Risk and the Capital Structure: A Causal-Realist Approach

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Abstract:
This paper will explore the relationship between the risk component of the interest rate and the capital structure using insights from the Austrian School of Economics in monetary theory and capital theory. Our main findings are: First, risk is a phenomenon that appears only in advanced stages of development and is one of the main characteristics of a capitalist economy. Second, based on subjectivity analysis, risk can be conceptualized as the degree of flexibility of a plan. Third, holding money can be conceive as the plan with greater degree of flexibility and serve as a benchmark to appraise the risk or adaptability of production plans in the capital structure. Finally, the risk premium of the interest rate regulates how investments are allocated in the capital structure. The role of risk is to smooth the change within the capital structure.

"Every action refers to an unknown future. It is in this sense always a risky speculation." (Mises 1949, p.106)

1. Introduction

Austrian economics broadly accepts that the interest rate is a sum of three components (see Mises 1949, Garrison, 2001 and Huerta de Soto, 2009): the time preference component, the price premium and the risk component (sometimes called the entrepreneurial component of the interest rate). The two first components of the interest rate are the ones that have received more attention by Austrians. For example, Herbener (2011) makes an extensive treatment of the implications of the time preference component of the interest rate. Horwitz (2003) points out the potential cost of inflation in undermining the coordination within the market process. However, less attention has been paid to the risk component of the interest rate. As Garrison (2001) pointed out:

> …there has been no macroeconomic theory attempting to explain episodes of boom and bust by contrasting the market's allocation of risk-bearing and policy-induced distortions of risk-related market mechanisms. Except for relatively recent experience, such a theoretical formulation would have little if any application. But the macroeconomic experience of the 1980s and 1990s – and possibly beyond – might best be accounted for by just such a theory.

Recent attempts respond to Garrison's challenge by exploring how the risk component of the interest rate affects the business cycle. In the original version, the Austrian Business Cycle Theory (ABCT) put forward by Mises (1912, 1949) and later developed by Hayek (2008) focus on how monetary policy cause a discoordination between savings and consumption plans by only affecting the time preference component of the interest rate. Garrison (1994) and Cowen (1997) pointed out the possibility to make variations of the canonical version of the ABCT by explicitly analyzing the role that risk plays in business cycles. According to Garrison (1994), the risk preferences of savers did not match the risk taken by the investors which led to the boom and bust of the 80's in the United States. Building on Garrison (2001), Young (2012) and Cachanosky (2014a) try to extend

the graphic model by incorporating a risk dimension to study the Great Recession. Furthermore, Bagus and Howden (2010) by using the term of structure of the interest rates shows how monetary policy can induce maturity mismatching of banking assets and liabilities. This strategy can potentially increase the risk of bankruptcy in the banking system.

The present paper seeks to contribute to this literature by extending how the capital structure and the risk component of the interest rate relate to each other. In contrast to the equilibrium "always" paradigm, the theory of market process can be more suitable for explaining the role of risk in the economy as risk only appears in disequilibrium. Market process theory developed by the Austrian School is a powerful tool that can be used to show how the risk component of the interest rate helps the entrepreneur to coordinate its production plans in the economy. Instead of consider change as exogenously given, the market process theory can demonstrate how change is endogenously introduced in the market system by adding risk in this framework. This theory focus on disequilibrium conditions where prices change as entrepreneurs seek profits by bearing risk (see Foss and Klein, 2012).

2. The Mengerian Roots of a Subjective Theory of Risk

> *"The theory of money necessarily presupposes a theory of the saleableness of goods. If we grasp this, we shall be able to understand how the almost unlimited saleableness of money is only a special case,—presenting only a difference of degree—of a generic phenomenon of economic life—namely, the difference in the saleableness of commodities in general." (Menger 1892, p. 21)*

Menger's Principle of Economics in 1870 has accomplished groundbreaking advancement in economic theory. His *magnum opus* is primarily recognized as the work that helped to launch the marginal revolution and which gave birth to the Austrian School of Economics. Other notably contributions are in the theory of institutions especially in the origin of money. Moreover, Menger advance the consistent application of subjectivism in economic theory.

