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***Unlearned Lessons from Risk, Debt Service, Bank Credit,
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WP 43/2009/DE/UECE

WORKING PAPERS

ISSN N° 0874-4548



Unlearned Lessons from Risk, Debt Service, Bank Credit, and Asymmetric Information

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Abstract: this paper presents a model of the economy that explains the economic bubbles, based on bank credit, debt service and risk. In the first period of the model, banks offer too much credit seeking to maximise their expected profits. The excessive debt created in the boom period generates, in the second-period, the expansion of the debt bubble, which induces failures in the financial market and the downturn of the overall economy. Business cycles are inherent in the free market systems. They may be caused by endogenous factors of financial markets and, given the absence of adequate, effective regulation, they may be unavoidable. Credit crunch in the financial market is therefore highly probable. In order to reduce substantially the risk of such occurrences, economic and financial policies are proposed.

Key words: Asymmetric information, bank credit, risk, debt service and business cycle.

Introduction

In the past three years, a considerable effort has gone into the study and comprehension of the present global financial and economic crisis.² It would seem that current mainstream economics has no solutions as yet to the causes of the severe crises which arise from time to time in the market economies. Basically, the models constructed in the neoclassical approaches view equilibrium as the fundamental concept that counters the instability of the free market economies. For instance, Lucas (1972) recognises this problem and argues in his influential paper that the endogenous instability does not make sense. He elaborates a sophisticated theory

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² On this matter, see for example Adrian and Shin (forthcoming), Brunnermeier (2009), Caballero and Krishnamurthy (2009), Shiller (2008), Fostel and Geanakopulos (2008), Zandi (2008), IMF (2008), Allen and Gale (2007), Martin and Rey (2006). Although not so recent, see also Diamond and Rajan (2005), Bernardo and Welch (2004). An excellent work on financial crises was written by Kindleberger and Aliber (2005).

in which the systematic inability to understand signals leads to business cycles. However, in the present paper, we attempt to show that it is viable to derive the instability in the market economy systems from the endogenous factors of the model introduced further on in Section 2. Our study assumes an analogous partial equilibrium structure of the models proposed by de Meza and Webb (1987, 1990), Stiglitz and Weiss (1981), Leland and Pyle (1977) and Ibrahimo and Barros (2009). Moreover, we include in the model the ideas of Akerlof and Shiller (2009) and those of Minsky (2008). We should note that the views of the three mentioned researchers embrace a number of visions offered by Keynes (1936). Notwithstanding, we are convinced that the ideas of these scholars can be reconciled with the visionary perspectives of the authors of the neoclassical synthesis theory.

A philosophical point must be underlined here. The rational expectation theory assumes that the economic system is continuously in equilibrium because of rationality and perfect knowledge on the part of economic agents. The movement of equilibrium from one stage to another is like a smooth wave. This is a limited viewpoint. We believe that there must also be a contextual jump from one stage to another stage of equilibrium in a discontinuous manner. That is, an abrupt change in a given economic context, representing a weighty advance or augmentation. Usually, the abrupt change happens all at once, rather than gradually over time. However, we must note that this change, which can be either insignificant or significant, can vary in magnitude. In the insignificant case, there is an apparent idea that the structural changes in any economic system are like a continuous wave of the equilibrium positions. In the significant case, the structural changes are large in magnitude, producing cycles which are predominantly explained from the alterations of endogenous conditions of the economic systems. The transitional movement from one stage to another stage of equilibrium is typified by the disequilibrium settings. In such contexts, economic systems are out of equilibrium, as George Soros (2008) points out with the notion of the reflexivity principle. In financial markets, the behaviour of economic participants resembles the actions of the herd. The *animal-spirit* behaviour of individuals is clear here, as Akerlof and Shiller (2009) would argue. This animal-spirit conduct may explain the causes of emerging crises in the market economies.

Equilibrium and disequilibrium in the free market systems or in any type of economic system constitute the two sides of the same coin. In any circumstances of nature, either equilibrium or disequilibrium is prevalent. How the economic agents observe the movement of an economic system may be determinant in defining whether or not it is in equilibrium (e.g. via confidence).

When the economies are in crisis, disequilibrium is prevalent. The current global economic crisis was caused by a number of factors. In this paper, we focus on four of those causes: the misperception and mismanagement of risk; the high level of leverage of economic agents; the

erroneous management of bank credit; and the absence of sufficiently stringent regulation by the central banks.

The structure of information between parties and the Chamberlin (1929) hypothesis on banks' behaviour, when banks are few in the market, play a decisive role in the model.³ The main goal of the present analysis is to make clear the nature of equilibrium in the financial markets in the "boom" phase of economies. This type of equilibrium conceals factors which lead to the "bust" cycle and hence to the financial fragility of the economic systems.

