The Determination of the Monetary Expression of Labor Time under the Inconvertible Credit Money System

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Abstract

This paper tries to answer the important question: how is the "monetary expression of labor time" (MELT) determined under the inconvertible credit money system? We provide a clear definition of the inconvertible credit money system by differentiating four monetary regimes. It is argued that the dynamic between changes in the quantity of money and prices should be explained on a sectoral level. A key element in explaining this dynamic is found in the decomposition of the MELT into the "monetary expression of value" (MEV) and the "value expression of labor time" (VELT). In so doing, Marxian value theory is shown to supersede the quantity theory of money because it can explain not only the general price level, but individual prices as well.

JEL classification: B51, E11

Keywords

Marxian value theory, the "New Interpretation", inconvertible credit money, monetary expression of labor time

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1. Introduction

In this paper, we try to provide an answer to the important question: how is the "monetary expression of labor time" (MELT) determined under the inconvertible credit money system, i.e. when money is not gold? The MELT, a parameter connecting total working hours with total money value-added, represents how many units of money correspond to one hour of labor time. In the literature on Marxian value theory, the MELT has been a key concept. In particular, the MELT was the most important working tool of the "New Interpretation" (NI) raised by Duménil (1980), Foley (1982) and others since the 1980s. Under the gold standard system, as was assumed in Marx's *Capital*, it is relatively easy to explain the determination of the MELT; money itself is gold, the MELT is inversely related to the socially necessary labor time to produce a unit of gold. In the inconvertible money system, however, this concept breaks down because the systematic relationship between money and the conditions of the production of gold no longer exists. The NI theorists were also aware of this problem (e.g., Foley 2005). However, they did not provide a theoretical answer to it. Recently, Saros (2007) and Moseley (2011) tried to address this issue. Moseley's (2011) contribution is especially worth examining because it provides the determining equation for the MELT under the inconvertible money system as follows:

$$\mathrm{MELT}_p = \frac{M_p V}{L} \qquad (1)$$

where MELT_p represents the MELT in the case of government-issued fiat money, M_p is the quantity of paper money forced into circulation, V is the velocity of money circulation and L represents total labor.

The "surprising result" (Moseley 2011: 99) of equation (1) is that, under the inconvertible money system, the MELT does not depend on the labor time contained in a unit of gold. Therefore, if M_p were doubled, then MELT_p would also be doubled. This conclusion raises an old issue regarding the difficulty of applying Marx's critique of the quantity theory of money to the case in which money is not gold.

Marx argued that the price level is not determined by the quantity of money, but by processes that work in the inverse direction. If, however, the MELT does not depend on the quantity of socially necessary labor, but directly reflects the quantity of money, Marx's critique does nothing but invert the direction of causality raised by the quantity theory of money. If this is the case, how can Marx's critique be justified? Moseley (2011) argues that Marx's theory of money is still superior to the quantity theory of money in that it can explain not only the general price level, but individual prices as well. This idea is described below in point (2).

> Marx's theory is superior to the quantity theory in the following important respects: (1) Marx's theory also explains the necessity of money in a commodity economy, and the quantity theory does not ; (2) Marx's theory explains not only the general price level (by the MELT), but also explains individual prices, as determined by the MELT and quantities of socially necessary labor-time…, and the quantity theory does not; and, most importantly, (3) Marx's theory of money also provides the basis for a theory of surplus-value and for a theory of the dynamics of capital accumulation, and the quantity theory does not. (Moseley 2011: 99)

Moseley's points (1) and (3), however, are not self-relevant to those who do not accept Marx's value theory. In this sense, they are subjected to point (2). Therefore, everything hinges on whether the determination process for individual prices can be satisfactorily explained from the perspective of Marxian labor theory of value. We will pursue this point further.

The paper is organized as follows: section 2 provides a clear definition of the inconvertible credit money system by differentiating four monetary regimes. Section 3 introduces the decomposition of the MELT into the "monetary expression of value" (MEV) and the "value expression of labor time" (VELT). The determining elements of the MEV and the VELT are specified here. Section 4 explains the determination process of individual prices, and the crucial difference between Marx's value theory and the quantity theory of money is clarified by specifying the four different cases. Concluding remarks are provided in section 5.