Arguably, the topic less explored in Menger´s legacy is his theory of marketability or saleableness of commodities. The theory is the foundation of his thesis of the origin of money. The theory of marketability consists broadly in two parts. The first part explores the characteristics that an economic good has to possess in order to become a commodity. Menger called it the theory of commodities. The second part studies the factors that influence the degree of marketability of the commodities. After explaining the two theories, Menger explains the origin of money as the most marketable commodity. In the next section, these themes would be explored individually.

2.1. The Theory of Commodities

Menger dedicates a whole chapter to the theory of commodities in his *Principle of Economics*. It is after the theory of value, price and exchange but is before the chapter on the theory of money. Menger sees fit to develop a theory of commodities which is a necessary condition to explain the origin of money. Menger, step by step, builds up its argument of how markets are institutions that develops through time.

Menger explains the theory of commodities using a chronology of different stages of how modern markets developed. The first stage is the closed household economy. Individuals cooperate within organizations like farms. The economy is composed by different households that do not trade with each other because they are self-sufficient. Within the household there can be division of labor but in very limited scope.

On the artisan stage, some individuals stand out by possessing a particular skill which is gained due to the advance of the division of labor and specialization. Some examples are provided like carpenters, smiths, weavers and millers. The artisans are pictured as a rudimentary producer who only offers their skill to the consumers. The artisans have no savings so the consumers have to provide the raw materials for the particular task. In a later phase, the artisan can buy the raw materials but only when an order is in place by the consumer. It is important to highlight that under this stage, the artisan bears minimum risk as he only operates by orders. Menger remarks:

> A further step in the path of economic development to higher levels of well-being can be regarded as having been taken when the artisans themselves begin to procure the raw materials for their products, even though they still produce these products for the consumers only on order…The artisan does not yet manufacture products for later, and hence uncertain, sale. (Menger 1870, p. 237)

Menger proceeds to point some disadvantages of the artisan phase. First, the consumer has to wait until the product is finally ready. Second, the consumer does not know the quality of the good by first hand. Third, the artisan can have periods with peaks in orders which can exceed its capacity and other periods that orders are absent.

The next stage is the production of good of uncertain sale. In this stage the economy overpasses these inconveniences present at the artisan stage. Now, the producers produce goods which are intended to sale in the future. Producers have to keep its goods in stock so the consumers can inspect them before buying. Two new processes are added in this stage: the standardization and the mass production of goods. In Menger words:

> These drawbacks have led to the production of goods for uncertain future sale, the producer keeping them in stock in order to be able to meet requirements at once as they arise. It is this method of supplying society that leads, with continuing economic development, to factories (mass production) on the one side and to the purchase of ready-made (standardized) commodities by consumers on the other side. Hence it offers the highest degree of economy to the producer because of the possibility of full exploitation of the division of labor and the employment of machines, and the highest degree of safety (inspection before purchase) and comfort to the consumer. (p.238)

Under this condition, the economy development has reached a point where goods become commodities. For Menger commodities are a subcategory of an economic good. He defines commodities as *"goods of any kind that are intended for sale" (p.239)* and also *"Products that the producers or middlemen hold in readiness for sale are called commodities"* (p.238). Producer and consumer can consent on a mutual meeting point to exchange commodities. This is where the genesis of the market is conceived. As Menger described it:

> An owner can express his intention in very different ways. Most commonly he expresses it by displaying his commodities at places where purchasers are accustomed to assemble—such as markets, fairs, organized exchanges, or other special places that either are well known as sites at which commodities are concentrated or give evidence of being points of concentration by their external appearance or by prominently visible characteristic markings (e.g., shops, stores, warehouses, etc.). (p. 238-239)

Finally, the commodity exchange market stage emerges as specialized middlemen are necessary to conduct the exchange between buyers and sellers. The protagonists on this stage are the traders which benefit from trade operations. Quoting Menger in length:

> The higher the level of civilization attained by a people and the more specialized the production of each economizing individual becomes, the wider become the foundations for economic exchanges and the larger become the absolute and relative amounts of those goods that at any time have commodity character, until finally the economic gains that can be derived from the exploitation of the above relationship become sufficiently large to call forth a special class of economizing individuals who take care of the intellectual and mechanical parts of exchange operations for society and who are reimbursed for this with a part of the gains from trade. When this has occurred, economic goods no longer, for the most part, pass directly from producers to consumers but often follow very complex paths through the hands of more or less numerous middlemen. By occupation these persons are accustomed to treat certain economic goods as commodities and to keep special places open to the public for the purpose of selling them. Popular usage has now limited the term "commodity" to goods that are in the hands of these traders and in the hands of producers who produce them with the obvious intention of selling them. (p.239)

