Reconstructing Marx's Theory of Credit and Payment Crises under Simple Circulation

Andrew B. Trigg

Published online: 20 Apr 2021.

Submit your article to this journal

Article views: 377

View related articles

View Crossmark data

Routledge
Taylor & Francis Group

Reconstructing Marx's Theory of Credit and Payment Crises under Simple Circulation

Andrew B. Trigg

The Open University, Milton Keynes, UK

ABSTRACT

There is general agreement amongst scholars of Marx that his monetary theory is incomplete, especially in his most detailed writings on credit in the third volume of *Capital*. Moreover, in these unfinished notes Marx takes sides with the banking school approach, notable for its opacity compared to the clear axioms of its currency school counterpart. A reconstruction is proposed based on Marx's step-by-step method, commencing with a critique of Say's Law under simple commodity circulation, these foundations formalised here using the model of pure labour developed by Pasinetti (1993). Piecing together the fragments, and filling in some of the gaps in Marx's writings on money, the analysis builds from commodity money and private debt contracts, to the modelling of pure credit and pure banking systems. Adapting the Pasinetti model of a real economy, its endogenous money requirements provide an alternative to the exogenous money approach of the currency school: a streamlined analytical core to the banking school approach, as interpreted by Marx. In addition, the structure of payment crises — as an extension of Marx's possibility theory of crises — is examined with money as a means of payment required to settle debts between producers and the banking system.

1. Introduction

There is general agreement amongst scholars of Marx that his monetary theory is incomplete. Though Marx develops abstract foundations of money in the first and only published volume of *Capital*, his detailed treatment of credit in Part 5 of the third volume is little more than a collection of notes. As Engels, the posthumous editor of these passages, laments: 'we did not have a finished draft, or even an outline plan to be filled in, but simply the beginning of an elaboration which petered out … ' (Marx 1981, p. 94). The problem is compounded by Marx's qualified support for the most sophisticated treatment of credit available in mid-19th century: the banking school approach of Tooke and Fullarton — which, built on a detailed empirical observation of how the banking system operates, is often considered to be 'vague' and 'cloudy' by monetary theorists

CONTACT Andrew B. Trigg ✉ Andrew.Trigg@open.ac.uk 🏛 Department of Economics, Faculty of Arts and Social Sciences, The Open University, Milton Keynes MK7 6AA, UK

(Le Maux 2012, p. 595). In contrast, the currency school's alternative approach, anchored to the orthodox quantity theory of money, is based on clear axioms that to this day have an influence macroeconomic policymaking, in competition with the banking school tradition (see Goodhart and Jensen 2015).

Though Marx failed to elaborate a complete theory of credit there are, however, some pointers to a way forward. A key theme of Marx's wrings is his step-by-step method, that begins with the abstract starting point of simple commodity circulation, based on commodity exchange between independent producers, before exploring the full complexity of capitalism in more concrete levels of analysis. As summarised by de Brunhoff (1976, p. 22): 'Marx considers it necessary to begin with 'simple,' i.e. abstract, circulation in order to understand money in the capitalist form of production'. Less understood, however, is the extent to which this starting point is used in Marx's study of banking. In his *Capital*, Volume 3, treatment of the banking school approach, 'the laws developed earlier in considering simple commodity circulation … still apply for the quantity of money circulating' (Marx 1981, p. 577). From this starting point, money's abstract function as a means of payment (to settle debt contracts under simple circulation) is given a central role by Marx in the study of some of the complex credit arrangement associated with banking.

An understanding of credit is also critical to formulating a theory of crises. For Nelson (1999, p. 148): 'According to Marx, capitalist crises necessarily appear as monetary or credit crises because the evaluation and social confirmation of private production is a monetary process.' Under a developed credit system, dislocations in the circulation of commodities are associated with payment crises, where debt contracts cannot be settled. But the theorisation of crises, like that of credit, was also never completed by Marx. For Heinrich (2012, p. 171) 'one cannot find a comprehensive theory of crises in Marx's work, but rather scattered, more-or-less elaborated observations … '. This appraisal, it may be argued, limits the efficacy of Marx's critique of orthodox political economy, especially with respect to his critique of Say's Law, the proposition that supply creates its own demand (see Persky 2018). Here again, the most detailed treatment payment crises can be found in Marx's framework of simple circulation, where payment crises are examined in Part 2 of his unpublished *Theories of Surplus Value* (see Nelson 1999, p. 149).

Building on these insights, the contribution of this paper is to reconstruct Marx's theory of credit and payment crises under the rubric of simple circulation. In an attempt to follow Marx's method, some of the pieces of Marx's monetary theory will be fitted together by starting with the most abstract circulation of commodity money, moving to more concrete institutional arrangements, such as private credit contracts between producers, and then to the modelling of note issues by the banking system. Payment crises take different forms at each stage in the analysis: from the breakdown of private debt contracts between producers to a drain of gold from the central bank. The aim of this approach is to develop some coherence between the different fragments of Marx's theory of credit and payment crises, based on his writings; and, where possible, fill some of the gaps in our incomplete understanding.

This may be seen by some as a novel way of approaching Marx's monetary theory. Though the importance of simple circulation is acknowledged in the secondary Marxian literature, there is often a presumption that the circulation of capital should

be developed prior to a consideration of banking. The contribution of Weeks (2010), for example, includes a detailed consideration of Marx's theory of credit in relation to capital, implicitly prior to any mention of banking. Similarly, Crotty (2017, Chapter 3) briefly mentions banking only after focusing on credit and capital. Where banking is considered in detail, this is often at a final stage of analysis, after considering capital, as in the four-stage framework developed by Evans (1997). The model of the banking school developed by Lapavitsas (2016, Chapter 3) is also based on the circulation of capital, under Marx's reproduction schemes. Such improvisations are understandable given the gaps in our understanding of Marx's monetary ideas, but a more systematic framework for organising Marx's ideas is offered by imposing Marx's step-by-step method. By first modelling credit and banking *without* capital, under simple circulation, it may also be possible to offer simplified foundations that enable credit and banking relationships to be understood more clearly at the outset by stripping out some of the institutional details.

As a way of imposing some rigour to Marx's step-by-step approach, a formalisation is introduced here using the model of pure labour model developed by Pasinetti (1993). This model has similar characteristics to Marx's treatment of simple commodity circulation, including a social division of labour between producers and an assumption of zero profits. Indeed, the model is particularly suitable for providing a basic classical model of Say's Law for a production economy, establishing a condition for its satisfaction. Using this model, the role of money and credit will be developed in order to formalise Marx's critique of Say's Law. A credit-contract matrix, as suggested by Crotty (2017), will also be formalised here in order to model the role of credit money in Marx's system, as a basis for also examining the banking system and payment crises.

It will also be shown that the Pasinetti model can be used to formalise the role of endogenous money in Marx's system. As argued by de Brunhoff and Foley (2006, p. 188), in addition to a critique of Say's Law Marx refutes a second pillar of orthodox theory, the quantity theory of money, treating 'the quantity of circulating money as endogenous, and the prices of commodities as exogenous'.

Section Two introduces the Pasinetti system, and the Say's Law condition, followed in Section Three by a demonstration of how this framework can be related to Marx's treatment of simple commodity circulation with endogenous money and private credit contracts. Formalisation is then provided in Section Four of Marx's critique of Say's Law under a possibility theory of payment crises based on money as a means of payment. In Section Five, the role of private credit is taken to its logical conclusion with the specification of a pure credit system, in which assets and liabilities are cleared in a credit-contract matrix. This leads to the creation in Section Six of a model of pure banking, with the central bank as its pivot under simple circulation. Banknotes are issued on the strength of bank loans, a key feature of the banking school approach. The problem of payment crises in the banking system is elaborated in Section Seven, followed in Section Eight by some conclusions.

