 6, 1973, chapter 2), is a process too complicated to be envisioned by human rationality, then rational expectations begs the question of where the correct model of the world comes from.[8]

These objections do not imply that economic agents behave irrationally, but that there are other *a*rational aspects that are as relevant as rational expectations, though the focus on the latter obscures the roles of the former. To remain uninformed of an unknown is neither rational nor irrational.[9]

Even though the rational expectations critique alludes to a relevant characteristic of the Mises-Hayek theory, the case that the rational expectation is to be taken as given is not

[7] See O'Driscoll (1979, p. 108): "The very term *anticipated inflation* is misleading. What is anticipated in an anticipated inflation? For an inflation to have no effect on real activity (to be neutral), the precise sequence of price changes must be anticiapted. If transactors could predict the exact sequence of price changes, they could predict every future price. To do so they must have direct access to future demand and supply condution in each market. If such knowledge were possible, why would we use prices at all?" (emphasis in original).

[8] See also Caballero (2010, p. 91): "While it often makes sense to assume rational expectations for a limited aplication to isolate a particular mechanism that is distinct from the role of expectations formation, this assumption no longer makes sense once we assemble the whole model. Agents could be fully rational with respect to their local environment and everyday activities, but they are most probably nearly clueless with respect to the statistics about which current macroeconomic models expect them to have full information and rational information."

[9] See Evans and Friedman (2011).

as straightforward as the critique assumes. The rational expectations critique has blurred the dynamics that take place in the market of factors of production and capital goods by assuming that systemic errors cannot take place given rational expectations in a representative agent. To focus in the market of factors of production and capital goods shows how the Austrian imbalances can take place in a context of rational behavior as well.[10]

The Adverse Selection Problem

Let us assume that the monetary authority decides to follow an expansionary monetary policy so that interest rates are artificially lowered below the equilibrium values. Following Callahan and Horwitz (2010), let us also assume two types of entrepreneurs, the naïve and the savvy. The naïve group thinks that the new interest rate is the correct one, the savvy group thinks that the market interest rate should be higher and that sooner or later the monetary policy will be corrected. Since equilibrium conditions are unknown; the naïve group thinks the equilibrium rate is the new one, but the savvy group thinks otherwise. Although this is a strong simplification, to divide entrepreneurs in these two groups is enough to show how adverse selection takes place. The distinction between the two types of entrepreneurs should not be odd or controversial. Economists, for instance, are divided whether or not the Federal Reserve was too expansive before the 2008 Financial Crisis (and the same division of opinion exists with respect to other important crisis like the Great Depression).

[10] Yet, the Mises-Hayek business cycle theory is not the only one that presents challenges to rational expectations. See Eusepi and Preston (2011) and Fuster et al. (2010).

For the moment being, let us also assume that the banks behave homogeneously and are ready to offer credit at the lowered interest rates, and also that both groups of entrepreneurs are evaluating the same project. With these simplifications, the next section centers on the adverse selection problem. The subsequent sections will relax some of these assumptions offering a more detailed analysis.

The Dynamics of Adverse Selection

The rational expectations critique argues that there should not be a cluster of errors since the decisions of the naïve and savvy entrepreneurs even out. However, since each type of entrepreneurs has different expectations the discount rate they use differs. The naïve group feels comfortable by discounting at a lower interest rate than the savvy. Since projects are discounted at different rates, each type of entrepreneur assigns a different economic value to the project, and therefore will be willing to bid for factors of production differently. Namely, since the naïve entrepreneur discounts at a lower interest rate, he sees himself in the position to bid up in the market of factors of production to secure the required resources. This can be seen financially.

Let *EVA*® be the expected economic value added of the project, *ROIC* be the return over invested capital, *K* be the financial capital and *c* be the cost of capital.[11] Subscripts *n* and *s* denote naïve and savvy respectively. For simplification purposes I assume a same discount rate for all periods. Then, the economic value added for any year t for each entrepreneur will be:

$$EVA_{t,i} = (ROIC_t - c_n)K,$$

[11] On EVA® see J. C. Cachanosky (1999), Rappaport (1986) and Stewart III (1991). EVA® is a rearrangement of the free-cash-flow (FCF) approach.

where $i = \{s, n\}$.