In summary, risk is almost nonexistent in the first stages of development. Risk being preliminary defined as a potential mismatch of consumer plans with production plans. In the self-sufficient stage, consumer plans and production plans match perfectly as the household produces exactly what is going to consume. Households produce first order consumer goods such as food and clothes. There is no surplus or savings. Markets are less developed as households have no surplus to trade. In the artisan stage, savings or surplus starts to appear. Consumers supply the raw material to the artisans in order to get consumer or capital goods. There is risk in consumption plans as consumer have to pre order in advance and they are not certain about the quality of the good. Also they have to wait until the good is ready. Producers (artisans), in this sense, do not bear any risk. It is only in later stages of development where there are enough savings or surplus that allows producers to bear risk by producing goods in advance. Now consumers can check and inspect the goods before making a purchase. In addition, they do not have to wait for the goods to be ready for sale. We can then conclude that the consumers bear almost no risk. Consumers are capable of distinguishing which consumption goods will satisfy their wants. Lachmann (1956) described this position as:

> But this subjectivism of interpretation is something altogether different from the subjectivism of want which underlies our utility theory. The former yields provisional judgments to be confirmed by later experience, imperfect knowledge capable of being perfected. The latter can provide us with no new knowledge: we either have a want or do not have it. (p.21)

Mises characterized the consumer as a sovereign given his privilege position to direct the production of the capitalist economy.

2.2. The Theory of Marketability of Commodities

Under the last stage of development, Menger sees fit to study the theory of marketability of commodities. Even though *Principle of Economics* advanced some ideas, it is on Menger later essay

On the Origin of Money where he developed in greater detail his theory of the marketability of commodities. He defined the marketability or saleability of a commodity in terms of the easiness to sell the commodity under economic prices:

> A commodity is more or less saleable according as we are able, with more or less prospect of success, to dispose of it at prices corresponding to the general economic situation, at economic prices. (Menger 1892, p.26-27)

Menger refers by economic prices "*the prices that become effective are always the product of existing competitive conditions, and correspond more closely to the general economic situation the more complete the competition on both sides." (Menger 1870, p.248).* It is implicit in Menger treatment that, under a commodity exchange market stage, monopoly would be less common. He stated "*The manner in which competition develops from monopoly is closely connected with the economic progress of civilization." (p.217).* In a commodity exchange market stage there would be bilateral competition.

What Menger had in mind with economic prices is that parties interested in exchange (buyers and sellers) are matched in a particular place. As Menger puts it:

> Market places, fairs, exchanges, public auctions that are held periodically (as is the case in large sea-ports, for example), and other public institutions of a similar nature, are for the purpose of bringing all persons interested in the pricing of a commodity together at a particular place either permanently or periodically to ensure the establishment of an economic price. Commodities for which an organized market exists can be sold without difficulty by their owners at prices corresponding to the general economic situation. But commodities for which there are poorly organized markets change hands at inconsistent prices, and sometimes cannot be disposed of at all. (p.249)

Menger proposes that the degree of marketability of a commodity can be characterized by the spread between the bid and ask price. As he remarks "*The smaller the difference between the buying and selling of an article, the more saleable it usually proves to be." (p.24-25).*

Now Menger lists every factor that affects the degree of marketability and groups them in three broad categories. First, the demand category depends on:

1. Consumption demand: Influenced by the number of consumers and their income.
2. Speculation demand
3. Divisibility of the commodity
4. Political limitations

The demand category is subject to spatial and time limits. Spatial limits involve the physical place where the exchange is consent to take place and the reach of its communications to other participants. Cost of transport is also taken into account. Spatial limits involve:

1. Cyclicality of the total demand
2. Durability
3. Storage Cost
4. Rate of Interest
5. Periodicity of market exchanges
6. Political restrictions