2. Say's Law

In its classical form, Say's Law is the proposition that demand for commodities is configured by producer supply of commodities. Producers only have the wherewithal to

demand commodities from each other if they have something to supply in exchange: 'one can make purchases only with what one has produced' (Say 1803, pp. 175–180; translated by Baumol 1977, p. 155). Using the formalisation of Say's Law provided by Trigg (2020), this can be modelled for a simple economy in which there is a fixed technology and m single-commodity producers each using N_i units of their own labour to produce (supply) S_i of their own commodity. These commodities are produced at a given money price (p_i), and each term is exclusively positive, that is $p_i > 0$, $S_i > 0$ and $N_i > 0$. In order to model the demand which follows from production let D_{ji} be the consumption demand for good j by each commodity producer i. Under Say's Law,

$$
\begin{aligned}
p_1 D_{11} + p_2 D_{21} + \cdots + p_m D_{m1} &= p_1 S_1 \\
p_1 D_{12} + p_2 D_{22} + \cdots + p_m D_{m2} &= p_2 S_2 \\
&\vdots \\
p_1 D_{1m} + p_2 D_{2m} + \cdots + p_m D_{mm} &= p_m S_m
\end{aligned}
\tag{1}
$$

Producer 1, for example, allocates income from production (supply) of $p_1 S_1$ to demand commodities from all other producers (including himself) of $p_1 D_{11} + p_2 D_{21} + \cdots + p_m D_{m1}$. Adding up all these equal quantities of supply and demand across all producers, it follows from (1) that aggregate supply is identical to aggregate demand. This is Say's Law in classical form: the proposition that when the demand of each producer is constituted by supply then aggregate supply and aggregate demand are identical.

Two further classical assumptions can be made in this simple production economy. First, it can be assumed that this simple production economy is egalitarian, with a uniform money wage rate (w) paid to each unit of labour (see Stirati 1994). Second it can be assumed that money prices are determined under a pure labour theory of value such that:

$$
p_i = w l_i
\tag{2}
$$

where $l_i = N_i/S_i$ are labour coefficients. Substituting (2) into (1), and cancelling for the wage rate, it follows that under Say's Law:

$$
\begin{aligned}
l_1 D_{11} + l_2 D_{21} + \cdots + l_m D_{m1} &= l_1 S_1 = N_1 \\
l_1 D_{12} + l_2 D_{22} + \cdots + l_m D_{m2} &= l_2 S_2 = N_2 \\
&\vdots \\
l_1 D_{1m} + l_2 D_{2m} + \cdots + l_m D_{mm} &= l_m S_m = N_m
\end{aligned}
\tag{3}
$$

Now with $N = N_1 + N_2 + \cdots + N_m$ representing total employment of labour units, equation 3 can be aggregated to give:

$$
\begin{aligned}
N = (l_1 D_{11} + l_2 D_{21} + \cdots + l_m D_{m1}) + (l_1 D_{12} + l_2 D_{22} + \cdots + l_m D_{m2}) + \cdots \\
+ (l_1 D_{1m} + l_2 D_{2m} + \cdots + l_m D_{mm})
\end{aligned}
\tag{4}
$$

which can be re-arranged as:

$$1 = l_1 \frac{(D_{11} + D_{12} + \cdots + D_{1m})}{N} + l_2 \frac{(D_{21} + D_{22} + \cdots + D_{2m})}{N} + \cdots$$
$$+ l_m \frac{(D_{m1} + D_{m2} + \cdots + D_{mm})}{N} \tag{5}$$

Hence, with $c_i = (D_{i1} + D_{i2} + \cdots + D_{im})/N$ defined as average per capita consumption coefficients, it follows that:

$$1 = l_1 c_1 + l_2 c_2 + \cdots + l_m c_m \tag{6}$$

is a necessary condition for the satisfaction of Say's Law: when 'any production always generates demand exactly equivalent to it' (Pasinetti 1993, p. 133). Under the proposition in (1) that each producer allocates income from supply to demand, and with a uniform wage rate and pure labour theory of value in (2), then the condition for Say's Law (6) must hold.

By now multiplying throughout (6) by the money wage rate such that:

$$w = p_1 c_1 + p_2 c_2 + \cdots p_m c_m \tag{7}$$

then together with (2) it follows that:

$$\begin{bmatrix} p_1 & p_2 & \cdots & p_m & w \end{bmatrix} \begin{bmatrix} 1 & 0 & \cdots & 0 & -c_1 \\ 0 & 1 & \cdots & 0 & -c_2 \\ \vdots & \vdots & \ddots & \vdots & \vdots \\ 0 & 0 & \cdots & 1 & -c_m \\ -l_1 & -l_1 & \cdots & -l_m & 1 \end{bmatrix} = \begin{bmatrix} 0 & 0 & 0 & \cdots & 0 \end{bmatrix} \tag{8}$$

This is the price system for the Pasinetti model of pure labour (see Pasinetti 1993, p. 18). Say's Law holds under this system in which labour is the sole factor of production and the uniform money wage is allocated to consumer expenditure. The Say's Law condition (6) must hold for the determinant of the block matrix in (8) to be zero, and hence under singularity for a non-trivial solution to be established.

Illustration: Consider an economy with four single-commodity producers each making and supplying physical outputs of $S_1 = 38$, $S_2 = 30$, $S_3 = 16$, and $S_4 = 11$, at given money prices $p_1 = 1$, $p_2 = 2$, $p_3 = 3$ and $p_4 = 4$. Assuming producers only purchase commodities produced by others, then under Say's Law each producer's demand is constituted by supply such that:

$$\begin{aligned} p_2 D_{21} + p_3 D_{31} + p_4 D_{41} &= p_1 S_1 \\ p_1 D_{12} + p_3 D_{32} + p_4 D_{42} &= p_2 S_2 \\ p_1 D_{13} + p_2 D_{23} + p_4 D_{43} &= p_3 S_3 \\ p_1 D_{14} + p_2 D_{24} + p_3 D_{34} &= p_4 S_4 \end{aligned} \tag{9}$$

Table 1. Equilibrium inter-producer demands.

	1	2	3	4	Total
1		15	12	11	38
2	25		20	15	60
3	9	21		18	48
4	4	24	16		44
Total	38	60	48	44	190

The demand and supply equations may hold when, for example, the commodity demands of individual producers are:

$$D_{21} = 12\tfrac{1}{2}, D_{31} = 3, D_{41} = 1$$
$$D_{12} = 15, D_{32} = 7, D_{42} = 6$$
$$D_{13} = 12, D_{23} = 10, D_{43} = 4 \tag{10}$$
$$D_{14} = 11, D_{24} = 7\tfrac{1}{2}, D_{34} = 6$$

These are combined with the given money prices to give a set of (monetary) inter-producer demands as displayed in Table 1.

Assuming that 95 units of labour are carried out by these independent producers, with given labour coefficients $l_1 = 1/2$, $l_2 = 1$, $l_3 = 3/2$ and $l_4 = 2$ at a uniform money wage rate of $w = 2$, average per capita consumption coefficients are:

$$c_1 = \frac{(15 + 12 + 11)}{95} = \frac{38}{95}, \quad c_2 = \frac{(12\tfrac{1}{2} + 10 + 7\tfrac{1}{2})}{95} = \frac{30}{95}$$
$$c_3 = \frac{(3 + 7 + 6)}{95} = \frac{16}{95}, \quad c_4 = \frac{(1 + 6 + 4)}{95} = \frac{11}{95} \tag{11}$$

We are now able to check Pasinetti's condition for Say's Law:

$$l_1 c_1 + l_2 c_2 + l_3 c_3 + l_4 c_4 = \left(\frac{1}{2} \times \frac{38}{95}\right) + \frac{30}{95} + \left(\frac{3}{2} \times \frac{16}{95}\right) + \left(2 \times \frac{11}{95}\right) = 1 \tag{12}$$

Since this holds a non-trivial solution is provided in this example Pasinetti price system, as specified in (8).