Let $NOPAT$ be the net operating profit after taxes. Then, $ROIC = \frac{NOPAT}{K}$, therefore:

$$EVA_{t,i} = \left(\frac{NOPAT_t}{K} - c_i\right) K = NOPAT_t - c_i K$$

Since the project under evaluation is the same for both groups, *ROIC* and *K* are the same for the naïve and savvy entrepreneurs. The project's *MVA* (market value added) will be the present value of the expected future *EVAs*:

$$MVA_i = \sum_{t=1}^{\infty} \frac{NOPAT_t - c_i K}{(1 + c_i)^t}$$

Since $c_n < c_s$, then $MVA_n > MVA_s$. This means that the naïve entrepreneur assigns a higher expected market value to marginal projects than the savvy entrepreneur. Therefore, when the naïve and savvy entrepreneurs meet each other on the market of factors of production and capital goods, the former will be willing to assign a larger financial capital to bid and secure the required factors of production and capital goods.

Since both types of entrepreneurs do not see themselves in the same financial position, it is not the same to err up or down with respect to where the equilibrium rate of interest is supposed to be. Since naïve entrepreneurs are willing to increase their financial capital, in relative terms K_n/K_s increases. The market share of naïve capital increases with respect to savvy capital.

From the Adverse Selection Problem to the Capital Structure

The previous section assumed the same project is valued by both types of entrepreneurs. This assumption was intended to emphasize the adverse selection process that takes place due to different discount rates. The problem, however, is not *who* carries on the investment, but *what type of project* is carried out. If projects were the same, it would be unimportant who invests, if the naïve entrepreneur or the savvy entrepreneur. Not all projects, however, are affected evenly by a change in the discount rate. Long-term and capital intensive projects are more sensitive to changes in interest rates. Even though I simplify the scenario to two entrepreneurs, the general problem is that each entrepreneur has a set of potential projects under consideration and the most profitable are the ones that are funded first. Low interest rates make projects that would not look profitable at the free market rate scale up on the profitability ranking and crowd out capital goods and factors of production from sound projects.

The naïve group is willing to invest in more sensible (i.e. more roundabout and capital intensive) projects. If the naïve entrepreneurs bids out the savvy entrepreneurs in the market of factors of production and capital goods, then the capital structure is affected in a different way than if it were the savvy the group the one that carried out the investment. By gaining market share, the naïve entrepreneurs contribute to form the cluster of errors that proves inefficient when the monetary policy is revised and interest rates rise again. The aggregate value of K goes through microeconomic distortions as K_n/K_s increases. This distortion takes place in two ways. First, non-specific factors are reallocated to naïve projects. Second, the production of specific factor of production shifts from those required in savvy projects to those required in naïve projects.

Since the naïve group bids up the price of factors of production and capital goods, the savvy entrepreneurs find themselves in a difficult position. Given that the cost of production has increased, savvy entrepreneurs need to increase their financial resources to be able to acquire the factors of production they need. Even if the savvy entrepreneurs resist changing his structure of production, his increased debt exposure can become a financial problem when the monetary authority revises the monetary policy and increases the interest rate. In this context Carilli and Dempster (2001) call for the prisoner's dilemma arguing that the savvy entrepreneur can find a rational behavior in acting as a naïve entrepreneur and sell the project to a naïve entrepreneur before the bust. In other words, either the naïve group increases their market share, or savvy entrepreneurs behave as if they were naïve to stay in business. In any case, the naïve behavior is increased by the artificially lowered interest rate.[12] The difference with the adverse selection problem is that if savvy entrepreneurs resist behaving as predicted in the prisoners' dilemma, the adverse selection problem still takes place by the naïve entrepreneurs as the savvy entrepreneurs are driven out of the market. In other words, the prisoner's dilemma captures the problem faced by the savvy entrepreneurs, but does not consider the role of the naïve entrepreneurs in the market.