The structure of the model is defined in Section 2. Two time periods in the model are considered: a "boom" stage, followed by a "bust" stage. For the boom stage, a simple framework is assumed of a one-period partial equilibrium model, with asymmetric information between two categories of participants: banks and entrepreneurs. The environment is such that entrepreneurs behave in a risk-averse manner and each of them is endowed with a project at the beginning of the period. The projects, if carried out, require external finance from risk-neutral bankers, who offer financial contracts to entrepreneurs. All projects are assumed to have the same expected return and are divided into continuous types, depending on the probability of securing the successful return. Projects with high probabilities of success are less risky. The quality of an individual entrepreneur's project is defined by its success probability, which is private information, known only by the entrepreneur and, therefore, not known by the financial institutions.

Section 3 develops the model established for the first time period. Assuming the non-existence of moral hazard problems, the financial equilibrium may cause separating equilibrium, with projects being financed through some level of the entrepreneur's own equity and an overbearing level of debt. Interestingly, even considering the possibility of adverse selection, this does not strictly occur and all entrepreneurs receive an actuarially fair payoff. However, there is one singular characteristic of the adverse selection problem: the financing of investment projects that are simply too risky. Hence, credit rationing does not exist and firms become highly leveraged. Note that banks are risk-neutral in the boom stage and thus, all projects are equally attractive to them.

Section 4 discusses the main issues of the second period, which is characterised by the economic environment in downturn. Downturn is the essential effect of the conditions and results of the first period. In the boom stage, due to banks' incentives to lend at maximum, firms

³ The claim of Chamberlin (1929) that there a tendency towards collusion when there are few sellers has been endorsed by a number of influential authors, in particular Samuelson (1967) and Stigler (1964). See also Scherer (1980).

become highly leveraged. Investments are the main drivers of economic growth. However, consequent overinvestment is not desirable, as the study of de Meza and Webb (1987) rightly points out. Furthermore, the quality of investments may not be proper, as derived by Hillier and Ibrahimo (1992). Because of the high level of firms' leverage, the probability of defaulting on investment repayments inevitably increases. Perhaps the most basic underlying driver of the crisis is the inherent cycle of human psychology in relation to risk perceptions. Whenever times are good, perceptions of risk diminish. Individuals convince themselves that the good times will go on indefinitely. Then, when the downturn becomes apparent, risk aversion increases, often far beyond normal levels. The psychological effects of this boom-bust cycle are amplified when investors use leverage. Borrowing in order to purchase assets is lucrative when asset prices are rising, because all the upside value beyond the interest costs goes to investors, not to the lenders. However, when times are bad and asset valuations are falling, the losses of investors are magnified by leverage. The models of Modigliani and Miller (1956) and Miller (1977) are highly illustrative on this issue. The adjusted present value model, which is derived by the authors mentioned, exemplifies that the firms have an incentive to be leveraged at maximum because of fiscal savings.

Section 5 considers policy implications of the most important results derived in the present model. Apart from many other government measures, we emphasise the great, pressing need for the correct and adequate central bank regulation of credit. The path which leads the economy to be over-heated or under-heated is clearly not in the least desirable.

Finally, in Section 6 we summarise the major results of the model and address the issue for further well-grounded research into the management of money and credit.

2. A model of credit and investment

The economic context is a two-period partial equilibrium and disequilibrium model, with informational asymmetries between banks and companies owned by entrepreneurs. Here we make precise the starting assumptions and conditions of the first period of the financial market. The unstable nature of equilibrium which will be the cause of financial fragility and downturn of the economy in the second period will be derived.

The explanation of the main assumptions of the model, as well as the behaviour and objectives of economic participants, are as follows. Each entrepreneur is endowed by a project. The projects differ in risk and can be financed through own equity, debt and outside equity. This type of finance is usual in the financial market. It is the framework of finance proposed in the

study of de Meza and Webb (1990). However, the present model takes also into consideration the seminal work of Stiglitz and Weiss (1981).⁴

For the purpose of simplicity, we assume that in the financial market there are only two groups of agents: entrepreneurs or firms in need of finance for their projects and banks or financial institutions who make it available.

Entrepreneurs behave in a risk-averse manner and are expected utility maximisers, all with identical continuous quasi-concave utility function of end of period wealth, $U(W)$. Each of them is endowed by the same initial wealth, W_0 , which can be invested in an indivisible amount of investment, K , or in a safe asset paying the same interest ρ . Again to simplify matters, it is assumed that deposit is the unique safe asset in the market, thus if projects are not carried out, the initial wealth W_0 is invested in deposits demanded by banks. The i th project, when carried out, earns a random return \tilde{R}_i of R_i^s if it succeeds and R_i^f if it fails. Following the mean preserving spread condition defined by Rothschild and Stiglitz (1970), each project has an equal expected return. Thus, for each project:

$$(1) \quad p_i(R_i^s)R_i^s + [1 - p_i(R_i^s)] R_i^f = \mu, \text{ for all } i.$$

In this equation, p_i is the success probability of the i th project and μ is a constant. Without any loss of generality, consider that $R_i^f = R^f$ for all i . Projects are ranked in accordance with the second-order stochastic dominance definition, i.e. projects differ in risk and since p_i depends on R_i^s , they therefore differ in the successful return. Entrepreneurs' projects are distributed uniformly in the interval $(0, 1)$. The high-risk projects have a lower probability of success than the low-risk projects. The successful probability is inversely related to the successful return, i.e. the higher the successful return, the lower is the successful probability. This relationship comes from the above equation. In what follows the subscript i will represent the entrepreneur's type of risk.

