Refutations of Say's Law and Dynamics of a Monetary Economy of Production

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Abstract:

In a monetary economy of production, Say's law is not verified for many reasons. On the basis of these refutations, it is possible to state that the demand issued from the revenues generated by the production process is structurally lower than the value of production. We study here the dynamics of such an economy and obtain two main results. First, the long-term debt of this economy has to increase along a growth phase to enable the global demand to grow at the same pace as the global supply. Secondly, due to the repayment of this debt, the gap between the global supply and the demand issued from the revenues generated by the production process widens along a growth phase.

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1. Introduction

In a famous article, Domar develops a model which aims to spread to the long-term the Keynesian multiplier (1947). Investment effects are not only taken into account on the demand side, but also on the supply one, by increasing the stock of capital. One of the main results of this study is that investments enable demand to equalise supply in the present, but make this adjustment more difficult in the future by increasing the capacity of production of the economy. Investments appear then to be "*at the same time a cure for the disease and the cause of even greater ills in the future*" (ibid, p 49-50). Consequently, more and more investments are required to allow demand to grow at the same pace as supply.

Recent studies, within the monetary circuit theory (Cottin-Euziol *and* Rochon, 2013) and the Domar model framework (Cottin-Euziol, 2015) have shown that similar results could apply for bank credits having financed investment and their repayments. In both cases, investments financed by bank credits are necessary to equalise demand and supply. However, the repayment of these credits will tend to heighten the gap between demand and supply in the future. Indeed, these repayments are equivalent to a destruction of money, interests excluded. They represent then a spending, made by firms on their receipts, which will generate no revenues, creating a gap between the revenues distributed by firms and the ones they intend to receive. More investments financed by bank credits will then be necessary to fill this gap in the future, drawing similar mechanisms as in the Domar model.

Our goal in this study is to generalise this reasoning to a monetary economy of production. Proposed by Keynes and further developed by Post-Keynesians, this concept is a cornerstone to understand how economies work. More precisely, we would like to show that, as soon as we consider Say's law as incorrect within this framework and take into account the results mentioned above, the volume of long-term debt as well as the gap between the global supply and the level of demand issued from production should increase during a growing phase. To do so, we will first come back, in the next section, on the notion of monetary economy of production. We will then study, in section 3, the different refutations of Say's law developed within this context. On the basis of these refutations, we will propose in section 4 a very simple model, aiming at representing the functioning of a monetary economy of production. In sections 5 and 6, we will study respectively the evolution of the long-term debt and of the gap between demand and supply in this model. Finally, we will conclude in section 7.

2. The main features of a monetary economy of production

In the 30's, Keynes called for the development of a monetary theory of production, opposed to the real exchange economy built by classical economists (Keynes, 1930, 1937a, b). Such a framework was for him necessary to understand macroeconomic dynamics and imbalances. Afterwards, mainly Post-Keynesian economists will developped his project (Graziani, 2003; Rochon *and* Seccareccia, 2013). Relying on their works, we distinguish three main principles on which relies a monetary theory of production. The first one is called the principle of *essentiality*, the second one refers to the notion of endogenous money, and the third one to the concept of debt-money. In this section, we come back successively on these three principles.

According to the principle of essentiality (Parguez, 2003), money is not only a medium of exchange, but also and above all an essential condition for the realisation of production. Taking its roots into Keynes' Treatise on Money (Keynes, 1930) and in the finance motive (Keynes, 1936; 1937a, b), it explains that firms need an access to money in order to trigger their production process. Focus is not then placed on the desire to hold money, but rather on

the one to spend it. Money is not anymore regarded as a stock, but as a flow, necessary to the financing of production. This principle is closely related to the one of historical time. Indeed, firms need money to produce because the process of production takes time and precedes the selling of goods.