3. Simple Commodity Circulation

The Pasinetti model provides a possible vehicle for representing the abstract system developed by Marx as his starting point for economic analysis. This suitability of Pasinetti's approach, in so far as Marx is part of the whole stream of 'classical' thought 'from Adam Smith to John Stuart Mill' (Pasinetti 1981, p. 5), is based on the importance of industrial production carried out by labour. In the Pasinetti model, as adapted above, there is an advanced division of labour in which each independent commodity producer specialises in their production of a commodity. This has some similarity to what Marx refers to as simple commodity circulation: a system developed in the first three chapters of *Capital*, Volume 1, in Part 2 of *Theories of Surplus Value* (Marx 1976; Marx 1968); and, as we shall see, referred to throughout Marx's work.

The pure labour theory of value, operational in the Pasinetti model, is also assumed in Marx's treatment of simple commodity circulation: 'It is assumed throughout, that the commodity is sold at its value' (Marx 1968, p. 492). There are also no capitalists and zero profits in the Pasinetti model, since wage is the only category of income, and under a uniform wage rate all producers exchange their commodities on an equal footing. As summarised by Nelson (1999, p. 111): 'In simple commodity production there is an equality between producers who sell their own product, because none benefit more or less than they contribute … '.

This adaptation of Pasinetti's framework to the study of Marx should, however, be approached with caution. First, it should be noted that Pasinetti uses his basic system to examine the dynamics of structural change (for which he is something of a pioneer); whereas in Marx dynamics are not introduced until a much later stage of analysis — even after the introduction of social class relations under simple reproduction. The more primitive stages in Marx's analysis (starting with simple circulation) are ostensibly static. Though the Pasinetti framework provides a pathway to modelling dynamics, which could in principle be fruitfully adapted to Marx's system, the stages of analysis are organised in a different order. Second, Pasinetti refers to his basic system as pre-institutional, with institutions '*not* considered' (Pasinetti 1994, p. 41, original emphasis). This contrasts with the interpretation of simple circulation by many (though not all) Marxists as a vehicle for understanding the actual capitalist mode of production. In Campbell (2013, p. 151), for example, simple circulation represents 'the appearance form of the capitalist model of production', not prior to capitalist relations, but an abstraction of these relations. In the analysis that follows monetary relations under simple circulation are argued to be relevant to the consideration of an important basic institution of capitalism, the banking system. In this sense our approach is *not* pre-institutional, but one in which capitalist institutions are considered in their most rudimentary form.

Finally, it should be noted that there are limitations associated with trying to decompose capitalist relations into different stages of analysis. As argued by Marxist philosopher Chris Arthur, each stage may have its own logic, but our understanding is provisional, only fully developed from the perspective of later more complex and concrete stages of analysis. 'Because this starting-point is severed from the whole, as abstracted thus it is necessarily inadequately characterised' (Arthur 2004, p. 26). Notwithstanding the potential simplicity and clarity of thought offered by developing a theory of money under simple circulation — since capital is 'far too complex a concept to be introduced immediately' (Arthur 2004, p. 25) — it is necessarily incomplete, a preliminary starting point for capturing the role of money under capitalism.

Under simple circulation the circulation of money and commodities takes the form C–M–C. This has two stages. First, the commodity exchanges for money (C–M) which is for simplicity assumed by Marx to be represented by units of gold. In the second stage, money is used to purchase commodities (M–C). There is a flow of physical commodities and the money commodity (gold) between producers. Money acts here in its key role as a medium of circulation, facilitating the circulation of commodities.

For Marx, the amount of gold required for the circulation of commodities is endogenous, dependent on the level of economic activity. Two assumptions underly this position. First, a 'condition for circulation' (Marx 1970, p. 126) is that there are sufficient reserves (hoards) of money held by producers. It is necessary, as part of the internal

logic of simple circulation, for producers to hold money hoards as a contingency against variations in economic activity (see Foley 1983, p. 385). As one of the 'laws developed for simple commodity circulation' the money reserve 'must be sufficient to cope with fluctuations in the circulation of money' (Marx 1978, p. 400). Second, for Marx money prices are determined by the labour time expended in commodity production. Let gold be the first commodity (commodity 1) produced in our multi-commodity economy. The labour time required to produce a physical unit of gold is represented by the labour value coefficient (l_1). Pasinetti's price equation 2 can thus be modified such that the money wage is:

$$w = \frac{1}{l_1} \qquad (13)$$

Substituting (13) into (2), the price equation hence takes the form:

$$p_i = \frac{l_i}{l_1} \qquad (14)$$

Dividing the labour value of each commodity (l_i) by the labour value of gold (l_1) gives us an expression showing a gold/commodity ratio l_i/l_1 for each commodity i: the gold (money) price of the commodity.[1] The money price of each good is determined by the labour time required for its production relative to the labour time required to produce a unit of gold. By modifying the price equation in this way, a conversion is made from the labour required to produce each commodity i and its equivalent in gold bullion.

It follows that money prices (p_i) are determined, according to (14), prior to the circulation of money. With levels of output supplied (S_i) set by producers under Say's Law in Section Two, the overall price level for the economy $\left(\sum_{i=1}^{m} p_i S_i\right)$ is a given quantity. The amount of money required for circulation, drawn from money hoards as required, is then endogenously determined in an equation of exchange:

$$M = \frac{\sum_{i=1}^{m} p_i S_i}{v} \qquad (15)$$

where v is the velocity of circulation: the average number of times each unit of money circulates in the economy. For Marx (1970, p. 105): 'If the velocity of circulation is given, then the quantity of the means of circulation is simply determined by the prices of commodities.'

This contrasts with the quantity theory of money which, stretching back to 18th century, is most associated with Hume. For Marx (1970, p. 163), 'Hume infers that increases or decreases of commodity-prices are determined by the quantity of money in circulation.' The direction of causation in (15) would be from left to right with the quantity of money determining prices; an approach which Marx rejects, seeing the causation as from right to left under his theory of value.

4. Marx's Possibility Theory of Crises

The existence of money hoards, though essential as reserves for channelling money in and out of circulation, also creates a potential problem for the system. It is possible

---

[1]This is based on the more complete conversion from gold to money provided by Marcuzzo and Roselli (1994).

for money to be received from the sale of a commodity (C–M) and to be then hoarded, interrupting the circuit such that M–C does not take place. This 'falling asunder of purchase and sale' is referred to by Marx (1968, p. 510) as the 'first form' of his possibility theory of crises. Once hoarding takes place there may be insufficient demand to meet supply, and Say's Law can break down under simple commodity circulation.[2]

In its second form, Marx's theory of crises moves to a more concrete level of analysis by introducing debt–credit relationships. 'The role of creditor or of debtor results here from the simple circulation of commodities' (Marx 1976, p. 233). Under the 'development of circulation', delays are introduced between the purchasing of commodities and the receipt of payment (Marx 1976, p. 232).[3] A producer signs a bill of exchange (a private debt contract) in exchange for use of another producer's output, a promise to pay an agreed amount at a later fixed point in time. When the time for payment comes, commodity money is used to pay off this debt, thus performing its function as a means of payment. 'Not until payment falls due does the means of payment actually step into circulation' (Marx 1976, p. 234).

