Model for the Formation of Economic Bubbles.

**Abstract:**

In this paper I intend to formulate of model that can describe the formation mechanism of an economic bubble. Also, I intend to formulate the conditions required for the economic bubble to occur.

**Introduction:**

The first occurrence of the term bubble appeared between 1711 and 1720, during the British ¨South Sea Bubble¨1. This was one of the first economic crisis.

The impact of an economic bubble is regarded as highly important for the economy, and for that reason the study of the phenomenon is of great importance.

Until today, there is no consensus in the academic world regarding the true cause of the bubble or a mechanism for accurately predicting the formation of a bubble.

This article aims to provide a possible model for explaining the mechanism that generates a bubble, and also provide a method for detecting it before it bursts.

**The idea of an infinite resource**

In order to detail the model, first I must introduce the idea of an infinite resource.

As it is known, no resource can be infinite per se. But, it is conceivable that a resource can be so great in contrast to another, that it can be approximated as infinite. Let´s consider the case of information. Theoretically, information is infinite. We can produce such large amount of information, that by contrast, any material resource will fade. For example, let´s consider a song that we want to sell on the internet. Because that song is just a piece of information, it can be sold in billions of copies. There is no material limit regarding the possibility of selling information or producing it, unlike any material good, such as cars or airplanes.

Also, we must notice the fact that information has a very limited variable price. It has a fixed price, the price required for producing that information, but once the information is available, there are no more prices to be paid for manufacturing it. In contrast, in the case of a material good, there are always variable prices such as materials, manufacturing, etc... Of course, this is not completely accurate, but as a model we can consider that the variable prices of information are very small. Let's consider again the case of selling a song on the internet. We have to upload the song on a server, and for that we must pay a maintenance tax, but assuming that we will sell 1 billion copies, that tax is very small.

This situation leads to the following idea. Because there are no variable prices when it comes to information, once the fixed prices are covered, there is no more minimum price required for selling that information (from the producer perspective). Once the fixed prices are covered, information can be theoretically sold at any price, as long as there is a demand for it. This leads directly to the idea that, considering that demand can never reach zero (if we consider the fact that demand diminished exponentially - exponential functions can never be 0), information can be sold forever, because there are no variable prices and the producer of that information has no reason to stop selling at a price that is always diminishing because it will always end up producing a profit from that sell. This lead to the following formulation:

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| --- | --- |
|  | (1) |

So, in theory, the profits made by selling information can be infinite. Of course, this is not true in real life.

**Model for describing the economic bubble formation and detection**

Let's now consider the case of an economic bubble.

It is know that an economic bubble always occurs under the influence of large amount of crediting.

Credit itself is not a material good, unlike money. Credit is a form of information; when someone takes a credit from a bank, one theoretically sells the information that one will return the money in a fixed amount of time and will also pay an interest rate. But, unlike credit, money or liquidities are a material good. They are not infinite. On a given time, there can be only a fixed amount of liquidities on the market. So, in this case we have a situation where an infinite resource (credit) is traded for a finite resource (liquidities). According to the model of an infinite resource described before, in theory, an infinite resource can acquire all the finite resource (because it has no fixed prices). This means that in theory, the amount of credit can be infinite which means that there is no limit to the amount of credit that can appear on the market, taking away all the liquidities (situation that occurs in the case of an economic bubble - a crisis of liquidities because the credit ate it all).

Now, let's consider the case when a bank is making a loan.

Obviously, banks need a certain amount of liquidities in order to function. So it would be impossible in practice for a bank to make loans until it goes bankrupt.

That certain amount of liquidities required by the banks to function will be named critical point.

So, theoretically, a bank will make loans until it reaches the critical point and then it will stop. This case would be true if we were to consider a single bank that is making loans. That bank will always know when it comes close to the critical point and therefore it will always be aware when it can no longer offer credit.

But, on the real market, there are multiple banks. Every bank has its own critical point. Also, any bank can loan money to another bank. This fact leads to a very interesting situation. One bank can reach the critical point, and in that case it can make the following reasoning: I will continue to provide loans beyond the critical point, and in order to fill the gap I will make loans myself to another bank. If the interest rate of the loan that the bank provides is grated that the interest rate required from the bank that is afterwards loaning the first bank in order to fill in her gap, then the first bank is going to make a profit.

One the other hand, considering we have multiple banks on the market, all finding themselves in the same situation of reaching the critical point, all the banks can make the same reasoning. I will keep giving loans, and cover my gap from another bank.

This situation in itself is not dangerous, as long as the banks are fully aware of the liquidities available on the market. In order to be aware of the liquidities, all banks must exchange information between themselves considering the amount of liquidities that each of them has. This information is indeed exchanged, but it is exchanged at a certain speed. We will call that speed the "speed of information exchange".

On the other hand, banks are making loans. This loans are also made at a certain speed. We will call that speed "speed of crediting".

If the speed at which the banks are making loans is greater than the speed at which the banks exchange information about liquidities situation on the market, then it is likely that when all banks are making a lot of loans and are reaching the critical point, one bank will make a loan that goes beyond the critical point and then find itself unable to fill in the gap, because all the other banks did the same thing and no one has any more liquidities to loan. In this case, the bank that went beyond the critical point can no longer sustain itself and goes bankrupt.

This phenomenon can usually be observed only in the last portion of the decaying liquidities, when banks start to panic because of the scarcity of liquidities.

But, by taking into account the fact that the speed at which the loans are made and the speed at which the information between banks travel are real and measurable properties, this phenomenon can be predicted earlier, by measuring and comparing these two speeds.

A market in which the speed of offering loans is grater then the speed at which information about liquidities travels between banks is a market that is unstable and it is likely that this type of market will result in an economic bubble.

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|  | (2) |

**Conclusion:**

The model presented here is intended to predict the formation of an economic bubble. A lot of work would be required in order to figure out how to accurately calculate the speed of crediting and the speed of information exchange.