To motivate the need for external finance, we assume that $W_0 < K$, thus, if a project is to be carried out, additional finance must be raised. Banks are willing to offer finance through the issuance of outside equity and/or debt security. Debt security of current value B pays in the successful state an amount: $D = (1+r)B$, where r is the loan rate charged by banks, or otherwise pays the total project return to the bank in the event of bankruptcy. Then the return on

⁴ The model developed here resembles closely that of de Meza and Webb (1990). A basic distinction is that in the latter authors' case, investment projects differ in terms of expected return, whilst in our case, they differ in terms of risk, as in Stiglitz and Weiss (1981).

debt security is $\min(D, R^j)$, and the return on equity is $\max(R^j - D, 0)$, where $j = s, f$. The proportion of inside (own) equity in the project is $0 \leq \alpha \leq 1$, which is held by the entrepreneur and what is left – the proportion of the outside equity – is sold to a bank. For the demand of debt security with face value of repayment D and the proportion $(1 - \alpha)$ of the equity, the bank agrees to pay an amount F .

Taking into account the two states of nature in the first period, if a project of category i is successful, the entrepreneur's or firm's end-of-period wealth is:

$$(2) \quad W_i^s = \alpha(R_i^s - D) + (1 + \rho)(F + W_0 - K).$$

And in the unsuccessful state, the wealth is⁵:

$$(3) \quad W_i^f = W^f = \alpha[\max(R^f - D, 0)] + (1 + \rho)(F + W_0 - K).$$

Given the uncertainty of states and assuming that the utilities are not state-dependent, the expected utility of an entrepreneur of category i is defined by the following function:

$$(4) \quad EU(W_i) = p_i U(W_i^s) + (1 - p_i) U(W^f).$$

The entrepreneur will implement the project if:

$$(5) \quad EU(W_i) \geq U[(1 + \rho) W_0].$$

A group of a few large banks provide finance. They are assumed to be risk-neutral and expected profit-maximisers. Oligopoly is the market structure in which banks operate, according to the Chamberlin (1929) hypothesis on price strategies, i.e. each competitive bank assumes strategically the hypothesis of the unit conjectural variation in prices. As Vives (1989) rightly states the viewpoint of this author: 'He [Chamberlin] thought that while in the 'large group' case the monopolistically competitive model was appropriate, in the 'small group' case firms would act (implicitly) to maximise joint profits taking into account the possible use of retaliation strategies against defectors. This view has been endorsed by many influential economists, including Samuelson (1967) and Stigler (1964), and has been popularised in Industrial Organisation textbooks like Scherer (1980).' (p. 505).

Banks pay for each unit of deposit the safe interest rate ρ . To simplify, it is assumed that other costs to the banks are absent. The supply of funds is non-decreasing at the safe rate of interest. It is also considered that banks have knowledge with regard to the distribution of entrepreneurs'

⁵ For a given financial contract, note that $W_i^f = W^f$, for all i , as $R_i^f = R^f$.

categories. Furthermore, they know the success probability p_i of each category of entrepreneur. Nevertheless, banks have no means of distinguishing *ex-ante* the characteristics of each entrepreneur's project. This assumption makes clear the fundamental asymmetry of information in the model. A relevant issue is that the *ex-post* return of each project, once completed, is assumed to be observable with no cost to participants in the market. If funds are offered, the financial contract stipulates its values' conditions for F , α and D . With this financial contract offered to an entrepreneur of type i , the joint-profit equation of banks which could come from this entrepreneur in the successful state is⁶:

$$(6) \quad \Pi_{Bi}^s = D + (1 - \alpha)(R_i^s - D) - (1 + \rho) F, \quad \text{for each } i \text{ in } (0,1).$$

And in the unsuccessful state:

$$(7) \quad \Pi_{Bi}^f = \Pi_B^f = \min(D, R^f) + (1 - \alpha) \max(R^f - D, 0) - (1 + \rho) F.$$

So, expected profit to the banks from a project of type i and the offered financial contract is:

$$(8) \quad E(\Pi_{Bi}) = p_i \Pi_{Bi}^s + (1 - p_i) \Pi_B^f.$$

In this model, coalition between entrepreneurs is not permitted and so each entrepreneur will potentially execute just one project.⁷ However, because of the unit-conjectural variation behaviour, there is a tendency to an implicit agreement between banks concerning the optimal offer of financial contracts.