2.3. From Marketability to Liquidity

Menger indentifies the double coincidence of wants as a problem in the commodity exchange market stage. "*How rarely does it happen that a good in the possession of one person has a smaller use value to him than another good owned by another person who values these goods in precisely the opposite way at the same time!" (p.258).* Indirect exchange emerges as a solution for this problem. Individuals start to buy commodities with a higher marketability in order to sell it in a future transaction for the commodity that they really want. In Mengers words:

> As each economizing individual becomes increasingly more aware of his economic interest, he is led by this interest, without any agreement, without legislative compulsion, and even without regard to the public interest, to give his commodities in exchange for other, more saleable,

> commodities, even if he does not need them for any immediate consumption purpose. With economic progress, therefore, we can everywhere observe the phenomenon of a certain number of goods, especially those that are most easily saleable at a given time and place, becoming, under the powerful influence of custom, acceptable to everyone in trade, and thus capable of being given in exchange for any other commodity. (p.260)

Menger later adds *"When the relatively most saleable commodities have become "money," the great event has in the first place the effect of substantially increasing their originally high saleableness. Every economic subject bringing less saleable wares to market, to acquire goods of another sort, has thenceforth a stronger interest in converting what he has in the first instance into the wares which have become money. (Menger 1892, p.39).* A further stage of development is reached when money is finally present in the society. Menger considered money as *"the most liquid of all goods."(Menger 1870, p. 242). C*ommodities are now evaluated not by their degree of marketability but by their degree of liquidity. Finally, financial exchange markets emerges (stock exchange and money markets). Financial markets accomplish similar roles as the commodities exchange market:

> Similarly, the admission of a security to trade on a stock exchange (so-called "listing") contributes to the establishment of economic prices in the selling of that security and also, in an outstanding fashion, to increasing its marketability since the listing of the security assures the owners of sales at economic prices. (p.249)

So far the implications of the Mengerian theory of money are that: first, savings or surplus is a precondition for risk. Only when capital accumulation through savings have increase enough, the economy can assume more risk (or a potential mismatch between consumer and producer plans). Second, agents are aware that commodities differ in their degree of marketability. The easiest commodity to sell will become money. With money in the picture, now individuals can assess the degree of liquidity of commodities and capital goods.ie, how easy is to convert this goods to money.

3. Misesian Catallactics

Mises (1912, 1949) start his economic analysis where Menger left it off. For Mises *"Catallactics is the analysis of those actions which are conducted on the basis of monetary calculation." (Mises 1949, p.235)*. Catallactics is commonly known as economics: the study of human action under economic calculation. Mises catallactics already presupposes a stage of economic development where money, financial exchange markets and a developed banking system exists. Under economic calculation, the capitalist stage of development is reached:

> The concept of capital cannot be separated from the context of monetary calculation and from the social structure of a market economy in which alone monetary calculation is possible. It is a concept which makes no sense outside the conditions of a market economy. It plays a role exclusively in the plans and records of individuals acting on their own account in such a system of private ownership of the means of production, and it developed with the spread of economic calculation in monetary terms. (p. 262)

> Capital is a praxeological concept. If we were to resort to the terminology of traditional philosophy, which is characterized by neglect of all praxeological issues, we could call it a voIuntaristic concept. It is a product of reasoning, and its place is in the human mind. It is a mode of looking at the problems of acting, a method of appraising them from the point of view of a definite plan. It determines the course of human action and is, in this sense only, a real factor. (p. 512)

Note that capital is a subjective notion that only exists in the minds of the individuals. The appraisals of the future plans of the entrepreneurs are what is important and not the accounting notion of capital. Moreover, the stock exchange plays a significant role for Mises:

> In this sense the stock exchange becomes simply "the market," the focal point of the market economy, the ultimate device to make the anticipated demand of the consumers supreme in the conduct of business. (p. 514-515)

More importantly, Mises considered the function and existence of the stock market as a test to whether know if an economy is socialist or capitalist:

> A stock market is crucial to the existence of capitalism and private property. For it means that there is a functioning market in the exchange of private titles to the means of production. There can be no genuine private ownership of capital without a stock market: there can be no true socialism if such a market is allowed to exist. (Rothbard, 2006 p. 426)

Under a capitalist economy is also common to see the rise of institutions that can handle Knightian risk such as insurance companies. The insurance sector can quantify risks that possess a stable probability distribution.