The second principle is the endogenous nature of money. This notion, developed among others by Robinson (1956), Kaldor (1970) and Moore (1988), states that the quantity of money is mainly determined by the demand of bank credits of solvent agents. Money is then detached from any reference to a standard and banks can grant credit theoretically without any limitation, obtaining afterwards the reserves required by the law. This does not mean that the access to bank credits cannot be constrained, but that their scarcity cannot be explained by boundaries in the money emission, as it was the case for example under a gold standard system[2]. Interest rates are, as for them, exogenous and no longer natural.

The third one is that the money injected to finance production and other spending relies on bank debts. As written by Rochon (2003, p. 123), "*Capitalist economies are debt economies: production cannot be separated from the discussion over credit, bank and debt*". Firms will then have to repay borrowed sums to banks, leading to a destruction of the corresponding money. The functioning of economies is then characterized by these flux and reflux of money from banks to firms and firms to banks. This principle is at the core of the Monetary Circuit Theory (Graziani, 1990, 2003; Piégay and Rochon, 2003; Rochon, 2009) and Stock-Flux Coherent Models (Godley and Lavoie, 2007), where a systematic effort is made to insert a money fully backed on bank debts.

Putting these three notions together, we obtain the description of an economy in which money is necessary for production, endogenous and relies on the issue of bank credits. This looks a much more realistic view than the classical real exchange economy. Several refutations of Say's law have been expounded within this framework. We explore them in the next section.

3. Refutations of Say's law in a monetary economy of production

Since its enunciation in 1803 (Say, 1803)[3], the validity of Say's law has been the subject of numerous debates (Sowel, 1972). It remains the central pillar of the neoclassical theory and an unrealistic construction for most heterodox schools. We present here different refutations of this law offered within a monetary economy of production. Some explain why the factors of production can be underused and others why the whole production cannot be sold. Within the latter, some rely on the excess of savings and others on the lack of revenues generated by the production process.

An important refutation, which is common to the Keynesian multiplier theory, the Domar model and numerous Post-Keynesian models, is what Graziani called the non-opening of the circuit (Graziani, 1990). Inside, supply refers to the capacity of production of the economy and demand depends on the mindset of entrepreneurs, which will determine their decisions of production and investments. Nothing insures that these decisions will imply full utilisation of the capacity of production of the economy. Such a situation is just a special case of a wider set of possibilities. Most of the time, the stock of capital is underused and unemployment appears.

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[2] To a further discussion about this point, we refer to the debate between Horizontalists, assessing a curve of money offer which is horizontal and Structuralists, assessing that it is to certain extent positive.
[3] Smith (1774) and Mill (1821) offered also reasoning very close to Say's law.

A second kind of refutation relies on the idea that households hoard or save a part of their revenues. These amounts do not then flow back toward firms and prevent them from selling their whole production. Say's law is therefore refuted in this case by the existence of an important amount of unused revenues. This explanation has been advanced by a lot of economists (among others, Malthus, 1820; Marx, 1884; Keynes, 1930). For Keynesians, the main explanation of this excess of saving in a monetary theory of production is that it is not saving which generates investments, but the contrary. There are then no reasons for investment and saving to be equal. Within the monetary circuit theory, Graziani calls it the *non-closing* of the circuit.

The third one relates to the non-injection by firms of the sums allowing them to make profits. This refutation relies on the thought of Sismondi (1819), Malthus (1820) and Marx (1885) and is directly linked to the recent debates among monetary circuit theorists about the monetary origin of profit (Zazzaro, 2003; Rochon, 2005, 2009). The idea is that firms could not make profits on the basis of the revenues they have injected while producing. In this case, even if all these revenues injected are spent, demand resulting from them would be lower than the firms' expectations of selling. Denis (1997, 1999), Renaud (2000) and Cottin-Euziol and Rochon (2013) have offered refutations of Say's law relying on this argument. The global demand is then insufficient to buy the whole production, even in the absence of saving.

Finally, a fourth explanation relies on the fact that firms finance a part of their production costs through their made profits. It has been proposed by Schmitt (1984), inside the monetary circuit theory. Following his refutation, the whole sale of production requires at least that all made profits are spent to buy production or investment goods, and so are added to the global demand. If, on the contrary, production costs are partly financed on them instead of being financed by short-term bank credits, this will create a discrepancy between the global supply and the global amount of revenues. Indeed, a given volume of money would have been used to produce goods instead of being used to consume the goods produced. Therefore, the production process will generate insufficient revenues to enable the selling of the whole production.