An increasing layer of fragility is introduced by these debt–credit relationships. Say a producer decides, as before, to interrupt the circuit by *not* purchasing a particular commodity. This will impact the seller of that commodity who no longer receives the expected amount of commodity money. But it may also mean that seller cannot settle a debt owed to another seller; and the other seller is unable to settle additional debts. Marx (1968, p. 514) observes that 'as the same sum of money acts for a whole series of reciprocal transactions and obligations here, inability to pay occurs not only at one, but at many points, hence a crisis arises'. There is a 'non-fulfilment of a whole series of payments' (Marx 1968, p. 514).

These two forms together constitute a possibility theory of monetary crises. The payment crisis of the second form cannot happen without the separation of purchase and sale in the first form: 'the second form is not possible without the first' (Marx 1968, p. 514). And once the second form takes place, once there is a non-fulfilment of payments, this is 'the characteristic form of money crises' (Marx 1968, p. 514).

Illustration: As a starting point, it can be assumed that all the transactions in Table 1 are carried out using a money commodity (gold). Assume that producer 1 is a gold producer, and that the other three producers have gold hoards that they have amassed in previous periods of production.[4] Commodities for these producers are purchased by drawing on these hoards. Consider a case where producer 2 decides on this occasion not to purchase 21 money units of commodity 3. Instead of spending 21 units of gold (as in Table 1) she hoards these units, withdrawing them from circulation. Since

---

[2]A limitation of this analysis is that under simple commodity circulation, as consider here, there is assumed to be a zero interest rate, precluding any mechanism for equilibrating savings and spending, as in more sophisticated treatments of Say's Law that relate savings to investment (see Garegnani 1978, p. 340).

[3]An 'interval of time' is introduced for reasons such as the production of commodities exchanged at different times of the year or distances travelled by commodities: 'One commodity-owner may therefore step forth as a seller before the other is ready to buy' (Marx 1976, p. 232).

[4]Following Marx (1976, p. 228) it may be assumed that the gold producer barters gold with the other commodity producers; in this instance with only gold bullion considered, not coins. To further simplify the analysis, it may also be assumed here that the gold received by the other producers is used solely for luxury consumption purposes. See Trigg (2020) for an alternative analysis of Say's Law in which gold is used to replenish amounts lost through wear and tear in circulation.

Table 2. Equilibrium inter-producer demands under private debt contracts.

	1	2	3	4	Total
1		15	12	11	38
2	25		20	<u>15</u>	60
3	9	21		18	48
4	4	24	<u>16</u>		44
Total	38	60	48	44	190

$D_{32} = 0$ (the previously purchased 7 physical units of commodity 3 are no longer required by producer 2) it now follows, in contrast to (11), that:

$$c_3 = \frac{3+6}{95} = \frac{9}{95} \tag{16}$$

and hence:

$$l_1c_1 + l_2c_2 + l_3c_3 + l_4c_4 = \left(\frac{1}{2} \times \frac{38}{95}\right) + \frac{30}{95} + \left(\frac{3}{2} \times \frac{9}{95}\right) + \left(2 \times \frac{11}{95}\right) = \frac{84\frac{1}{2}}{95} < 1 \tag{17}$$

This is a disequilibrium outcome since the sum of the combined consumption and labour coefficients is less than 1. Pasinetti (1993, p. 22) refers to this as a type of disequilibrium in which there is a 'deficiency of effective demand'; the shortage in demand here being due to hoarding by producer 2. Under this disequilibrium, Say's Law, as captured by (6), is broken in this first stage of Marx's possibility theory of crises.[5]

In a second more concrete form of crises, the role of money can be introduced as a means of payment required to settle private debt contracts. As shown in Table 2, it can be now assumed that there are two (underlined) transactions for which private borrowing takes place between producers. Assume here that producers 3 and 4 have limited money hoards. Due to this constraint, producer 3 sends a bill of exchange worth 16 money units to producer 4: a promise to pay in return for 16 money units worth of commodity 4. Producer 4 also sends a bill of exchange to producer 2 for 15 money units worth of commodity 2. Money can now function as a means of payment. Producer 3 receives 48 units of gold for his sales of commodities, out of which he settles the debt of 16 (using gold as a means of payment) with producer 4. Since this is settled, producer 4 receives 44 units of gold which allows him to settle his debt of 15 with producer 2.

But consider what might happen if, as in the first crisis scenario, producer 2 decides not to spend D_{32} on commodity 3, hoarding 21 units of gold. As before, this has consequences for producer 3, who incurs a 21 unit cut in income from sales of commodity 3. Now producer 3 owes producer 4 a debt of 16 money units, which he cannot settle. Producer 4 is thus 16 units short of income, and in addition he has a debt of 15 units with producer 2, which cannot now be settled. The commodities (16 worth of commodity 4 and 15 worth of commodity 2) have been handed over to producers 3 and 4 but their sale has not been fully realised, their ownership by the producers not completed. For

---

[5]Note that the Pasinetti pure labour model is of the somewhat indeterminate closed input-output form, giving multiple solutions as a linear dependent system. It does not offer a precise mechanism for mapping what happens to the system when there is a disjuncture between supply and demand. A possible way of addressing this, in future work, would be to introduce a multiplier mechanism in which economic activity is determined by autonomous expenditures, along the lines of the open input-output extension of Pasinetti provided by Trigg and Lee (2005).

Table 3. Interrupted inter-producer demands under private debt contracts.

	1	2	3	4	Total
1		15	12	11	38
2	25		20	**0**	45
3	9	**0**		18	27
4	4	24	**0**		28
Total	38	39	32	29	138
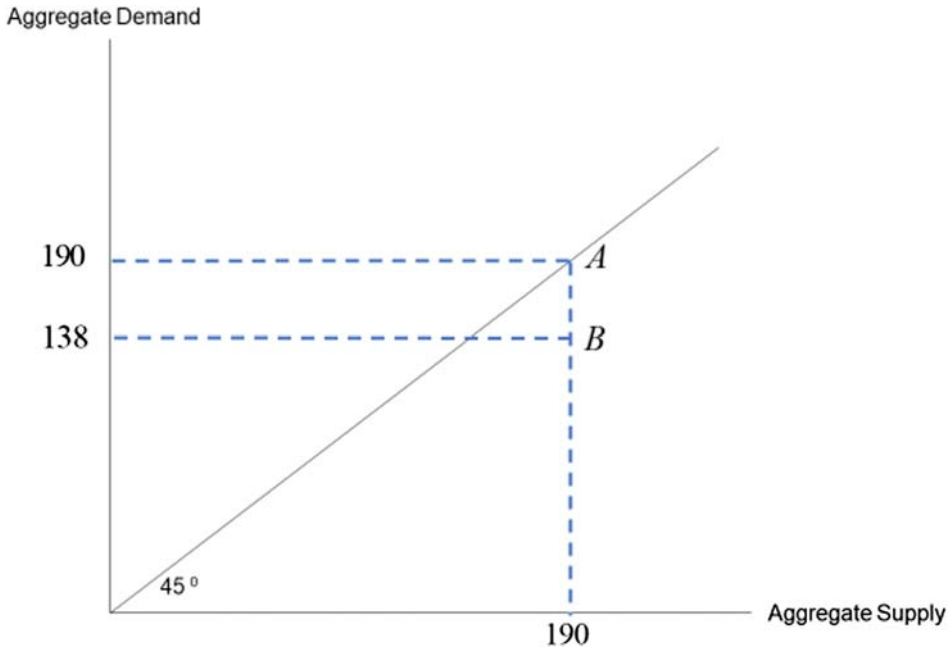
Figure 1. Say's law and disequilibrium positions.