3.1. **The entrepreneurial or risk component of the interest rate**

The financial market with their different financial instruments is the mechanism which capital goods are represented and exchanged. The financial instruments are directly affected by the interest rate. Mises postulates that the gross market rate of interest is composed by three components: the time preference component, the price premium and the entrepreneurial component of the interest rate. The time preference component (also known described as originary interest rate) is *"the discount of future goods as against present goods." (p.521).* The price premium component reflects the adjustment in the anticipation of future change in the purchasing power of money.

In this section we are going to focus on the entrepreneurial component of the interest rate. According to Mises, the entrepreneurial component of the interest rate includes "*the creditor's gross proceeds is determined by all those factors which are operative in every entrepreneurial venture." (p.537).* He also refers to the entrepreneurial component as *"the premium for risk bearing." (Mises 1912, p. 379).* The factors that influence the entrepreneurial components according to Mises can be grouped by the classification of modern financial theory (see Uyemura and Van Deventer, 1993 and Van Deventer, Imai and Mesler, 2013). In this sense, risk can be classified in credit risk, market risk and liquidity risk.

3.1. Market Risk

Market risk is the variation of a price of an asset. Market risk can be found in the Austrian School literature. For example, Mises acknowledges that variations in prices cause an increase in risk:

> All such transactions involve a risk, and this fact is well known to all contractors. When anybody buys (or sells) corn, cotton, or sugar futures, or when anybody enters into a long term contract for the supply of coal, iron, or timber~ he is well aware of the

> risks that are involved in the transaction. He will carefully weigh the chances of future variations in prices, and often take steps, by means of insurance or hedging transactions such as the technique of the modern Exchange has developed, to reduce the aleatory factor in his dealings. (Mises 1912, p.195-196)

Menger (1870) also recognizes the market risk. He expands on how market participants penalize commodities or securities by buying them below the market in order to protect themselves from violent price fluctuations protection:

> Commodities whose prices are not well known or subject to considerable fluctuations also do not pass easily from hand to hand…But commodities that are subject to violent price fluctuations can circulate easily only "below the market," since all persons who are not willing to speculate will want to protect themselves against loss. Thus commodities whose prices are uncertain or fluctuate severely are also not well suited to free circulation from hand to hand. (Menger 1870,p. 255- 256)

In the same lines, Mises recognizes that some methods of accounting can appraise assets below the market value to generate a safety margin:

> Commercial legislation aims at a method of accounting which could indirectly protect creditors against loss. It tends more or less to an appraisal of assets below their estimated market value in order to make the net profit and the total funds owned appear smaller than they really are. Thus a safety margin is created which reduces the danger that, to the prejudice of creditors, too much might be withdrawn from the firm as alleged profit and that an already insolvent firm might go on until it had exhausted the means available for the satisfaction of its creditors. (Mises 1949, p.214)

3.2. Liquidity Risk

Once more, this is what Mises had in mind when he provided an explicit definition of liquidity risk:

> Liquidity is that condition of the bank's assets which will enable it to meet all its liabilities, not merely in full, but also in time, i.e. without being obliged to ask for anything in the nature of a moratorium from its creditors. Liquidity is a particular sort of solvency. (Mises 1912, p.331)

According to Mises, banks can avoid liquidity risk if they comply with the golden rule:

> For the activity of the banks as negotiators of credit the golden rule holds, that an organic connection must be created between the credit transactions and the debit transactions. The

> credit that the bank grants must correspond quantitatively and qualitatively to the credit that it takes up. More exactly expressed, 'the date on which the bank's obligations fall due must not precede the date on which its corresponding claims can be realized. Only thus can the danger of insolvency be avoided. It is true that a risk remains. Imprudent granting of credit is bound to prove just as ruinous to a bank as to any other merchant. That follows from the legal structure of their business; there is no legal connexion between their credit transactions and their debit transactions, and their obligation to pay back the money they have borrowed is not affected by the fate of their investments; the obligation continues even if the investments prove dead losses. But it is just the existence of this risk which makes it worthwhile for the bank to play the part of an intermediary between the granter of credit and the grantee of it. It is from the acceptance of this risk that the bank derives its profits and incurs its losses. (Mises 1912, p. 263)
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> As on the one hand many firms badly need money in order to avoid bankruptcy, and on the other hand no firm any longer enjoys confidence, the entrepreneurial component in the gross market rate of interest jumps to an excessive height. (Mises 1949, p.560)