2. The definition of monetary regimes

Conceptually, we can differentiate four monetary regimes according to the origin (or fundamental source) of money and the role of financial institutions (banks). Firstly, there are two sources for the base money supply: commodity money and government fiat money. Commodity money, the first source, is the commodity monetary standard based on gold or silver. Aside from the forty or fifty years since the demise of the Bretton Woods system, commodity money was understood to be true money, and other types of money were seen as symbols or tokens of commodity money. The supply of commodity money was constrained by the new gold mines and by production costs. However, the difficulties in handling commodity money, the restricted supply of metal and national governments' growing confidence contributed to commodity money being substituted with government fiat money. At first, the credibility of government fiat money was so fragile that only the guarantee of conversion to gold sustained the national currency. As the government fiat money was substituted for commodity money, the central bank's supply of this monetary base was no longer restricted by the supply of metal. The only restriction on supply was the consideration of the internal and external value of the national currency because increasing the money supply decreases its value. It is important to also note the government's role in the changing value of the national currency and the potential impacts on sectors of the economy. A redistribution of wealth could be induced between debtor and creditor, between fixed income earners and the owners of assets, and between export firms and domestic demand firms.

The second criterion of monetary regimes is the role of financial institutions, particularly in the supply of money or money substitutes. Two cases are possible: in the first, passive banks with 100% reserve requirement do not contribute to the supply of money. Except for private transaction-related credit instruments, such as private bills, new financial instruments that may be used as money substitutes cannot emerge in this situation in a systematic way without the active role of banks. Even if banks issue bank notes, the 100% reserve requirement restricts money creation. Financial institutions are warehouses for base money (in the form of gold or government fiat), and bank notes are just the symbol of this base money. In the second case, active banks participate in money creation. A partial reserve system (or fractional reserve banking), with deposit money or bank notes, creates a new money supply through the process of bank lending and the reflux of lending as new deposits. Regardless of the types of base money (commodity money or government fiat money), the role of banks and financial institutions as the sources of money or money substitutes increases their importance in this monetary regime. We can call this regime a credit money system because credit creates money and because there is the possibility of a sudden interruption in the creation of this credit money due to the fact that the fractional reserve requirement cannot guarantee the full withdrawal of deposits. Moreover, in this credit money system, the (credit) money supply is endogenous: banks can influence the quantity of money given the condition of the base money supply. There is also the possibility that banks choose to create money through non sector-neutral practices. Unlike the passive banking scenario, with its full reserve requirement and traditional “real bills doctrine,” banks extend loan as a way to make profit in conditions of uncertainty and information asymmetry.[1] Industries with advantageous financial conditions have easy access to these loans. Large firms with high profitability and more fixed capital, which may be used as collateral, increase their debt capacity,[2] and it is relatively easy for them to finance their new investments with these loans.[3]

Hence, we can assume four monetary regimes; (a) a commodity money system with no credit creation, (b) a commodity money system with credit creation, (c) an inconvertible (government) money system with no credit creation and (d) an inconvertible (government) money with credit creation, which is called an inconvertible credit money system. This classification is purely conceptual, and actual monetary history does not correspond to this order of classification.

The benefit of this classification lies in the ability to identify the different determinants of the MELT according to the monetary regime. Comparing regime (a) with regime (d), we find that the role of government (or central banks as creator of government fiat) and the active participation of financial institutions (especially banks) are prominent in the inconvertible credit money system. In this case, the money supply is endogenous with exogenously given base money.[4]

3. The decomposition of the MELT into the MEV and the VELT

Following Rieu (2008), we introduce the decomposition of the MELT into the MEV and the VELT. The MEV represents the number of units of money that correspond to one unit of

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[1] For the information asymmetry in the financial market, refer Stiglitz and Weiss (1981).

[2] Rajan and Zingales (1995) show the determinants of capital structure.

[3] As we will show, these factors have a diverse sectoral impact on the MEV. However, it is not clear if a monetary regime change could contribute to the equalization of the profit rate. The development of a credit system might enhance the equalization of profit by easing the transfer of financial resources. It could also deter the equalization process due to the widening financial capabilities among sectors.