Marx (1976, p. 234) these commodities are requisitioned: 'If he does not pay, his goods will be sold compulsorily'. These commodities can be classified as unsold in the first instance, as shown by the zero entries in Table 3 (now represented in bold). Compared to Table 2, demand is lower for producers 2, 3 and 4. The overall aggregate demand is now 138 money units, lower than the aggregate supply of 190.

This disequilibrium outcome under private debt contracts is illustrated in Figure 1. The 45-degree line represents all positions of identity between aggregate demand and aggregate supply under Say's Law, with point *A* the point of equilibrium established in Table 2 — aggregate demand and aggregate supply are each valued at 190. Under the interruption illustrated in Table 3 the shortfall in aggregate demand (138 compared to 190 aggregate supply) is represented by point *B*, a new position of disequilibrium.

5. A Pure Credit System

As producers buy and sell commodities under private debt contracts, the system of production and the monetary system become more developed, with the circulation of

Table 4. Pure circulation of bills of exchange.

	1	2	3	4	Total received (in bills)
1	0	B_{12}	B_{13}	B_{14}	$B_{1\bullet}$
2	B_{21}	0	B_{23}	B_{24}	$B_{2\bullet}$
3	B_{31}	B_{32}	0	B_{34}	$B_{3\bullet}$
4	B_{41}	B_{42}	B_{43}	0	$B_{4\bullet}$
Total borrowed (in bills)	$B_{\bullet1}$	$B_{\bullet2}$	$B_{\bullet3}$	$B_{\bullet4}$	B

commodity money becoming less important to commodity exchange. In return for commodities, producers increasingly receive bills of exchange, promises to pay at future points of time, instead of commodity money. For Marx, taking this process to its logical conclusion, a pure credit economy becomes possible in which metallic money disappears completely. Building on Marx's foundations, keeping the production and circulation of commodities at its core, Marx's monetary theory can be used to model a pure credit economy.

Let B_{ij} represent an amount borrowed by producer j from producer i: producer j draws up and sends a bill of exchange (promise to pay note) to producer i. If we focus solely on this use of credit in order to facilitate the circulation of commodities, then the amount borrowed can be set equal to the amount demanded by producer j in the Pasinetti model: $B_{ij} = p_i D_{ij}$. Via money prices there is in this framework a direct correspondence between the amounts borrowed and the real flows of physical commodities between producers.

As suggested, though not formalised, by Crotty (2017, p. 87), a credit-contract matrix can be constructed. For a four-producer economy, as considered above, this matrix is represented in Table 4.

Consider the row and column totals of the credit-contract matrix. For producer i let $B_{i\bullet}$ represent the total receipts of bills of exchange from other producers, and $B_{\bullet i}$ represent the total borrowed by issuing bills of exchange. Under an equilibrium outcome for each producer, the output supplied by each producer is all sold to the other producers. This means that the amount received by each producer is equal to the amount borrowed: $B_{\bullet i} = B_{i\bullet}$. As an example, for producer 1 this equality between receipts and outlays takes the form:

$$B_{12} + B_{13} + B_{14} = B_{21} + B_{31} + B_{41} \tag{18}$$

which can be re-expressed as:

$$(B_{12} - B_{21}) + (B_{13} - B_{31}) + (B_{14} - B_{41}) = 0 \tag{19}$$

If say producer 1 has a net debt with producer 2, i.e. $B_{12} < B_{21}$, under equilibrium this must be balanced by a net credit with one or both of the other two producers: either $B_{13} > B_{31}$, $B_{14} > B_{41}$, or both. All credits and liabilities between producers balance out.

For Marx (1976, p. 235): 'The debts due to A from B, to B from C, to C from A, and so on, have only to be brought face to face in order to cancel each other out, to a certain extent, as positive and negative amounts.' Indeed, the basis for a pure credit economy is established: 'When payments cancel one another as positive and negative quantities, no money need actually appear on the scene' (Marx 1970, p. 145). Indeed, bills of exchange themselves emerge as a form of money. In *Capital*, Volume 3, Marx (1981,

p. 525) develops the theory of credit 'out of simple commodity circulation', where he writes:

> For the sake of brevity, we can refer to all these promises to pay as bills of exchange. Until they expire and are due for payment, these bills themselves circulate as means of payment; and they form the actual commercial money. To the extent that they ultimately cancel each other out, by the balancing of debts and claims, they function absolutely as money, even though there is no final transformation into money proper. Marx (1981, p. 525)

Since bills of exchange can be re-signed by other parties, Marx also sees them as a form of credit money. 'Credit-money springs directly out of the function of money as a means of payment, in that certificates of debts owing for already purchased commodities themselves circulate for the purpose of transferring those debts to others' (Marx 1976, p. 238).

However, as we have seen an interruption may occur in which producers do not purchase an equivalent amount to what they receive from sales. In such a disequilibrium outcome one producer i may receive bills of exchange in excess of the total amount borrowed ($B_{i\bullet} > B_{\bullet i}$), whereas another j borrows more than received ($B_{j\bullet} < B_{\bullet j}$). Following from such disparities there is always a possibility of crisis in which confidence in bills of exchange is undermined. For Marx (1981, p. 674), 'at the moment of crisis, the bill circulation completely collapses; no one has any use for promises to pay, each wanting only to accept cash payment'. Commodity money appears on the scene as a means of payment. In this credit system an 'upheaval that forcibly interrupts the flow of payments and upsets the mechanism for balancing them against another suddenly turns money from the nebulous chimerical form it assumed as measure of value into hard cash or means of payment' (Marx 1970, p. 146). Indeed, since these debt–credit relationships obscure the underlying need for hard cash (commodity money) its reappearance leads to 'theoretical dismay' and 'panic', as the credit system collapses (Marx 1970, p. 146).

6. A Pure Banking System

Having developed spontaneously, out of simple commodity circulation, the credit system (with privately contracted bills of exchange) provides the basis for three further institutional innovations. First, Marx (1976, p. 235) refers to an 'artificial system' or 'clearing' out for settling payments: 'With the concentration of payments in one place, special institutions and methods of liquidation develop spontaneously'. These special institutions are clearing banks that balance out the credit liabilities between individuals. Consider, for example, the case in Table 4 of producer 1 owing $B_{\bullet 1}$ in privately contracted debt to other producers, and these in turn owing $B_{1\bullet}$ to producer 1. Instead of producer 1 dealing with each other producer individually, he (and the other producers) can present the bills of exchange to the clearing bank, and it is this mechanism that ensures that all debts and credits are cancelled out.

Second, once banks carry out this clearing function, they also issue their own money. 'When the credit system is developed, so that money is concentrated in the hands of banks, it is they who advance it, at least nominally' (Marx 1981, p. 664). Instead of (and in addition to) bills of exchange circulating as money, banks issue banknotes. These are a type of bill of exchange, in so far as they represent a written promise to pay, a promise that the piece of paper can be exchanged for gold. But importantly the

banknote is more flexible than a privately contracted bill of exchange since it has no expiry date: 'A banknote is nothing more than a bill on the banker, payable at any time to its possessor and given by the banker in place of private drafts' (Marx 1981, p. 529).

Finally, banks become the repositories for reserves. For Marx (1970, p. 147), the work of Locke 'shows how substantial a proportion of the money in circulation in England was absorbed by the reserves of means of payment precisely during the period when banking began to develop'. Instead of individual producers keeping reserves of gold for its potential use as means of payment, commodity money tends to be collected in the vaults of banks, as the credit system develops.