These different refutations explain why demand and revenues can be structurally lower than supply and match the opinion of Renaud, when he writes:

"In the absence of compensatory factors [...] the rule of a monetary Production is the structural inferiority of expenditures in relation to the supply price of total production and the subsequent invalidation of Say's law." (Renaud, 2000, p.302)

We can notice that these refutations appear because we considered a monetary economy of production. Indeed, in a non-monetary economy, in which production costs are paid in kind and profits are made in kind, none of these refutations would be true. We present in the next section a simple model taking into account these refutations.

4. A simple representation of a monetary economy of production

We have explained in the previous section how, in a monetary economy of production, revenues and demand can be lower than the value or the capacity of production. For the three latter refutations, we can notice that this is especially true in a growing economy. Indeed, as the revenues increase, the net flues of savings, which are linked to them, should be positive. Moreover, the expectations of profits rise in a growing economy. Then, even the spending on past profits cannot allow firms to make their expected profits. Finally, firms continue to self-

finance a part of their growing production costs. Therefore, if the level of demand in this economy only relies on production costs and on consumption of past profits, economies will suffer chronic overproduction and firms will always accumulate more unsold goods or underused capital whatever their decisions of production will be.

However, economies do not behave like that because other spending are added to the production ones. Firms will notably finance part of their investment by long-term bank credit. These investments, which are not counted as production costs, increase the global demand and firms' profits (Kalecki, 1943). As for governments, they can implement a budget deficit in order to increase the global demand. And households have access to bank credits for their property purchases and their consumption, allowing them to increase their spending over their revenues. These different elements will then contribute to increase the level of demand in the economy. Monetary creation by bank credit plays here a crucial role, as it is the only way to add purchasing power to the one created by firms while producing.

According to what we have just seen, a monetary economy of production could then be depicted as a system in which the revenues generated by production and the demand resulting from these revenues are structurally lower than the value of global supply, especially when economies are growing. Nevertheless, they do not face chronic overproduction because bank credits issued in response to financing firms' investments, or requirements of households and States, can increase the level of demand. If these credits are sufficient, the whole production can be sold and the whole factors of production can be used.

We depict this simple representation of a monetary economy of production in equations (1) and (2) below. Demand resulting from the revenues generated by production (D) is structurally lower than global supply (GS). However, the global demand (GD) can reach the latter if enough long-term bank credits (BC) are issued to finance firms' investments or requirements of households and States.

$$D_t = (1 - x_t)GS_t \qquad\qquad\qquad (1)$$

$$GD_t = D_t + BC_t = (1 - x_t)GS_t + BC_t \qquad\qquad\qquad (2)$$

As long as these bank credits will be sufficient to enable the global demand to grow at the same pace as the global supply, firms will not have unsold goods. Production and investment decisions are then likely to maintain at a high level. On the contrary, if these bank credits are not sufficient, firms will remain with unsold goods, which will affect their future decisions of production and investment.

To complete this representation, we have to add the repayments of these long-term bank credits. Indeed, the bank credits issued during a period to fill the gap between the global demand and the global supply will have to be repaid during the next periods. This means that firms, households and States will have to devote a part of their revenues to make these repayments. Repayments will then decrease revenues and profits, and so the level of demand in the economy. Therefore, long-term bank credits, which have filled the gap between demand and production in the past, will dig it in the future when they will be repaid, by decreasing the disposable income and the level of demand. Taking into account these repayments will then modified the dynamics of the economy, as it has been highlighted in two recent studies (Cottin-Euziol and Rochon, 2013; Cottin-Euziol, 2015).