[4] In Mosley (2011: 101), this point is stated as follows;

> One important difference between inconvertible fiat money and inconvertible credit money is that the quantity of money is determined differently. In the case of inconvertible fiat money, M_p is determined exogenously by the state. In the case of inconvertible credit money, the determination of M_p is much more complicated: it is partly exogenous (influenced by the state through its monetary policy) and partly (and perhaps primarily) endogenous.

We can consider the “inconvertible fiat money” in Mosley (2011) as case (c) in our regimes.

abstract labor, i.e. value. The VELT is the parameter expressing the reduction of an hour of concrete labor to the corresponding unit of abstract labor. The MELT is, therefore, the product of the MEV and the VELT.[5] This decomposition does not matter on an aggregate level because the MELT is constant at a given point in time, and it can be directly computed from money value-added and total labor time data. On a sectoral level, however, this decomposition does matter. The importance of the decomposition is shown in the following example.

Assume that these two sectors carry the same weight in a certain economy. The total working hours are assumed to equal 1,000.

Example A

sector 1: $\mathrm{MEV}_1 = 1.$ $\mathrm{VELT}_1 = 1.$ labor time = 500 hrs.

sector 2: $\mathrm{MEV}_2 = 1.$ $\mathrm{VELT}_2 = 1.$ labor time = 500 hrs.

Example B

sector 1: $\mathrm{MEV}_1 = 2.$ $\mathrm{VELT}_1 = 0.5$ labor time = 500 hrs.

sector 2: $\mathrm{MEV}_2 = 0.5.$ $\mathrm{VELT}_2 = 2$ labor time = 500 hrs.

In both examples, 1,000 total working hours are represented by the same amount of money, i.e., 1,000 dollars, with one hour equal to one dollar. The MELTs are equal to 1. In example A, the distinction between the MEV and the VELT does not give any implication because all the MEVs and all of the VELTs are equal. In example B, however, the quantity of value produced in Sector 2 is four times the quantity found in Sector 1. Although far more value is produced in Sector 2, both sectors have the same amount of money on the market because Sector 1 is capable of taking in more money than it produces. The conventional use of the MELT, especially in the NI literature, is actually premised on the assumptions in example A.[6]

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[5] Formally, VELT and MEV are defined as follows, where VNP and R denote value of net product and net revenue, respectively (Rieu 2008: 565).

$$\mathrm{MELT} = R/L, \quad \mathrm{VELT} = \mathrm{VNP}/L \quad \text{and} \quad \mathrm{MEV} = R/\mathrm{VNP}.$$

Whereas the dimension of the MEV is [dollar/hour], the VELT is a pure number.

An additional important point should be noted. The NI, unlike Marx, argues that total prices are equal to total values regarding net product, not gross product; therefore, equation (1) should be modified. For analytical simplicity, this issue is ignored here without a loss of generality.

[6] In the NI literature, there have been two streams. Mohun (2004) argues that the NI is only focused upon the

As Marx assumed something like “perfect competition”[7] in the 3rd volume of *Capital* ; the MEVs are only determined by market forces equalizing sectoral rates of profit. The so-called transformation of Marxian values into prices of production describes the process by which the same quantities of produced value are changed to sectorally different quantities of money. For example, the sector with a high organic composition of capital would get more of the money equivalent to its value than the quantity of value it produced.

However, under real-life conditions of “imperfect competition,” there are many other factors that cause differences in the sectoral MEVs. Gouverneur (1983) used the expression, “degree of protection.” If, for example, Sector 1 in case B is protected by a certain kind of “entry barrier,” then it has enough monopoly power to fight against the profit-rate-equalizing forces. Monopoly price, defined as the excess over the price of production, implies that the MEV in that sector is larger than the social average.