The definition of the equilibrium is now introduced.

Definition 1: Equilibrium in the financial market is a set of financial contracts such that all contracts in the equilibrium set yield the maximum jointly-expected profit to banks; in addition, with these contracts, entrepreneurs obtain an expected payoff which is actuarially fair and maximum.

This definition implies that banks assume the unit-conjectural variation behaviour as in the Chamberlin model mentioned above. That is, each bank expects that the rivals will vary the terms of financial contracts in precise accordance with its own decisions.

The next section examines the conditions and the properties of the market equilibrium in the first period of the model described.

⁶ Because of the Chamberlin (1929) hypothesis, there is a tendency towards an implicit coalition among banks.

⁷ Thus, the terms *project*, *entrepreneur* and *firm* are often used interchangeably here.

3. Nature of equilibrium in the first period

As explained earlier, equation (1) defines the risk of a project. The higher the success probability, the lower is the risk. According to the mean preserving spread criterion, more risky projects have a larger variance in returns than the less risky ones. This section shows that the nature of equilibrium in capital markets with asymmetric information is highly unstable.

Chamberlin's hypothesis of implicit coalition between banks implies that equation (8) must be jointly maximised when a financial contract is offered to an entrepreneur of category i . Here we assume that $R^f < D$. This assumption is more logical and interesting than otherwise. Now taking into account equations (1), (2), (3), (6), (7) and (8) and after some mathematical manipulation, equation (8) becomes:

$$(9) \quad E(\Pi_{Bi}) = \mu - [p_i W_i^s + (1 - p_i) W^f] + (1 + \rho)(W_0 - K).$$

On the right side of this equation, the first and third components are constants. For the sake of simplicity, we assume that the value of K is constant in the first period. The expected profit of banks is a linear decreasing function of the success probability in the $((E(\Pi_{Bi}), p_i)$ geometric-space. The lower the success probability, the higher the expected profit will be. Therefore, as p_i approaches the zero value, the expected profit of banks obtained from the riskiest project tends to reach its maximum value. As in Stiglitz and Weiss (1981), banks prefer riskier projects because they expect to gain higher profits from them. Banks will maximise the jointly-expected profit if all categories of projects are financed. Thus, there is no advantage in rationing credit, which clearly contradicts the claim made by both Stiglitz and Weiss on this matter. Here it should be noted that banks seemingly cannot *ex-ante* ascertain the quality or category of each project, despite the fact they know the distribution of projects' qualities. This issue is clarified below. Noticeably, the marginal project is the least risky one, in which the success probability approaches its maximum value of one.

Although there is an *ex-ante* asymmetry of information between banks and entrepreneurs, banks have knowledge of the probability distribution of projects. Even without knowing who the marginal entrepreneur is, banks are able to determine the optimal financial terms which should be offered to this entrepreneur. Differentiating equation (9) with reference to the success probability and making it equal to zero, the following equation is obtained:

$$(10) \quad \frac{dE(\Pi_{iB})}{dp_i} = -W_i^s + W^f = 0.$$

From equations (2) and (3), equation (10) becomes:

$$(11) \quad -\alpha(R_i^s - D) + \alpha \max(R^f - D, 0) = 0.$$

Noting by assumption that $R^f < D$, then the optimal financial contract which should be offered to the marginal entrepreneur should imply $D = R_i^s$. Here, the index i refers to the marginal project. This means that the optimal debt for the marginal project should be equal to its successful return. It must be noted that R_i^s could be interpreted as the net successful return before the debt repayment. Also, note that the success probability of projects is a decreasing function of the successful return. For the optimal financial contracts offered by banks, there may be many combinations of α and D . However, because of *ex-ante* asymmetric information, it is in the banks' interest to devise an incentive-compatible set of financial contracts to be offered so as to screen the risk-categories of the potential projects to be financed.

The expected profit of banks, expressed by equation (9), is maximised if all risk categories of projects are financed for their investments. Thus, the optimal result derived from equation (11) can be generalised to all types of projects, but making the proportion α (inside equity) higher, with a higher level of debt demanded by entrepreneurs. More precisely, banks will offer the required credit for all investments, on condition that a higher debt demanded should be matched by a higher proportion of inside equity. Since funds are provided to all projects, riskier entrepreneurs have no incentive to conceal their specific risk quality. Hence, in equilibrium, the optimal financial contracts must satisfy the increasing function:

$$(12) \quad \alpha_i = f(D_i).$$

With this function, banks define the optimal set of financial contracts (F, α_i, D_i) to be offered to entrepreneurs. The value of F will be determined elsewhere. The optimal result of equation (11) must also be satisfied for all projects, i.e. $D_i = R_i^s$. Again, it must be noted that banks do not know *ex-ante* the value of R_i^s . However, in devising the terms of financial contracts as defined in equation (12), banks have a real possibility to screen the risk quality of projects. Here, one issue could be raised: Why would entrepreneurs taking greater risks want to maximise the level of demand for debt? Elsewhere, it is shown that in behaving in this manner, they will obtain the same payoff as that gained by the entrepreneur taking the least risk. Moreover, although in a different setting, the model developed by Modigliani and Miller (1957) and Miller (1977) shows that the companies have a real incentive to become highly leveraged via debt. The rationale for this is the maximisation of net income from fiscal savings which result from debt acquisition.