The fact that the savvy is aware that the interest rate is too low does not mean he can short his position since the capital structure consists of specific projects with no close

[12] In the Buck Hill Falls Seminar, 1955, Mises offered a similar argumentation: "It is very difficult for a businessman not to be fooled, let us say, when easy money is being offered. When a policy of easy money is being practiced, everybody is optimistic. Business is booming. Now, it is very difficult under such circumstances for a businessman to say: 'There is something questionable in the whole thing; this boom is only produced by the printing press.' It is very difficult. And even if the businessman is very clever, clevere enough to understand what is going on, he may say, '*Why should I remain outside? I will also participate in the boom. Of course, I will try to withdraw in time.*" (Mises, 1955, pp. 83-84, emphasis added).

liquid substitutes. The short strategies carried out in the financial market occur on a very different context; in such market, the asset shorted is liquid at the market price. In the real sector projects are unique; then this kind of short strategy cannot be pursued. The assets in the financial market are homogeneous and perfect substitutes, the assets in the real sector are heterogeneous and not perfect substitute. In addition, the capital goods in a firm are not just heterogeneous with a particular structure; they are also a complementary piece of the capital structure of the whole market. The capital structure of any firm is only functional in the structure of a broader market similarly to how a jigsaw fulfills a particular place in a puzzle.[13]

Capital theory is a key characteristic of the Mises-Hayek business cycle theory that points to two important features. First, the naïve and savvy entrepreneurs do not compete to invest on similar projects; namely, the naïve entrepreneur is comfortable by investing in more roundabout projects than the savvy entrepreneur because each group discounts at different interest rates. It is this different behavior what results in inefficient structural changes that are costly to correct. Capital goods of one type do not cancel out with the capital goods of other type. The level of aggregation implicit in the rational expectations critique does not give room for capital heterogeneity to come forward. Second, it contributes to explain why the savvy group cannot short their position and alleviate the bust. The investment projects are not only conformed by heterogeneous capital goods, but each project in itself is a piece of a larger capital structure. If a short strategy is unfeasible, then the prisoner's dilemma behavior becomes a rational strategy for the savvy entrepreneur that expects to sell to a naïve entrepreneur before the central banks revises its monetary policy.

[13] I borrow the jigzaw example from Horwitz (2011).

Naïve and Savvy Banks

The assumption that all banks behave homogeneously and are ready to loan the excess of funds at the lowered interest rate simplifies the scenario to a situation similar to where the entrepreneurs demand credit directly from the central bank. Still, even if we allow for banks to be naïve or savvy as well, the overall result remains the same. Since the naïve banks think that the expansive monetary policy is sound, they see fit to increase the size of their portfolio by seizing new funds from the monetary authority and offer credit at a lowered interest rate. In addition, I assume that banks cannot distinguish between naïve and savvy entrepreneurs.

An increase in relative naïve investment occurs through two channels. First, since credit from each group of banks is a close substitute to each other, the decision to offer credit at lowered interest rate on part of the naïve banks affects the decision on interest rates by the savvy banks as well. If naïve banks lower their interest rates, the savvy banks need to do the same if they do not want to lose their customers. This confirms the naïve entrepreneur's expectations of low interest rates.

Second, even if the savvy banks decide to not extend credit to projects that they consider to be unsustainable at the equilibrium interest rate, the adverse selection process still takes place among entrepreneurs. Savvy banks can reduce their exposition to unsustainable projects at the expense of lowering their market share. At a lower interest rate, the savvy bank needs to decide if he wants to extend new credits or to let the monetary expansion be channeled through the naïve banks. In the former case, the savvy bank behaves like a naïve bank, in the later the naïve bank crowds out the savvy bank participation in the market. In either case the market share of naïve banking increases with respect to savvy banking.

The role of the banks is to finance sound investments and avoid issues like the adverse selection problem. Banks use (among other things) interest rates to deal with asymmetric information and differentiate between profitable and unsustainable investments. However, given the monetary policy, naïve banks do not find their expectations to be mistaken and savvy banks are driven out of the market or start to behave like a naïve banks. Similarly occurs on the side of the entrepreneurs. Since rational expectations are formed *given* market information, the monetary policy confirms, rather than correct, the naïve expectations.

Likewise to the case of naïve and savvy entrepreneurs, the savvy bank can find a rational behavior in extending credit to naïve entrepreneurs and sell its portfolio to naïve banks before the bust. Since naïve and savvy banks will value their customer's projects also by discounting at different discount rates, the same adverse selection problem translates to the allocations of credit by the banking sector.