Conclusively, equation (2) shows the decomposition of the MELT on a sectoral level.

$$\mathrm{MELT}_i = \mathrm{MEV}_i \times \mathrm{VELT}_i \qquad (2)$$

First, VELT_i is determined by the complexity of labor. The more complex or skilled the labor that is used in the i-th sector, the larger the VELT_i grows. One clock hour of skilled labor corresponds to more abstract labor time. Labor productivity is another complicated factor. According to Marx in the 1st volume of *Capital*, the same amount of labor time always produces the same amount of value irrespective of labor productivity. Although this statement is true on the abstract level of total social capital, labor productivity operates differently on the level of many capitals.[8] An increase in the labor productivity of a certain sector implies that the sector can produce more use value and in most cases can get more revenue within the same length of time, although this revenue increase is not proportional to the increase in use value production. On a sectoral level, therefore, the development of labor

relation between aggregate variables. In contrast, Foley (2005) considers this as an econometric problem and introduced a theoretical assumption that every sector has the same composition of labor complexity. Duménil, Foley and Lévy (2009), however, implicitly admitted the distinction between the MEV and the VELT.

[7] Without doubt, this is only in a limited sense, not in the sense of the neoclassical economics.

[8] As Kliman (2012: 131) noted, Marx also implicitly abstracted from changes in the MELT. Although Kliman (2012) is based upon the ‘Temporal Single-System Interpretation’ (TSSI) which criticizes the NI, the discussion here is not related to the conflict in Marxian value theory.

productivity in the i-th sector, *ceteris paribus*, implies the increase in the $VELT_i$. In other words, the $VELT_i$ is an increasing function of labor productivity in the particular sector in which it is found. Labor productivity data are usually measured by money value added per worker in real conditions; it is empirically difficult to distinguish “real” labor productivity from “monetary” labor productivity.

In sum, $VELT_i$ can be represented as follows:

$$VELT_i = f(LS_i, LP_i) \quad f_1 > 0, \; f_2 > 0 \qquad (3)$$

where in the i-th sector, LS_i denotes the skill index of labor and LP_i is labor productivity. Secondly, MEV_i is determined by the “degree of protection” and the sectoral financial capability, respectively denoted as P_i and F_i. Although these two elements are closely intertwined in reality, we distinguish them from one another to emphasize the role played by financial factors. This role is particularly important under the inconvertible credit money system.

$$MEV_i = g(P_i, F_i) \qquad g_1 > 0, \; g_2 > 0 \qquad (4)$$

Transformation of monetary regime from regime (a) in which the MELT is determined by the socially necessary labor time required to produce a unit of gold (or other metal) to regime (d) in which the MELT no longer depends on the value of gold and is influenced by the government monetary policy and the behavior of the financial institutions has a significant implication on the redistribution of surplus value among sectors, if we assume these two regimes have different degrees of influence in value redistribution among sectors. Assuming that the complexity of labor in each sector is determined by technological factors, the transformation of a monetary regime may have a significant influence on the redistribution of value in the process of the equalization of the profit rate. The MEV_i may also express the non-sector-neutral influence of monetary policy, differing financial capabilities among sectors and other contributing factors, such as monopoly, which may prevent an equalization of profit rates.

4. Explaining the determination process of individual prices: four different cases

In order to specify the effect of an increase in the quantity of money, we start with equation (2).

If $\overline{m}$ and $\overline{v}$ denote the social average of MEV_i and $VELT_i$, respectively, we can differentiate the following four cases.

Case 1: $MEV_i < \overline{m}$ and $VELT_i < \overline{v}$

Case 2: $MEV_i < \overline{m}$ and $VELT_i > \overline{v}$

Case 3: $MEV_i > \overline{m}$ and $VELT_i < \overline{v}$

Case 4: $MEV_i > \overline{m}$ and $VELT_i > \overline{v}$

In Case 1, both MEV and VELT in the sector are below the social average of the overall MEV and VELT (each $\overline{m}$ and $\overline{v}$). This case indicates that industries in this sector experience decreasing labor productivity with simple labor as well as lower degree of protection with inferior financial capability. A good example of this case is small businesses in a declining sector.

In Case 4, however, both MEV and VELT are above the social average $\overline{m}$ and $\overline{v}$. Industries in this sector enjoy higher productivity with a complex labor in the production process and a higher degree of protection with superior financial capabilities. Computer and mobile telephone industries are examples of this type of sector. Firms in these industries experience a rapid increase in productivity, and therefore labor in this sector can be evaluated as complex labor. However, at the same time, due to either financial capabilities or monopoly power from various kinds of "entry barriers," firms in these industries can extract monopoly profits from other sectors.