One point must be made clear here. Since banks could identify the risk quality of all projects via the set of incentive-compatible financial contracts, is there any possibility of charging different posted loan rates to entrepreneurs in accordance to their categories? Because of *ex-ante* asymmetry of information, banks cannot use the interest rate discrimination, given that in such an event, entrepreneurs would conceal their risk characteristics.

Indifference curves of risk-averse entrepreneurs are determined from equation (4). The slope of an indifference curve in (W^f, W^s) space is given by:

$$(13) \quad \frac{dW_i^s}{dW^f} = - \left[\frac{(1-p_i)U'(W^f)}{p_i U'(W_i^s)} \right] < 0, \text{ for all } i \text{ in the interval } (0, 1).$$

It is straightforward to prove that the indifference curve is strictly convex and steeper, at any point to the left of the certainty line, for riskier projects.

Taking into account the supply of, and demand for, financial contracts, the wealth of entrepreneurs in both high and low states, defined by equations (2) and (3), is:

$$(14) \quad W_i^s = W^f = (1+\rho)(F + W_0 - K), \text{ for all } i.$$

Then equation (4) becomes:

$$(15) \quad EU(W_i) = U [(1+\rho)(F + W_0 - K)], \text{ for all } i.$$

If ρ is the equilibrium rate on deposits, the projects will be executed under the conditions defined by equation (5) and (15), which means that:

$$(16) \quad (1+\rho)(F + W_0 - K) \geq (1+\rho)W_0.$$

In this equation and from the results derived, F can be thought of as the market value of a project, and K the cost of the capital asset of a project. From equation (16), it must be $F \geq K$. In both states of nature, each project secures an actuarially fair payoff equal to $(1+\rho)(F + W_0 - K)$. Thus, from the viewpoint of each entrepreneur, his or her project must be implemented.

Before summing up what has been developed up to now, one issue must be explained: the incentive of entrepreneurs to reveal their risk characteristics and thus to make use of the highest feasible level of debt available that is equal to the successful return on the projects. Indeed, entrepreneurs can conceal their risk type by indicating that it is of the less risky category. By so doing, they will obtain a lower level of debt and the proportion of inside equity will approach

the zero value. However, their payoffs will be exactly equal to that obtained by revealing their true risk characteristics. In this case, the value of inside equity will be approximately equal to zero and the model will be defined by the existence of a pooling equilibrium, with equal terms of financial contracts offered to all projects. This is a real possibility and the aggregate level of debt for investments will be lower than otherwise. However, entrepreneurs are apparently indifferent as to the matter of whether to reveal or not to reveal their risk type. Therefore, there is no incentive for entrepreneurs to conceal their real characteristics. Although in our model we do not consider the benefit of debt which leads to fiscal savings, this possibility generates an incentive for the more risk-assuming entrepreneurs to disclose their categories. Hence, this is more likely to occur. If this is the case, a separating equilibrium will come into existence in the model and banks will maximise their expected profit.

In addition, it must be noted that the proportion of the inside equity may function as a collateral offered by entrepreneurs to banks to guarantee the potential adversities in returns caused by uncertainty.

To summarise the results derived for the first period, the following proposition is now established.

Proposition 1: Let us assume that all categories of projects in a financial market have a common expected return, but each one has a different dispersion of returns. Furthermore, let us assume that banks cannot *ex-ante* ascertain the extent of risk of a project category. Then there may be a separating equilibrium, so that: (i) separating contracts are signed with $\alpha_i = f(D_i)$, an increasing function, $D_i = R_i^s$ and $F \geq K$; (ii) banks maximise their expected profit; (iii) firms obtain an actuarially fair payoff equal to $(1 + \rho)(F + W_0 - K)$; and (iv) the aggregate level of debt is too high in the economy.

Let us now put into perspective the implication of this proposition for the first period of the model which accurately delineates the specific features of the general boom stage of the free market economy. In this economic setting, there is generally excess liquidity under the control of banks. Observing that banks desire to maximise their profits and that the economic conditions are demonstrably highly favourable for investments, banks have a tendency to mismanage the risk quality of entrepreneurs' projects and, in general, the risk quality of all economic agents (George Soros, 2008) who look for funds to finance their consumption or investments. As some economists pointed out, under such a condition, it is likely that the irrational, exuberant attitude (Alan Greenspan, 2007) of investors will govern their behaviour. In other words, the animal spirit of decision makers (Keynes, 1936; Pasquinelli, 2008; Akerlof and Shiller, 2009) in the financial markets will find suitable conditions for its full development.