All Naïve and all Savvy Entrepreneurs

In the preceding sections, the discussion assumed two groups of entrepreneurs, the naïve and the savvy. The former assumes that it is the new interest rate the one that coincides with the equilibrium rate, the latter thinks otherwise. If we let all entrepreneurs to be either naïve or savvy, then both cases would fall outside the rational expectations framework. If all entrepreneurs are naïve, then the monetary policy can deceive all of them. But this is how the rational expectations critique sees the Mises-Hayek business cycle theory, and this is the behavior that is found to be objectionable. In other words, this scenario would reverse the critic to the initial situation.

On the other side, to assume all entrepreneurs of the savvy type, where they correctly assume what the equilibrium rate should be, also falls outside the rational expectations framework. The monetary policy does not result in any mistake on part of the savvy entrepreneurs since there are no naïve entrepreneurs. This is not a case of rational expectations, but a case of perfect foresight. The rational expectations critique would go from unexplainable naïve entrepreneurs to unexplainable super-intelligent entrepreneurs.

As long as we accept the presence of errors, though not systemic, the different market valuation and its effect on the market of factors of production and capital goods needs to be brought into consideration, rather than assume that naïve and savvy entrepreneurs participate in the market with a similar willingness-to-pay or bid for homogeneous capital goods. The distinction between naïve and savvy entrepreneurs allows spotting how the different valuation of each group produces the Austrian imbalances that are focus of the Mises-Hayek business cycle theory in the context of rational behavior.

From One Business Cycle to Repeated Business Cycles

If during the boom naïve entrepreneurs drive the savvy entrepreneurs out of the market, then the opposite occurs during the bust. Either the savvy entrepreneurs start to find their projects profitable or the naïve entrepreneurs learn from their mistakes and become savvy. As naïve entrepreneurs are driven out of the market during the bust, future business cycles should become less severe. Eventually a large proportion of savvy entrepreneurs will be able to avoid a business cycle from an expansionary monetary policy. The repetition of the monetary policy should do away with the prisoner's

dilemma and adverse selection problem. There are, however, three reasons why this may not occur.

First, the monetary policy described in the Mises-Hayek business cycle theory does not happen in a vacuum, but in a changing context under different market conditions. Entrepreneurs do not have the luxury to analyze a business cycle process under ceteris paribus conditions. A former savvy entrepreneur can become a naïve entrepreneur if he mistakenly assesses the monetary policy under different market conditions. An entrepreneur, for instance, may correctly evaluate the effects of monetary and fiscal policies, but may mistakenly assign a low weight to the distortions carried out by the expansionary monetary policy with respect to the effects produced by other policies and regulations (i.e. moral hazard or inefficient financial regulation).

Second, the turnaround in the population of entrepreneurs cannot guarantee that the newcomers will hold the same knowledge and interpretation than the leaving entrepreneurs. Since entrepreneurial population and market conditions change, and naïve entrepreneurs consider themselves to be savvy, it cannot be concluded that each business cycle must be less severe than the former ones. In turn, naïve entrepreneurs who hold a wrong theory of what produces a business cycle can pass the wrong knowledge to future generations of entrepreneurs. There still is, for instance, controversy on the different causes of the Great Depression after so many years of its occurrence. Empirical experience and evidence is not enough to sort these disagreements. Even though there are reasons to believe that entrepreneurs learn from past events, the correct learning requires a good theory to interpret past events correctly.

Third, even if the macroeconomic aspects of the Mises-Hayek business cycle are the same, the particular microeconomic effects can differ. In Hayek's terminology, since the knowledge required to predict the effects of time and circumstance are unavailable, economic agents can only rely on pattern, but not specific, predictions. Specific predictions require the implausible assumption of perfect foresight.[14] The kind of smartness and knowledge that entrepreneurs need to sort out these difficulties is not the kind of smartness that the entrepreneur is assumed to possess in the Austrian theory.

Why Adverse Selection Does Not Happen Absent the Expansive Monetary Policy

The previous section discussed the adverse selection problem between naïve and savvy entrepreneurs. The adverse selection dynamics, however, differs significantly without the expansive monetary policy. The naïve entrepreneurs can secure a higher amount of funds to the extent that the financial sector is able to supply these funds without an increase in the interest rate. In other words, for the adverse selection problem to take place the naïve entrepreneur does not only need to be mistaken on their expectations, he also needs to be able to finance his mistake. Without the expansive monetary policy, the increase in demand of loanable funds by the naïve entrepreneurs results in an increase in the interest rates. It is in this scenario, when the information provided by the central banks actually coincides with the equilibrium conditions, where the assumption of rational expectations leads to no cluster of errors. The main difference is that in the

[14] See O'Driscoll and Rizzo (1985, p. 222).

case of an expansive monetary policy, the low interest rates allow for the adverse selection to take place by financing and confirming wrong expectations.