3.3. Credit Risk

Credit risk is the probability of default of a financial obligation. In addition, a longer investment has a lower present value as cash flows are more distant in the future. This will have a definite impact on the solvency of the bank as assets are more prone to lose value compared with liabilities. As Mises puts it *"A bank may be said to be solvent when its assets are so constituted that a liquidation would necessarily result at least in complete satisfaction of all of its creditors." (Mises 1912, p.331).* Notice that for Mises banks generate their profits from credit risk bearing and not from maturity mismatching:

> It is true that a risk remains. Imprudent granting of credit is bound to prove just as ruinous to a bank as to any other merchant. That follows from the legal structure of their business; there is no legal connection between their credit transactions and their debit transactions, and their obligation to pay back the money they have borrowed is not affected by the fate of their investments; the obligation continues even if the investments prove dead losses. But it is just the existence of this risk which makes it worthwhile for the bank to play the part of an intermediary between the granter of credit and the grantee of it. It is from the acceptance of this risk that the bank derives its profits and incurs its losses. (Mises 1912, p. 263)

Mises later adds *"Gross interest can be reaped only by creditors who have been successful in their lending" (Mises 1949, p.536).* As the credit risk increases, the creditworthiness of the bank

deteriorates. The effect would be an increase in the cost of funding the bank "*Differences in the rate of interest are caused either by differences in the soundness and trustworthiness of the debtor or by differences in the terms of the contract." (Mises 1949, p.455)*

3.4. Other risks

Mises also takes into account other sources of risk. For example, he points out that countries that have a capital deficit will raise its risk premium to attract more capital:

> Consequently its capital has to emigrate. Now in a country which exports capital, even disregarding the premium for risk-bearing that is contained in the gross rate of interest, the rate of interest on loans must be lower than in a country which imports capital. (p. 379)

Governments and legislation can also affect the risk premium:

> The political risks involved in moneylending do not affect the height of originary interest; they affect the entrepreneurial component included in the gross market rate. (p. 538)

3.5. Relationship between the Mengerian theory of money and risk

It is important to note that market risk (price volatility) and liquidity risk (how easy is to convert an asset to money) is already considered in the Mengerian theory of money as the degree of marketability or saleability of commodities. Commodities and commodity money are assets and do not depend on anyone's solvency. However, when the economy reaches a stage where financial markets and instruments are developed, entrepreneurs bear higher levels of credit risk. Once again, as the economy develops and additional savings produce more capital accumulation, the economy can endure more risk.

4. Risk as a disequilibrium phenomenon

As we mentioned before, capital is the result of a capitalist economy where money exist and economic calculation is perform by entrepreneurs. This implies that money and capital is necessary a phenomena that appears under disequilibrium where uncertainty persists. Mises demonstrates how money cannot be part of an equilibrium construct like the Evenly Rotating Economy (ERE). He

stresses out that money will disappear in the ERE because it is a dynamic factor that is only useful under uncertainty. He identified that money in ERE would be useless and become a numeraire:

> Where there is no uncertainty concerning the future, there is no need for any cash holding. As money must necessarily be kept by people in their cash holdings, there cannot be any money. The use of media of exchange and the keeping of cash holdings are conditioned by the changeability of economic data. Money in itself is an element of change; its existence is incompatible with the idea of a regular flow of events in an evenly rotating economy. (p.414)

The expected result is that the institution of money would cease to be useful in the ERE as it has no function to perform. By the same token, if money disappears in a state of equilibrium, it would also imply that economic calculation cannot longer be performed and, by definition, capital would not exist. For this reason. Mises explains that the risk premium or the entrepreneurial component of the interest rate would be only present in a state of disequilibrium:

> Originary interest can therefore in the changing economy never appear in a pure unalloyed form. It is only in the imaginary construction of the evenly rotating economy that the mere passing of time matures originary interest (p.531)