To be more precise, the repayment of a bank credit comprises two parts: the interest, which forms the banks' revenues, and the capital, which brings to the elimination of the

corresponding credit line. The interests paid go back to the economy; they cannot be regarded in this way as an outflow. On the contrary, the capital repayment of past bank credits constitutes an outflow outside the economic circuit, as the corresponding money does not flow back to the economy. They will therefore decrease the level of demand and heighten the gap between it and the global supply. By taking into account these capital repayments (R) in our equations, we obtain this new system, in which the *net demand* (ND) corresponds to the demand issued from the production process minus the amount of repayments. The *net global demand* (NGD) corresponds then to the sum of the net demand and the volume of additional long-term bank credits:

$$\text{ND}_t = (1 - x_t)\text{GS}_t - R_t \tag{3}$$

$$\text{NGD}_t = ND_t + \text{BC}_t = (1 - x_t)\text{GS}_t + \text{BC}_t - R_t \tag{4}$$

The volume of repayments within a period depends entirely on the volume of bank credits issued in the past. If we consider that these credits are issued at most on n periods, we obtain the following relation:

$$R_t = f(\text{BC}_{t\text{-}1}, \text{BC}_{t\text{-}2}, .., BC_{t-n}) \tag{5}$$

The level of net global demand will then depend on the repayment of long-term bank credits issued during the *n* last periods and equation (4) can be rewritten as follows:

$$\text{NGD}_t = ND_t + \text{BC}_t = (1 - x_t)\text{GS}_t + \text{BC}_t - f(\text{BC}_{t\text{-}1}, \text{BC}_{t\text{-}2}, .., BC_{t-n}) \tag{6}$$

These equations offer us a simple representation of the functioning of a monetary economy of production. Thanks to them, we will study in the next sections some of its properties. In section 5, we will focus on the level of long-term bank debt in such an economy. In section 6, we will study the evolution of the structural gap between demand and supply throughout a growing phase, taking into account the repayment of past bank credits.

5. The level of long-term debt in a monetary economy of production

In the previous section we asserted that, in a monetary economy of production, the demand resulting from the revenues generated by production is structurally insufficient to enable the selling of the whole production. Nevertheless, long-term bank credits issued in response to the financing requirement of the economic agents can increase the level of demand and enable it to reach the value of production. We study in this section the evolution of the issue of these required long-term bank credits along a growth phase.

To determine the level of long-term debt in this economy, we have to calculate the volume of money which has to be injected throughout the periods in order to fill the structural gap between the demand issued from production and supply. By supposing a constant gap between the two, we can rewrite equation (1) in the following way:

$$D_t = (1 - x)GS_t \tag{7}$$

The level of long-term bank credits which have to be issued within each period to fill this gap is then:

$$BC_t = GS_t - D_t = xGS_t \tag{8}$$

Starting form a hypothetical initial period 0, we can then determine the accumulated amount of long-term bank debt (B) in this economy for a given period n. This debt corresponds to the sum of all the injections of long-term bank credits required to fill the structural gap between demand and supply from period 0 to period n, as presented in equation (9).

$$B_t = xGS_0 + xGS_1 + xGS_2 + ... + xGS_t \tag{9}$$

By supposing a constant growth of the global supply, we obtain the following geometric series:

$$B_t = x \frac{GS_t}{(1+g)^t} + x \frac{GS_t}{(1+g)^{t-1}} + ... + x \frac{GS_t}{1+g} + xGS_t \tag{10}$$

It is then simple to calculate the value of such a series, using the formula of the sums of the terms of a geometric series:

$$B_t = xGS_t \frac{1 - \dfrac{1}{(1+g)^t}}{1 - \dfrac{1}{1+g}} = x \frac{1+g}{g} GS_t \left[1 - \frac{1}{(1+g)^t} \right] \tag{11}$$

For *n* high enough, we can determine the value of the ratio of long-term bank debt on global supply. This ratio gives us the level of indebtedness of the economy:

$$\frac{B_t}{GS_t} \approx x \frac{1+g}{g} \approx \frac{x}{g} \quad \text{for t high enough} \tag{12}$$