Case 2 and Case 3 are interesting. Case 2 has higher productivity and a lower degree of protection than social average, $\overline{m}$ and $\overline{v}$. A good example of this may be found in emerging but highly competitive industries, such as manufacturing in developing countries. Case 3 shows that labor productivity is lower than $\overline{v}$, but the degree of protection is higher than $\overline{m}$. Sunset industries such as heavy industries in advanced countries are examples of this case. However, in these two cases, contradictory tendencies within the sectors prohibit $MELT_i$ from rising above the social average MELT. Therefore, the total result remains unknown.

Because $MELT_i$ is the net revenue divided by the labor hours in the sector i, $MELT_i$ shows the difference of monetary expression of labor time in a specific sector, which can be deviated from the average MELT. However, the $MELT_i$ s for different sectors do not show why the difference occurs from a Marxian perspective. By defining $MELT_i$ as the product of MEV_i multiplied by $VELT_i$, we can differentiate the causes for these variations in $MELT_i$ s to the process of the production of surplus value and the process of the distribution of surplus value.[9] This is an important difference between Marxian value theory and the quantity theory of money, even with their superficial similarities.

5. Conclusion

In this paper, we discussed the determination of the MELT under the inconvertible credit money system. We argued that the dynamic between changes in the quantity of money and prices should be explained on a sectoral level. Furthermore, a key element in explaining this dynamic is found in the decomposition of the MELT into the MEV and the VELT. By differentiating MELT into sectoral MELT and further differentiating sectoral MELT into MEV and VELT, we can increase the level of influence of Marx's concepts in the NI.

In conclusion, Marxian value theory supersedes the quantity theory of money because it is able to explain individual prices based on these differentiations. Pursuing an empirical method to estimate sectoral MEV and VELT remains the object of further research.

[9] This differentiation is similar to the differentiation between 'produced value' and 'acquired value' (Itoh 1980: 74-79).

References

Duménil, G. 1980. *De la valeur aux prix de production*, Paris: Economica.

Duménil, G., Foley, D. K., Lévy, D. 2009. A Note on the Formal Treatment of Exploitation in a Model with Heterogeneous Labor. *Metroeconomica* 60: 560-567.

Foley, D. 1982. The Value of Money, the Value of Labor Power, and the Marxian Transformation Problem. *Review of Radical Political Economics* 14:37-47.

Foley, D. 2005. Marx's Theory of Money in Historical Perspective. in Moseley, F. (ed.), *Marx's Theory of Money*, Palgrave Macmillan.

Gouverneur, J. 1983. *Contemporary Capitalism and Marxist Economics*, Rowman & Littlefield Publishers.

Itoh, M. 1980. *Value and Crisis: Essays on Marxian Economics in Japan*, Monthly Review Press, New York.

Kliman, A. 2012. *The Failure of Capitalist Production: Underlying Causes of the Great Recession*, Pluto Press, London.

Mohun, S. 2004. The Labour Theory of Value as Foundation for Empirical Investigations. *Metroeconomica* 55: 65-95.

Moseley, F. (ed.) 2005. *Marx's Theory of Money: Modern Appraisals*, Palgrave.

Moseley, F. 2011. The Determination of the "Monetary Expression of Labor Time" ("MELT") in the Case of Non-Commodity Money. *Review of Radical Political Economics* 43(1): 95-105.

Rajan, R.G. and L. Zingales. 1995. What Do We Know about Capital Structure? Some Evidence from International Data. *Journal of Finance* 50(5): 1421-1460.

Rieu, D.-M. 2008. Estimating Sectoral Rates of Surplus Value: Methodological Issues. *Metroeconomica* 59(4): 557-573.

Saros, Daniel, E. 2007. The Price-Form as a Fractional Reflection of the Aggregate Value of Commodities. *Review of Radical Political Economics* 39(3): 407-415.

Stiglitz, J. and A. Weiss. 1981. Credit Rationing in Markets with Imperfect Information. *The American Economic Review* 71(3): 393-410.