In developing his study of the banking system, Marx takes sides in a controversy that raged throughout 19th century: the debate between the currency and banking schools of monetary thought. The underlying theoretical dispute is over the direction of causality between prices and the quantity of money, as considered in Section Three in our consideration of endogenous money and the quantity theory of money. For Marx, following the banking school approach of Tooke and Fullarton, it is the total price, with a given value of money and velocity of circulation, that determines the amount of money required for circulation.[6] This contrasts with the adherence of the currency school to the quantity theory of money, associated with Overstone and Torrens. These were not purely academic differences; indeed, the currency school approach won out in the formulation of the 1844 Bank Charter Act, under which restrictions were placed on the quantity of money allowed to circulate in the banking system.

In the analysis that follows Marx's monetary theory is developed by drawing on the insights of the banking school, but emphasising that he gave only qualified approval to its precepts. The banking school writers were criticised by Marx for confusing, amongst other things, money with capital (see de Brunhoff 1976, p. 106; Arnon 1984, pp. 572–574). Capital, of course, has a key role in the banking system but the fundamental starting point is money's function as a means of payment (Marx 1981, p. 584). Moreover, this starting point should be based on simple commodity circulation: 'Generally speaking these [banking school] writers do not first of all examine money in its abstract form in which it develops within the framework of simple commodity circulation and grows out of the relations of commodities in circulation' (Marx 1970, p. 187). In Marx's analysis of banking in *Capital*, Volume 3, he makes several references back to the fundamentals of simple commodity circulation as developed in *Capital*, Volume 1 (see Marx 1981, p. 525, p. 577, p. 655).

Following Marx's method, a streamlined model of the banking school approach can be developed under the rubric of simple circulation. To keep this analysis simple, it may be assumed that there is just one bank (a central bank) — referred to by Marx (1981, p. 706) as 'the pivot of the credit system' — and, as in earlier illustrations, four producers. The central bank issues banknotes which are used by producers for their exchange of

---

[6]This direction of causation also operates for Marx under means of payment: 'If the velocity of money, both as means of circulation and as means of payment, is given, then the aggregate amount of money in circulation during a particular period is determined by the total amount of commodity prices realised [plus] the total amount of payments falling due during this period minus the payments that balance one another' (Marx 1970, p. 147).

commodities.[7] Modelling issuance by the central bank in its most abstract form, it will also be assumed, in the first instance, that the only means of circulation is provided by banknotes: a pure banking system.

A core way in which producers obtain these banknotes is by contracting a bill of exchange (loan) with the central bank. Green (1992, p. 185) refers to 'the true nature of bank notes, which, as the Banking School never tired of pointing out, could only be advanced *on loan* to meet commercial requirements' (original emphasis). This is similar to the unified system operated by the Bank of England in the two decades before the 1844 Bank Act, after which the issuing of banknotes and the granting of loans were operated by separate (issue and banking) departments (see Feldman 2015, p. 650). For Marx (1981, p. 557) 'discounting bills is transforming this credit money into a different money, i.e. banknotes'.[8] This process is referred to by Le Maux (2012, p. 603), in his model of the banking school approach, as part of the second channel of reflux.[9] To illustrate this process, a bill of exchange is drawn up by the central bank in which the producer promises to pay off the loan at a future date. If the circulation of commodities is uninterrupted it may be supposed that these loans are paid off by the return (reflux) of these banknotes to the central bank.

Assume that each producer j, as modelled in the Pasinetti pure labour model, purchases commodities from each other producer worth $p_i D_{ij}$ using banknotes M_{ij} borrowed from the central bank. The circulation of banknotes is shown in Table 5. Producer 1, for example, borrows $M_{\bullet 1}$ in banknotes from the central bank, out of which he hands M_{21} over to producer 2 for an amount $p_2 D_{21}$ of commodity 2. In an equilibrium outcome (for commodity 1), producer 1 receives the same amount ($M_{1\bullet}$) back from his sales of commodity 1 to the other producers. With the banknotes he receives from sales, producer 1 then pays off the loan that he took out with the central bank to borrow the banknotes. There is a reflux of the banknotes back to the central bank: the law of reflux, as posited in the banking school approach, is in operation. In contrast to the quantity theory of money, the amount of banknotes (M) is endogenous, dependent on the supply and demand of commodities by producers.[10] 'The amount of notes in circulation is governed by the needs of commerce, and each superfluous note immediately finds its way back to its issuer' (Marx 1981, p. 657).

---

[7]The central bank could, in a more complex level of analysis, be modelled to also carry out the clearing function, between private bills of exchange, as considered in the previous section. A explained by Marx (1981, p. 673), 'in addition to banknotes, wholesale trade has a second and far more important means of circulation: bills of exchange'. But, to present the model in accessible form, the initial part of this section is restricted to the consideration of banknotes. The analysis also abstracts from international relations and the role of government.

[8]Under the assumption of a zero rate of interest, the discounting of a bill of exchange is restricted here to the purchasing of that bill by the central bank for an amount representing the money value of the loan.

[9]In Le Maux (2012, pp. 602–603), Channel 1 refers to bank deposits (see also Marx 1981, p. 589), a mechanism that will not be modelled here for simplicity, but could be introduced at a more detailed level of analysis.

[10]Credit money, as represented here by the reflux of banknotes, can be distinguished from inconvertible paper money issued by the state. For Germer (1997, p. 47), 'in Marxist economy, the concept of paper money supplied the basis for the untenable suggestion that Marx, in one respect, made a concession to the quantity theory that was inconsistent with his own'. Issues relating to the overissue of paper money and the state are not considered here under simple circulation, but could in principle be introduced at a more complex level of analysis. Under our pure banking system, overissue of banknotes is not possible since their circulation is endogenous, refluxing back to the central bank when not required by the circulation of commodities.

Table 5. Pure circulation of banknotes.

	1	2	3	4	Total banknotes received
1	0	M_{12}	M_{13}	M_{14}	$M_{1\bullet}$
2	M_{21}	0	M_{23}	M_{24}	$M_{2\bullet}$
3	M_{31}	M_{32}	0	M_{34}	$M_{3\bullet}$
4	M_{41}	M_{42}	M_{43}	0	$M_{4\bullet}$
Total banknotes borrowed	$M_{\bullet1}$	$M_{\bullet2}$	$M_{\bullet3}$	$M_{\bullet4}$	M

Table 6. Balance sheet for central bank (flows).

	Assets	Liabilities
Ex-ante	Loans to producers (M)	Banknotes (M)
Ex-post	0	0

Table 7. Balance sheet for producers (flows).

	Assets	Liabilities
Ex-ante	Banknotes (M)	Loans to producers (M)
Ex-post	0	0

A central bank balance sheet for loans and banknotes is provided in Table 6.[11] These are *ex-ante* flows, which specifically means here that they take place during the production period, before it comes to an end. Producers take out loans with the central bank (promises to pay at the end of the production period), and these become assets of the central bank. In return the producers receive banknotes from the central bank: promises that the central bank will convert banknotes into gold at any time. Hence these notes appear on the balance sheet as liabilities of the central bank. Conversely, for the balance sheet of producers (Table 7), the loans appear as liabilities and the banknotes as assets.

Since Marx never provided a clear theoretical summary of the banking school approach, nested as it was in such complex institutional detail, the pure banking system here is proposed as a preliminary attempt to fill the gap in our understanding. In practice, of course, banknotes circulate alongside bills of exchange. Combining the mechanisms established in the pure credit and pure banking systems, it is possible to specify an equation of exchange:[12]

$$\sum_{i,j=1}^{m} B_{ij} + \sum_{i,j=1}^{m} M_{ij} = \sum_{i,j=1}^{m} p_i D_{ij} \qquad (20)$$

The flow of credit money made up of bills of exchange between producers (B_{ij}) and banknotes (M_{ij}) is endogenous, dependent on the demand requirements of the real economy, as represented on the right-hand-side of (20). This is a banking school interpretation of endogenous money, with its inclusion of bills of exchange as credit money, in contrast to the narrow definition of money in the currency school approach (see Green 1992, p. 187).