As a consequence, there is a continuous wave of debt supply and demand. The leverage of companies becomes increasingly unmanageable. Under this outcome, the equilibrium found in the economy may be exceedingly unstable (Minsky, 2008). This nature of equilibrium is not desirable and most probably will herald a period of disequilibrium, in which many varieties of non-beneficial economic and sociological effects emerge. The lack of confidence of economic participants, the devaluation of capital assets, the high level of unemployment and the decrease in the level of production are some examples of non-beneficial economic effects. To put it briefly, the wave of mismanaged debt, to which all of the economic agents have contributed, may result in a deep, generalised economic crisis. This explains the endogenous possibility of economic cycles. Now we have the main ingredients, as well as the motivations, to examine the features of the model relating to the downturn phase of the economy, that is, the second period of the model.

4. Downturn and disequilibrium in the second period

A number of studies in the economic literature recognise that the investment is the main engine of economic growth. Nevertheless, as mentioned by Hillier and Ibrahimo (1992), de Meza and Webb (1987), and Stiglitz and Weiss (1981), the quality of investment financed is critical for the sustenance of sound equilibrium in the capital markets. In the previous section, it was shown that a large number of investment projects are funded. As a result of this, there is a great, expanding wave of aggregate debt in the economy, in which a number of bond promises are of bad quality because of their high default probability. An intriguing aspect of this scenario is expressed in the question: why are banks so willing to finance these projects despite the fact that they can have full access to knowledge of the risk quality of entrepreneurs via the incentive-compatible supply of financial contracts? A straightforward answer can be given: the animal-spirit tendencies of financiers and investors are a major explanation for the behaviour of these agents. On this subject, Keynes (1936) argues: ‘Even apart from the instability due to speculation, there is the instability due to the characteristic of human nature that a large proportion of our positive activities depend on spontaneous optimism rather than mathematical expectations, whether moral or hedonistic or economic. Most, probably, of our decisions to do something positive, the full consequences of which will be drawn out over many days to come, can only be taken as the result of animal spirits – a spontaneous urge to action rather than inaction, and not as the outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities.’ (pp. 161-162).

On the basis of this view, credit is granted where it is not due. Thus, the allocation of debt in the economy is not socially efficient. The second period of the model inherits the full properties and results engendered by the economic dynamics of the first period. Equations (11) and (12),

condensed in Proposition 1, generate endogenously the fundamental outcomes of the second period. The high leverage of firms and the consequent high dependence of banks on deposits may suitably be described as a dynamic wave of debt. This explains why the equilibrium in the first period is inherently unstable. It is not because of any kind of external shock which may arise, but essentially due to endogenous variables of the capital market.

A large number of projects funded and therefore implemented in the first period are characterised by low success probabilities. Market participants, who are also subjective observers, and the real world of the capital market, the object of observation, are not separated. Subjective observers play an important role in defining the effective structure of the financial market through confidence. Agents, by observing the fragile nature of the equilibrium in the first period, will distrust the soundness of the market structure in the second period. As a result of this, a pervasive bubble of debt created successively in the first period will collapse in the second period. A large number of firms, with high default probabilities, will not be in a condition to repay the money borrowed, in addition to which the level of deposits with banks may decrease substantially. Under these circumstances, the expected profits of banks will be reduced and there may even be a high possibility of banks' bankruptcies. Furthermore, for new investments, both the supply cost of capital, K , and the demand cost of capital (market value of new investments), F , will be devaluated.

On the balance sheet of companies, because of devaluation of the supply cost of capital, K , the value of their assets will be lower, and the debt liabilities of a large number of firms will be higher, due to the costs of bankruptcy. For these firms, the burden of debt servicing will not be sustainable. Moreover, on the balance sheet of banks, because of the non-repayment of a significant number of debt promises, the value of credit will be lower, which, in turn, will decrease the asset value of banks relative to the deposit liabilities. Due to this fact, banks will assume a risk-aversion stance to lending money to investors. A natural consequence of this second period context is the diminishing level of credit offered in the capital market.⁸

Although the values of F and K are exogenously given in the present model, it is reasonable to assume that they are determined by the specific conditions prevailing in the capital market and, in general, in the economy.

Therefore, the most probable event in the second period is disequilibrium and distress in the financial market and, as a consequence, there may be a negative propagation mechanism from the capital market to the general economic system. In other words, the business cycle in the economy is created endogenously. In the absence of interventions by the government and the

⁸ On liquidity constraints but in a different setting, see Webb (2000).

central bank, systemic risks cannot be removed and hence, economic cycles are inevitable. Similar to the quantum leap phenomenon studied in physics, there is here a predictable jump from the general boom stage to the general downturn stage, a leap from equilibrium to disequilibrium in economic settings.

The following proposition summarises the results derived above.

Proposition 2: Given the properties of the financial markets delineated above and taking into account the absence of government and central bank interventions, business cycles in the free market system are endogenous and unavoidable.