According to this equation, the amount of long-term debt in a monetary economy of production will depend mostly on the structural gap between demand and supply, and on the growth rate of the economy. It can reach high values, showing that a monetary economy of production can be highly in debt. For example, if the structural gap between demand and supply is identical to the growth rate of the economy, the long-term debt would have to reach more than 100% of the value of production to enable the global demand to grow at the same pace as the global supply. To take a numbered example, if the growth rate of the economy is about 3% and the demand issued from the production process allow the selling of 97% of the production, then a long-term debt representing 100% of the value of supply is required to equalize the global demand with it. For a lower growth rate or a more important structural gap, this long-term debt could reach much higher values. This result could help us to understand why economies rely nowadays on so much debt.

It is important to notice that in no case this debt means that people in this economy lives beyond their means. Indeed, we just considered a single economy; people cannot in all consume more than they have produced. This debt reflects just the fact that monetary injections are necessary, beyond the short-term ones made to finance the production costs, in order to sell the whole production in this economy. As money relies on bank debt, these injections get then the economy into debt.

6. The evolution of the structural gap between demand and supply throughout a growing phase

We consider now the consequences of the repayments of this long-term debt on the gap between demand and supply. As explained in introduction and in the previous section, these repayments will decrease the disposable revenues, and so the level of demand, in the economy. More long-term bank credits will then have to be issued within a period to offset the repayment of long-term bank credits being issued in the past. We have called *net demand* the level of demand issued from production from which we subtract the volume of repayments. We study here how these repayments will modify the level of net demand and the gap between the net demand and the global supply throughout a growth phase.

To do so, we first insert equation (6) into equation (3) and suppose, as in the previous section, a constant structural gap between demand and global supply. We have then the following equation:

$$ND_t = (1-x)\text{GS}_t - f(\text{BC}_{t\text{-}1}, \text{BC}_{t\text{-}2}, .., BC_{t-n}) \tag{13}$$

As previously, we suppose a constant growth rate of the global supply. By taking into account the results obtained in the last section, we can express in equation (13) the volume of long-term bank credits as a function of the value of global supply:

$$ND_t = (1-x)\text{GS}_t - f\left[\frac{x(1+g)}{g}GS_t\left(1 - \frac{1}{(1+g)^t}\right)\right] \tag{14}$$

Now let's suppose, as did Rochon (2009) within a single period framework, that a part ρ of this debt is repaid within every period. Equation (14) becomes:

$$ND_t \approx (1-x)\text{GS}_t - \rho\frac{x(1+g)}{g}GS_t\left(1 - \frac{1}{(1+g)^t}\right) \tag{15}$$

We can then determine the value of the ratio of net demand on global supply:

$$\frac{ND_t}{GS_t} = 1 - x - \rho\frac{x(1+g)}{g}\left(1 - \frac{1}{(1+g)^t}\right)$$

$$\approx 1 - x - \rho\frac{x}{g}\left(1 - \frac{1}{(1+g)^t}\right) \tag{16}$$

This ratio gives us the gap between the level of net demand and the one of global supply within a period t. Therefore, it gives us the amount of long-term bank credits which will have to be granted within a period t, in relation to the level of global supply, to enable the global demand to reach the global supply. For a higher value of the structural gap (x) and of the repayment rate (ρ), this gap between demand and supply will heighten all along the growth of the economy. On the contrary, a higher value for the growth rate of the economy will, all things being equal, lowers it.

We can now draw a curve (figure 1), showing the evolution of this ratio throughout a growth phase. For the hypothetical period 0, it will depend on the structural gap between supply and