Another critique of using equilibrium construct comes from Hayek (1937). He regards the equilibrium construct as a necessary tool to analyze the real world but criticizes the perfect foresight assumption and the fact that the model presupposes all the information as given (preferences, resources and technology). He refers to this approach as the pure logic of choice where the solution to the supposedly economic problem is already implied in the initial conditions. For him, this is not the economic problem that a society faces. Hayek (1945) further elaborates this point in the *Use of Knowledge in Society*. He reformulates the problem of economics in the following way:

> It is thus not merely a problem of how to allocate "given" resources—if "given" is taken to mean given to a single mind which deliberately solves the problem set by these "data." It is rather a problem of how to secure the best use of resources known to any of the members of society, for ends whose relative importance only these individuals know. (p.520)

In this sense, the transmission and communication of the dispersed knowledge in a society becomes a central theme in Hayekian economics. Under this framework, equilibrium states can be defined as mutual compatibility of plans of agents in the economy. Ex ante and ex post formations of plans have to be equal in order to achieve equilibrium. It is important to highlight that the Hayekian equilibrium does not imply an optimum use of resources nor a Pareto efficiency condition. What Hayekian equilibrium achieves is coordination among different agents in the economy.

5. Risk as flexibility of plans

So far we have stated that capital or capital goods are represented by financial instruments such as deposits, loans, bonds, equity, etc. These financial contracts will be exchanged in the financial market. The price of these instruments will depend on the risk premium which reflects the credit risk, market risk and liquidity risk of each financial transaction. However, we have not yet explained why is the case that some financial instruments have a higher interest premium than others and how it relates to the capital structure of the economy. Hayek (1937, 1945) pioneered the idea that prices convey knowledge and markets are best viewed as a network system that transmits it. As presented earlier, if risk is one of the components of interest rate, it beg the question: what is this role that the risk component accomplishes? What knowledge is the risk premium transferring to market participants?

Under uncertainty or disequilibrium, it is obvious that not all plans can be successful as original intended by entrepreneurs. Not all production plans will be compatible with the consumer plans. Acknowledging its ignorance, the entrepreneurs will not only use economic calculation to appraise which plan can be more profitable (wider spread between future expected prices and costs) but also contemplate which plan will provide greater flexibility to adapt to potential changes in data (taste, technology and resources) in the case that they occur. Entrepreneurs are also interested in studying which action is more adaptable to changing conditions in the market. The appraisal of the

degree of flexibility to changes in market conditions or data is what we call risk. The risk is reflected on the entrepreneurial component of the interest rate or risk premium.

The conception of risk as the flexibility of plans is consistent with modern Austrian capital theory. Following Mises, Kirzner (1996), Lachmann (1956) and Lewin (2011) based capital on the subjective plans of the entrepreneur. They drop the concept of capital, made initially by Bohm-Bawerk (1890), who characterized capital as a longer and more roundabout process of production. Under the subjective paradigm, plans are pursued in order to accomplish a particular goal. However, it is important to note that capital plans are not rigid and possess certain degree of adaptability when change occurs. For example, Kirzner (1996) states that capital as unfinished plans. Lachmann (1956) and Lewin (2011) make allusion to plan revisions or plan contingencies. Lachmann advances the concept of capital heterogeneity where capital can be multi-specific in their use. Lachmann also highlights that capital can be seen as a network of plans which share some substitution and complementarity between each other. Kirzner complements this view by stating that capital is a system of interlocking plans. Mises notes this property of capital goods when he describes:

> The convertibility of capital goods is the opportunity offered to adjust their utilization to a change in the data of production. Convertibility is graduated. It is never perfect, i.e., present with regard to all possible changes in the data. (Mises 1949, p.501)

The idea of risk as flexibility of plans is also consistent with the *"Bearer of options"* function proposed by Anderson (1917). Money, by definition, is the generally accepted medium of exchange. Money is the most tradable asset in the market. This implies holding cash is the plan that provides the entrepreneur the greatest flexibility to participate in future market transactions. All goods and services are traded against money. Money occupies a central position in the subjective theory of risk because its serve as a benchmark of the degree of flexibility or adaptability of all

other plans within the capital structure. It is through money and its relationship with risk that Austrian monetary theory and capital theory is connected.