---

[11]This rudimentary balance sheet draws on the systematic analysis of early banking and the creation of money by Faure (2013).
[12]A velocity of circulation equal to 1 is assumed here, as under 'simultaneous sales' where the amount of money in circulation is equal to the sum of prices (Marx 1976, 215).

Table 8. Central bank balance sheet (stocks).

Assets	Liabilities	Net Worth
Gold Reserves (*G*)	0	Gold Reserves (*G*)

7. Banking Crises

Based on his analysis of events that followed the 1844 Bank Charter Act, Marx highlighted the disastrous consequences of the currency school straight jacket. He refers to 'the ignominious fiasco they suffered both in theory and practice, after experiments on the largest national scale ... ' (Marx 1970, p. 185). It does not follow, however, if central banking were to be organised under the more flexible banking school approach, that payment crises can be avoided. 'Ignorant and confused banking laws, such as those of 1844–45, may intensify the monetary crisis. But no banking legislation can abolish crises themselves' (Marx 1981, p. 621). In order to model the possibility of crises (in a banking school framework), a rudimentary balance sheet can be presented for the stocks of the central bank (Table 8).

It may be assumed that the central bank has no stock of liabilities, but that it has reserves of gold bullion (*G*) which appear on the asset side of the balance sheet.[13] These reserves, which constitute the central bank's net worth, are required in order to underpin convertibility (between gold and banknotes) in the banking school approach. Marx (1981, p. 658) refers to 'the state of the gold reserve in the Bank's vaults, which is what ensures the convertibility of these notes'. It should be emphasised that this system allows for $M > G$: there is no requirement in the banking school approach for gold reserves to match the volume of banknotes, i.e. $M = G$ (as became law under the 1844 Bank Charter Act).

So long as the circulation of commodities and money proceeds in an uninterrupted way, then there is no need for the gold reserves of the central bank to be employed. Indeed, one observer (quoted by Marx) quipped that under the 1844 Bank Act the metal reserve 'might as well have been thrown in the sea' (Marx 1981, p. 696). However, the banking school approach allows for the cashing in of banknotes for gold. Instead of notes returning to the central bank (as an inflow), there is a potential outflow of gold from the central bank. Le Maux (2012, p. 604) refers to this as the third channel of reflux (of banknotes back to the central bank), which is not enacted under normal circumstances: in 'the absence of suspension of convertibility and the absence of a systemic banking crisis'. As observed by Marx (1981, p. 579): 'In times of prosperity, the reflux of money proceeds smoothly ... '

A banking crisis is, however, possible, due to the same contradictions Marx considered earlier in relation to money as a means of payment, and the separation of purchase and sale, in the circulation of commodities. Once an interruption in circulation takes place, it is possible, as we have seen, for a series of interconnected debt repayment problems. This has the potential to create financial panic, where producers lose confidence in the ability

---

[13]There is a simplifying assumption here that gold reserves are owned by the central bank. Introducing more detail, one could model private individuals storing their deposits of gold in bank vaults; see, for example, the reference by Marx (1981, p. 634) to deposits of Australian and Californian gold with the Bank of England following the opening of new gold mines, in 1852 and 1853.

of others to settle debts. In such an extreme scenario, it becomes possible 'that the credit system should collapse into the monetary system' (Marx 1981, p. 707): that is, the credit system (based on debt contracts) is no longer viable and producers return to gold as the circulating medium and means of payment, a default represented by the metallic-based monetary system.

The central bank can alleviate a monetary crisis, so long as it is not restricted by the currency school principle: a 'demand for monetary accommodation' which the Bank can respond to (Marx 1981, p. 592). When 'panic broke out' in 1847, the Bank Act of 1844 had to be suspended, and the Bank of England 'was now able to put its supply of bank-notes into circulation without any obstacle; and since the credit of these banknotes was actually guaranteed by the credit of the nation, and thus unimpaired, the monetary tightness was decisively eased' (Marx 1981, p. 535). Similarly, with respect to an earlier crisis: 'The demand for gold in 1825 was aimed only at filling the vacuum created by the complete discredit of the £1 notes of the county banks; this vacuum could be filled only by gold, until such time as the Bank of England also issued £1 notes' (Marx 1981, p. 691). The central bank can alleviate a crisis by issuing banknotes, but if gold is needed it helps when 'in its vaults the Bank had a gold reserve of unheard-of dimensions' (Marx 1981, p. 534); a luxury that was not enjoyed ten years later in Scotland, which experienced the 'first run on the Scottish banks for gold, in 1857' (Marx 1981, p. 693).

A banking crisis is ultimately possible, under the banking school system, if the demand for gold outruns the gold reserves held by the central bank in its balance sheet (Table 8). The onus is on the central bank to forestall a financial panic by issuing loans to producers that are finding it difficult to meet their obligations. But, as shown by de Brunhoff (1976, p. 117), all banks will 'also tend to avoid the collapse of their own credit, and to preserve themselves as organs of the credit system'. As the pivot of the banking system (considered here), the central bank may be obliged to accommodate its creditors by making loans available, but also must preserve its own position. If too many banknotes are issued on loan then under a financial panic they can be cashed in for gold, exceeding the reserves of the central bank. Since, as we have seen, under Marx's possibility theory of crisis, interruption between purchase and sale is always possible, it also follows that it is possible for the banking system — even under the flexibility of the banking school approach — to fail to accommodate a payments crisis.

Two additional crisis scenarios can be mentioned. First, the possibility of crises is enhanced by the intertwining of banknotes with private bills of exchange between producers, as modelled in equation 20. Marx (1981, p. 591) observes that there are 'certain points in the crisis, i.e. when there is a complete breakdown of credit …' and 'it has become impossible to get bills of exchange discounted, and nothing counts any more except money payment, or as the merchant says: cash.' Marx is referring to cash as banknotes in this instance. The importance of shortages in banknotes is also made clear in *Capital*, Volume 1: 'The monetary famine remains whether payments have to be made in gold or in credit-money, such as banknotes' (Marx 1976, p. 236).

Second, the possibility of a drain in gold tends to be more associated with problems of international trade (at the time when Marx was writing). Marx (1981, p. 649) writes: 'The entire history of modern industry shows that metal would be required only to settle international trade and its temporary imbalances …'. For example: 'In 1857 the crisis broke out in the United States. This led to a drain of gold from

England to America' (Marx 1981, p. 623). This international dimension is beyond the confines of the one-country model developed here, but this foundational approach is developed as a possible basis for further exploration.

It should be emphasised that this development of the possibility theory of crises under a banking system is only a preliminary first step in the study of economic crises; one that can in principle be translated into a more dynamic system under Pasinetti's approach. Once a more dynamic system, based on the power of capital, is considered, additional layers of institutional complexity and contradictions come to the fore. Indeed, for Marx, the analysis turns from a consideration of mere possibilities of crises occurring, to an analysis focused on their inevitability: 'The contradictions inherent in the circulation of commodities, which are further developed in the circulation of money — and thus, also the possibilities of crisis — reproduce themselves, automatically, in capital, since developed circulation of commodities and of money, in fact, only takes place on the basis of capital' (Marx 1968, p. 512). The intention here is to clarify the contradictions associated with a monetary system, prior to the introduction of capital, as a way of defining specific issues of capitalism — 'in so far as crisis arises out of the special aspects of capital which are *peculiar* to it as capital, and not merely comprised in its existence as commodity and money' (Marx 1968, original emphasis, p. 513). Following Marx's method, a more complete theory of crises, founded on his stages of analysis — simple circulation, simple reproduction, expanded reproduction, and so on — can be formulated with the possibility theory of crises as the starting point.