demand. It will then decrease, due to the repayment of past bank credits, until reaching, for t high, the threshold value of $\left(1 - x - \rho \dfrac{x}{g}\right)$.
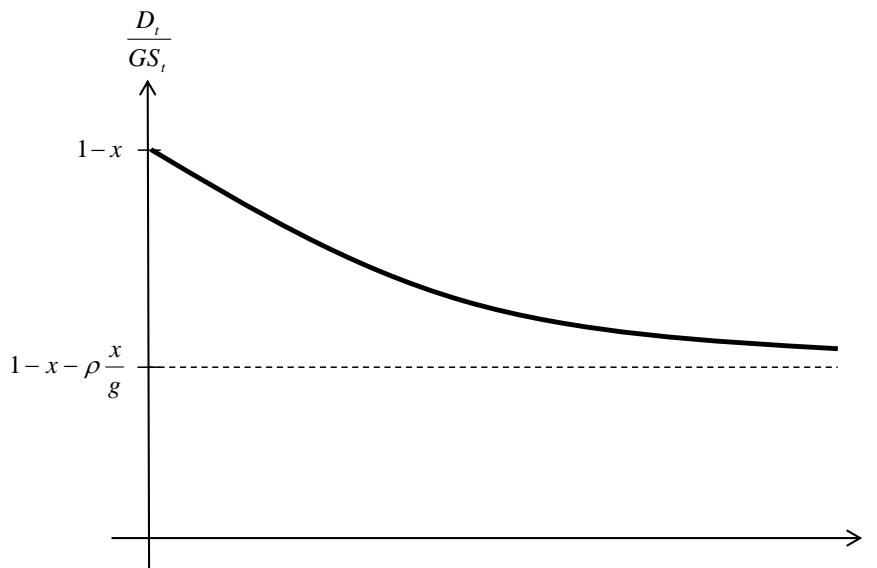

Figure 1: Evolution of the ratio of the net demand on global supply throughout a growing phase

The main result we obtain is that the ratio of the net demand issued from production on the global supply decreases all along a growing phase. To take an example, if the structural gap between demand and supply represents 3% of the value of supply, the growth rate of the economy is about 3%, and 20% of the global debt is repaid every year, then the level of net demand will decrease progressively until representing 77% of the value of production.

This can be explained by the depressive effect of the repayment of long-term bank credits on the level of demand. These credits which have filled the gap between the global demand and the global supply in the past will heighten it the future. This means that more and more bank credits, in relation to the level of global supply, will have to be issued along a growth phase to enable the selling of the whole production, leading to more and more repayments. In other words, it becomes more and more difficult to maintain a balance growth between the global demand and the global supply along a growth phase. Such a result could therefore help us to understand why economies often face overproduction crises after several years of growth.

7. Conclusion

In the General Theory, Keynes (1936) regards Say's law as the *classical theory's axiom of parallel* of classical economics and suggests building a non-Euclidian economic theory instead. The monetary economy of production, in which Say's law is not verified for the reasons expounded previously, fulfils clearly this wish. It is then possible to build a model in which the demand issued from the revenues generated by production appears to be structurally lower than the value of global supply.

A structural gap will therefore appear between the level of demand and the one of global supply. It will depend on the configuration, at a given moment, of social and institutional patterns framing the economy. For example, a ratio of power less favourable towards labour, as the one existing since the middle of the 70s, should widen it. This gap can nevertheless be filled by the issue of long-term bank credits. It is then necessary that economic agents get into long-term bank debt in order to enable the global demand to reach the global supply. However, the repayment of these long-term bank credits will heighten this gap in the future, as they will decrease the disposable income, requiring more bank credits to be issued in the future.

Considering this, we have built a very straightforward model and obtained two main results. The first one is that such a monetary economy of production requires an increasing long-term debt along a growing phase, in order to enable the selling of the production. This long-term debt can reach important values as regard the one of production, which could help to understand why the level of debt is so high in our economies. The second one is that the gap between the net demand issued from production and the value of global supply widens along a growth phase. Combined with the analysis of the regulation theory (Benassy *et al.*, 1979) and past explanations of business cycles, this result could help us to understand why economies often face overproduction crises after several years of growth.

These two results are fundamentally linked to the monetary nature of economies and the banking nature of money. In a non-monetary economy, in which profits are made in kind and production costs are paid in kind, or in an economy in which money does not rely on bank credits, none of the features highlighted here would have appeared. This strengthens the idea that building a proper monetary theory of production is essential to understand the functioning and dynamics of our economies.

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