The adverse selection problem explained so far has some similarities with the problem of financial accelerator that explains how small shocks can produce large effects on the economy through the financial markets.[15] Since financial institutions face asymmetric information, they rely on collateral values to allocate loanable funds to different projects. Therefore, a shock that affects the net worth of a firm changes the collateral value of the firm and its creditworthiness. In turn, this reduction in its creditworthiness reduces the access to loanable funds, which results in a decrease in investment that further affects the firm's net worth. Through this process of mutual feedback between the net worth of the firm and the access to loanable funds a small shock can produce a large impact in economic activity. The process of adverse selection is related, but not equivalent to the financial accelerator process. The similarity relies on the effect that the lowered interest rate has on the valuation of marginal projects. But the difference relies on the microeconomic concern of the Mises-Hayek theory. For this theory, the problem is not an overinvestment, but a problem of malinvestment.

A contrast to the winner's curse that takes place in some auctions can help to clarify the characteristics of the adverse selection problem.[16] Assume an auction where each bidder estimates the market value of the item they bid. If the market value is an average of the bidders' estimation, and the winner of the auction is the bidder with the higher estimate, then the winner knows that he has overvalued the item. However, by knowing

[15] See Bernanke and Gertler (1989, 1990), Bernanke, Gertler and Gilchrist (1996, 1999), Kamber and Thoenissen (2011) and Ćorić (2011).

[16] See Thaler (1988).

this process, bidders can adjust their estimations and minimize the loss. In the Mises-Hayek business cycle theory, however, there are two important differences. First, the problem is not just how to correctly evaluate the market value of an item, but how to combine a large number of different heterogeneous items. Each entrepreneur is investing in different capital goods. Once the expansionary monetary policy ends, the savvy entrepreneurs are in need of a different kind of item than the ones used by the naïve entrepreneurs. In the winner's curse, the market value of the item is independent of the bidders' plans, but the market value of the capital goods used in the market does depend on the entrepreneur's plan. In addition, the auction assumes that there is a known probability distribution, but if the auction were to be taken as a reflection of a market process, such information should be unknown and still undiscovered. Second, what the monetary policy does is erroneously confirm to the winner of the bid that his valuation is correct, as if the market value of the item is not the average of the auctioneers', but the market value assigned by the higher bidder.

Conclusions

The assumption of homogeneous entrepreneurs that hold rational expectation leads to the conclusion that errors could not be systemic, and therefore that the Mises-Hayek theory is ill-founded. But such line of critique overlooks the effects that take place in the market of factors of production and capital goods when monetary policy moves interest rates downward. Namely, the rational expectations critique neglects the insights of the capital theory that is in the core of the Austrian theory. The realization that movements in interest rates affect unevenly different projects *and* that capital goods are heterogeneous is what gives place for the adverse selection problem that produces the Austrian imbalances even under the assumption of rational expectations.

In addition, the adverse selection problem shows that the Austrian business cycle theory is robust to the rational expectations test, and that this line of objection does more to point to the strength of the microeconomic foundations of the theory than to offer a deadly critique. Even if a better knowledge by the entrepreneurs on the dynamics of the Mises-Hayek business cycle theory can mitigate the severity of the crisis, it does not go all the way to overrule the effects of the expansionary monetary policy and support a complete rejection of the theory. The analysis of the adverse selection problem in the context of rational expectations does not imply that the rejoinders considered in the above review section of the critique lack merit. On the contrary, they identify important problems that deserve no less attention. In this article I take the context of rational expectations as a way to emphasize the role of discount rates and the effects in the capital structure of the naïve entrepreneurs leaving aside other shortcomings of the critique.

The adverse selection problem not only sheds light on the Mises-Hayek business cycle theory, also points to its potential presence in business cycle theories in general as well as to the limits on the application of rational expectations.

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