This viewpoint is supported by Sharpe (1994) and Bernanke and Campbell (1988), who argue that the increased reliance on debt gives rise to substantial social costs associated with the financial distress, which could lead to the inevitable end of the boom cycle.

At this stage of our analysis, it is legitimate to ask if there is any type of social and economic organisations which could function as an alternative to the market system organisation. Examining the history of those social and economic alternatives, the answer is definitely negative. Thus, it is pertinent to discuss the policy implications of the present model. In the market system, the role of regulators is fundamental to the aim of circumventing the harmful social effects of the economy.

5. Policy implications and responsibility of regulators

A partial equilibrium model has been examined. It is highly probable that a credit crunch could emerge in the second period of the model. Accordingly, the real attribute of the downturn in this period will be characterised by insidious credit collapse in the financial market and in the economy as whole. Despite the nature of the model presented here, we will advocate the use of policies focussed on the mitigation of the problems caused by the credit crunch and, therefore, we will go further than the immediate implications raised by the present study. That is, we will broaden the scope of the policies required.

A citation of George Hegel by George Friedman (2009) is revealing: ‘To him who looks upon the world rationally, the world in turn presents a rational aspect. The relation is mutual.’ (frontispiece). Conversely, we could argue that to him who looks upon the world without confidence, the world in turn presents a non-confident aspect. The relation is mutual. This is in line with the principle of reflexivity enunciated by George Soros (2008), as well as with the idea of animal spirits so finely explored by Akerlof and Schiller (2009). Here, we emphasise that the general economic conditions are determined by the mutual relationships between people and the real world. Most certainly, the particular views of human beings, as well as the manner in which

they behave, are crucial to inducing either the boom state or the downturn state in any free market economy.

Throughout the history of capitalism, business cycles have periodically occurred for a number of reasons. We argue that such occurrences lead to specific features of economic downturns, depending on specific natures of the economies. Contrary to the past downturns, the present recession, which emerged in 2007, is distinct in terms of its characteristics. It is possible to enumerate a number of causes explaining the present crisis: for instance, the low level of aggregate demand and the high energy prices. However, the immediate origin of the current economic crisis is overwhelmingly the credit crunch. Moreover, the current crisis is pervasive, that is, it affects the economy as a whole. Hence, in today's economies, the management of money and credit supplies assumes a relevant role so as to overcome the troubles arising from the credit crunch.

As the study of Akerlof and Schiller (2009) emphasises, the credit crunch has its origins in three separate causes: first, the usual method of financing has collapsed; second, with reference to the banks, the relation between capital loss and leverage has deteriorated; third, the already-promised credit lines to clients have put pressure on banks by cashing in money on the promises they have found easy to obtain in better times. The second reason for the credit crunch, as stated here, is well understood in our model examined above.

Now, if the business cycles in free markets may be the end-result of endogenous features and so may be unavoidable, what can be done to mitigate the negative problems arising from those cycles? First, the application of a judicious, transparent regulatory policy, rightfully formulated by the central bank would undoubtedly be the correct approach. Wise regulation begins by recognising that free markets are prone to bubbles and, thus, the regulators should have the ability to assume the due responsibility to prevent bubbles from growing, even if in a market with imperfect information, such a requirement is complex and not at all easy to accomplish. The control and management of debt growth constitutes an effective method to prevent bubbles. The conventional monetary policy seeking the adjustment of interest rates, as well as the policy of fiscal stimulus, is no longer adequate for dealing with the problems arising from the specific nature of recession originated by the credit crunch. In this case, the control of the aggregate money supply will not suffice as an attempt to obtain the required objectives of mitigation. The conventional macroeconomic policies must be complemented and reinforced by the use of accurate mechanisms of credit controls, which could entail the need for the banks to have the minimum own-capital requirements in their balance sheets. The level of this minimum capital may vary during the time-span of the business cycle. For instance, the minimum requirement for the loan-to-capital ratio on commercial papers must be targeted over the full time-span of the

business cycle. Moreover, freezing new shares issues during a bubble process would be a wise regulation.

Second, the regulator has to supervise the systemic risk inherent in bubbles, considering that many participants are on the same side of the market during the time-span of the bubble's development. A clear-cut way to resolve this issue is again to oblige banks to have in their portfolio a minimum of their own capital for the management of credit and assets and to prevent banks from using the money owned and deposited by third parties for the banks' own speculative purposes.

Third, following the insights of our model, if banks are able to ascertain the riskiness of investment projects, credit should be denied to those investments exhibiting too high a level of risk. In this way, the losses ultimately caused by bad debts would be minimised.

Fourth, considering the need to target the level of credit in order to sustain a suitable growth and development of economies, both central banks and governments should construct an appropriate incentive mechanism to allow banks for to offer credit continuously to well-ranked firms in the market. In their book, Akerlof and Schiller (2009) argue: 'Achieving the credit target is urgent for several reasons. Most notably, firms that count on outside finance will go bankrupt if they cannot obtain credit. If the credit crunch continues and many firms go bankrupt, it would take an impossibly large fiscal and monetary policy stimulus to achieve full employment.' (p. 89).