In contrast to the risk free asset view in modern financial theory, money can be seen as the lowest riskiest asset in the economy offering the highest degree of flexibility to market participants. Entrepreneurs can either form new consumption or producer plans, or participate in existing plans depending his appraisal or preference.

6. Risk and the Capital Structure

The component of risk in the interest rate can be best seen as indicator how well can a production plan adapt into a changing capital structure. Capitalists will express their subjective appraisal of the flexibility or adaptability of a particular plan in the component of risk in the interest rate on the financial markets. In detail, the flexibility of a production plan will depend on the same factors that modern financial theory suggest for making valuation of financial assets. These factors include:

i) Interest rate composed by the three components: time preference, inflation premium and the risk component
ii) Expected cash flows
iii) Duration
iv) Legal and institutional context

All these elements also coincide with the degree of flexibility of capital plans. First, the risk premium contained in the market interest rate, will indicate the extra amount of money that a production plan have generated in each consecutive payment. In the case of a fixed instrument like a bond, this includes the amount of proceeds that the entrepreneur have to pay to its debtor.

Expected cash flows are also important for determining the flexibility of capital plans. Some securities have certain cash flows establish by the terms of contracts (like most fixed income

securities) and others are more uncertain (equities, variable interest bonds, derivatives and so on). Certain cash flow will have less risk and greater flexibility.

The flexibility of capital plans depends directly of its duration. If a capital plan contemplates a shorter maturity or duration, it means that it has lower risk premium as cash flow are recovered earlier. This implies that money is restored in earlier periods gaining more flexibility. The reverse will be true. If capital plans have a longer maturity, it will imply higher risk as money is restored in remoter periods.

Legal characteristic of the securities such as collateral and ranks of payments will provide more flexibility to the plan. Finally, changes in the institutional arrangements can affect legal and property rights of capital plans which affect the value and flexibility properties.

7. Change as a endogenous phenomena

Most treatments of change in Austrian economics are taken as exogenous[1]. For example, Lachamann refers to *"unexpected change"*. Mises refers to *"changes in data"* or a *"changing economy"*. Risk can be seen as a mechanism that adjusts and regulates change in the capital structure of the economy. As described before, a production plan that involves a higher risk premium will potentially be less adaptable to the capital structure of the economy, and vice versa.

The entrepreneurial component of the interest rate has the same functions as prices described by Boettke (1997). If a plan has a high risk premium this will indicate ex ante that the plan is less flexible given the capital structure of the economy. This can be seen as a warning sign to the potential investors. In this sense, the height of the risk premium affects the amount of funds that is allocated in a production plan. Capital structure will be in constant change but always

[1] An exception can be Huerta de Soto (2010) where he considers the entrepreneurial process as a social Big bang of knowledge growth.

delimited by the subjective appraisal of the entrepreneurs represented in the risk premium of the interest rate. In this sense, the change in the capital structure is as smooth as possible.

8. Conclusions

Capital can be defined in terms of the individual plans of economic actors. These plans are interconnected and depend on each other to form a network which we call the capital structure. By defining money as the plan which provides the maximum degree of flexibility, economic agents gain the capacity to compare the degree of flexibility of other available plans in the economy. This degree of flexibility of every plan is what we have called risk and it is appraised by the risk component of the interest rate. The risk component of the interest rate guides the change in the capital structure by regulating the amount of capital that is invested. High risk investment will be discouraged and lower proportions of capital will be allocated in plans that introduce higher changes in the capital structure. The capital structure would change but in a smooth way.

The present work can only be considered preliminary and further applications are encouraged. The subjective theory developed here has potential implications in the Austrian Business Cycle Theory. Expansionary monetary policies induce through the risk premium of the interest rate a mismatch between banks assets and liabilities. This can complement the work of Bagus and Howden (2010). Other applications can be explored in Growth and Development theory. Risk and its relationship with the capital structure can explain the behavior of capital flows from the developed world to the emergent economies. These insights can be used to expand the analysis made by Cachanosky, N. (2014b). Finally, the institutional environment and legislation can potentially have a significant affect in the risk premium and the composition of the capital structure especially in the developing world. The notion of regime uncertainty developed by Higgs (1997) can shed light in this matter.

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