Finally, given the characteristics of the present-day credit crunch, which is an essentially implicit result of our model, there is an urgent need for the reform of the financial institutions and, in particular, the central bank supervision so as to avoid repeating the mistakes of the past and to fill the possible macroeconomic voids.

Another important issue should be addressed here, namely, the problem of the early detection of a growth cycle in which there may be a possibility of a bubble's evolution. For example, if the private agents in the market cannot recognise bubbles, do the regulators possess the skills required to spot these occurrences? Most likely, they will only identify such events in an imperfect manner. Even so, if they are prepared to monitor debts alongside money supply, they will surely have a factual possibility to identify those outcomes and can thus continually recalibrate the policy measures engaged in order to correct any mistakes that occur. Similarly to the case with money, credit matters, and thus government interventions, targeted to the level of debts, are extremely relevant to the task of ensuring the health of the financial market and the economy as whole.

To conclude, the policy measures described above are only meaningful if crises are caused by endogenous factors in the financial markets. Otherwise, only a minimum of government

interventions are justifiable. Undoubtedly, exogenous shocks on any economic system may produce cycles. For instance, changes in geopolitics are critical in explaining economic failures. However, in many other circumstances, it is no easy task to distinguish between endogenous and exogenous variables which explain the form in which an economic system functions. For this purpose, a more encompassing approach, such as that of political economy, might be more appropriate and effective.

6. Conclusion

This paper has presented a boom-bust model of the market economy. In the first stage, we developed a simple one-period partial equilibrium model of credit and investment with asymmetric information between two types of participants: banks and entrepreneurs. The environment is such that entrepreneurs behave in a risk-averse manner and each of them is endowed with a project at the beginning of the period. The projects, if carried out, require external finance from risk-neutral bankers, who offer financial contracts to entrepreneurs. All projects are assumed to have the same expected return and are distributed in continuous types, depending on the probability of securing the successful return. Investment projects with high probabilities of success are less risky. The quality of an individual entrepreneur's project is defined by its success probability, which is information privately held by the entrepreneurs and not known by the financial institutions. Because of banks' incentives to lend at maximum, firms become highly leveraged. Investment is the main driver of economic growth. However, any resulting overinvestment is not desirable, as de Meza and Webb (1987) rightly point out. Because of the high level of leverage, which increases the risk quality of projects, a large number of firms will default.

In the second period, the economic and financial downturn is the inevitable effect of the conditions and results of the boom environment of the first period. When the downturn arises, agents' risk aversion increases, often far beyond normal levels. The psychological effects of this boom-bust cycle are amplified when investors become highly leveraged. Borrowing to purchase capital assets is lucrative when asset prices are rising, since all the upside values beyond the interest costs go to investors and not to the lenders. However, when times are bad and assets' valuations are falling, the losses of investors are magnified by debt-leverage. The path from the good to the bad times is a result of endogenous factors of the free market system, that is, the rationale of business cycles is mostly defined by the internal factors of the economic system. Therefore, it makes sense to delineate policy measures so as to overcome the very possible negative effects arising from those causes.

Money and credit are scarce, vitally important resources, the efficient allocation of which is crucial for the healthy functioning and growth of market systems. In our model, we have

illustrated some disturbing views of what could occur if the allocation of credit is not conducted in a proper manner. Business cycles may necessarily take place. Since the writings of Adam Smith, despite the economic crises experienced periodically, free market systems, sustained by many forms of political democracies, have generated economic conditions propitious for the immense worldwide growth of wealth. Throughout the history of capitalism, economists have learned much from the economic crises. The Great Depression of 1929 is the prime example. After the writings of Keynes, the neoclassical synthesis produced a great advance in economics by learning from theoretical mistakes of past. In the current economic environment of globalisation, in which the present economic and financial crisis has taken hold, the time has come for scholars to produce new advances in economics by learning from this new global economic and political context, as well as by understanding the real causes of this crisis. All factors affecting the sustainability of economies merit serious study. Lessons should be learned from some essential causes of the present business cycle. The allocation of bank credit, the management of risk, the sound servicing of debt and the problems of asymmetric information constitute good examples for further research. Furthermore, the growth and development of economies do not only depend on the traditional factors of production. They also depend on efficient allocation of credit and on the wise use of non-renewable resources, as well as on the real improvement of the quality of human capital and of the emergence of new ideas. These areas should also be on the agenda for future research.

It is our conviction that in years to come, the economies will tend to rely on stronger regulatory instruments in order to avoid market failures. More regulated economies will most likely be the end-result.⁹ Thus, both academics and decision-makers should assume their roles and responsibilities in the task of devising more effective policy measures.

⁹ On this matter, see the interesting views of Gray (2009).

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