Illustration: A banking crisis can be illustrated, in abstract form, by adapting our previous example (Table 2) here in Table 9. As before, the first row and column represent flows of commodity money that facilitate transactions carried out by the gold producer (producer 1). And gold provides the unit of measure for all flows, with the price of gold under (14) having a unitary value, $p_1 = 1$. But here it may now be assumed that the remaining (twice underlined) transactions are carried out using banknotes borrowed from the central bank. (For simplicity, privately arranged debt contracts are not modelled in Table 9). Producer 2, for example, borrows 21 worth of banknotes from the central bank, used to purchase commodity 3, and borrows 24 banknotes from the central bank to purchase commodity 4.

If everything proceeds as expected, at the end of the production period the central bank is reimbursed for the banknotes borrowed by the producers. Producer 4 receives $24 + 16 = 40$ worth of banknotes (from producers 2 and 3), which allows him to pay off the $15 + 18 = 33$ worth of banknotes he borrowed from the central bank. Producer 3 receives $21 + 18 = 39$ banknotes in income (from producers 2 and 4), which allows him to pay off the $20 + 16 = 36$ worth of banknotes he borrows from the central bank.

Table 9. Equilibrium circulation of banknotes.

	1	2	3	4	Total
1		15	12	11	38
2	25		20	15	60
3	9	21		18	48
4	4	24	16		44
Total	38	60	48	44	190

Table 10. Interruption in the circulation of banknotes.

	1	2	3	4	Total
1		15	12	11	38
2	25		**15**	<ins>15</ins>	55
3	9	**0**		<ins>2</ins>	11
4	4	<ins>24</ins>	0		28
Total	38	39	27	28	132

The process is slightly different for producer 2; she borrows $21 + 24 = 45$ banknotes, which can be paid out of the $20 + 15 = 35$ worth of banknotes received together with 10 out of the 25 units of gold received from producer 1.[14]

As before, let producer 2 be the spoiler, deciding to hoard 21 banknotes instead of spending them on commodity 3, as shown here by the new (bold) zero entry in Table 10. This has an immediate impact with producer 3 finding himself 21 short of banknotes, now that producer 2 is not buying commodity 3. Let's say that producer 3 defaults on 21 units of the loan from the central bank. The central bank will, it may be assumed by way of illustration, requisition 5 units worth of commodity 2 from producer 3 (reducing his realised demand from 20 to 15) and requisition 16 of commodity 4 (reducing his realised demand from 16 to 0); producer 3 has not obtained ownership of these commodities. In consequence, producer 4 is thus 16 short of banknotes and cannot repay his loan, forcing the central bank to requisition 16 worth of commodity 3, reducing producer 4's realised demand from 18 to 2 units (as shown in Table 10). In this first instance, the central bank has a stock of unsold quantities of commodities 2, 3 and 4 that it has requisitioned, since its loans to producers have not been settled. This is a disequilibrium outcome with aggregate supply of 190 but aggregate demand falling to 132.

The central bank could decide to accommodate producer 3, granting him a further loan, so that he may not default on his repayment and keep ownership of his commodity purchases. This would prevent the ripple effect on producer 4 and help contain the potential crisis. But if the central bank loses confidence in the producers and decides to limit the amount of loans it is willing to allow, the default crisis could extend beyond that simulated in Table 10. Since, for example, producer 2 has suffered a reduction in demand it could restrict the 24 paid to producer 4, which would have further ripple effects for producers 2 and 3, causing further defaults. In such an interdependent economy, a situation of panic could potentially set in when defaults on central bank loans multiply, threatening its viability in extremis, and opening up the possibility of banknotes being cashed in for gold, thus requiring it to have sufficient gold reserves (G).

8. Conclusions

Marx's monetary theory is incomplete and opaque in its detail and complexity. A reconstruction is suggested here based on Marx's step-by-step approach, using the Pasinetti pure labour system as a starting point. The contribution, as a preliminary exercise, is to unify some of the fragments in Marx's monetary theory by cutting out complexities

---

[14]The reflux of money back to the central bank can here take different forms, as the original banknotes, or as in this example as commodity money (gold).

such as the role of social classes, capital and international relations. The analysis focuses on the first step in Marx's layered approach, that of simple commodity circulation, where commodities and money circulate between independent producers.

The starting point is Marx's critique of Say's Law, a key tenet of orthodox political economy. A condition for the satisfaction of Say's Law is established in the Pasinetti model of simple circulation. Building on Marx's detailed analysis in Part 2 of *Theories of Surplus Value*, this condition breaks down under two forms of crises: the first due to the hoarding of commodity money, the second intensified by a chain of payment defaults. In the latter, private debt contracts between producers lead to the emergence of money as a means of payment required to settle debts. In order to explore the structure of payment crises, an illustration is provided using an empirical example and 45-degree diagram — a new simplifying framework for representing and clarifying these key aspects of Marx's approach.

Following from money as a means of payment, two pure monetary mechanisms can be identified in Marx's writings. First, once producers take out private debt contracts with each other a pure credit system is established, in which all transactions are conducted using bills of exchange (credit money). Second, it follows logically from this system that debts and credits are cleared by banks; and the banks themselves, as represented in pure form by a central bank, become the focal point for a pure banking system, issuing banknotes to producers. Though these pure systems are constructed here as analytical extremes, their formulation provides the basis for a combined treatment of private debt contracts and banknote issuance in a more concrete examination of credit relations.

The pure banking mechanism provides a model of the banking school approach, as considered by Marx in *Capital*, Volume 3, based on the law of reflux, with banknotes issued on loan revolving back to the central bank. Since in this approach money is endogenous, it is also necessary to anchor it in a model of production and simple circulation in order to establish the monetary requirements of the real economy, as proposed here using the Pasinetti system. On this basis an analytical core is provided to the banking school approach, filling a gap in our understanding of Marx's unfinished writings, enabling it to stand up as a streamlined alternative to the clear axioms of its currency school counterpart.

An extension is, in addition, provided to Marx's possibility theory of crises, based on Marx's concept of money as a means of payment. In the pure credit system, commodity money is not required, Marx shows, when debts and credits balance out through clearing. But once an interruption takes place, debts must be settled using cash, commodity money re-emerging as means of payment for settling debts. Similarly, in a pure banking system, banknotes reflux back to the central bank, with commodity money inactive in the reserves of the central bank. Only in a crisis can there be a drain of gold (and banknotes) from the banking system required to settle debts (money as a means of payment).

This analysis also provides some pointers as to how the institutional detail of Marx's foundations might be developed in a more modern setting. As we have seen, Marx recognises that banknotes, rather than commodity money, may function as a means of payment; and, as part of the banking school approach (as shown by Le Maux 2012), bank deposits could be included as an additional channel of reflux. The rudimentary central bank balance sheet developed here may also be extended to include securities

such as equities and government bonds, which Marx mentions only in passing (see Toporowski 2018). These and other extensions, such as the modelling of world money and interest rates (Vasudevan 2009), would necessarily lead to further layers of complexity, relaxing the assumption of zero profits in a multi-commodity production setting, pushing beyond and building upon the firm foundations provided by simple circulation.

Acknowledgements

Disclosure Statement

References

Arnon, A. 1984. 'Marx's Theory of Money: The Formative Years.' *History of Political Economy* 16 (4): 555–575.

Arthur, C. J. 2004. *The New Dialectic and Marx's 'Capital'*. Leiden: Brill.

Baumol, W. J. 1977. 'Say's (at Least) Eight Laws, or What Say and James Mill May Really Have Meant.' *Economica* 44: 145–162.

de Brunhoff, S. 1976. *Marx on Money*. Translated by Maurice J. Goldbloom. New York: Urizen Books.

de Brunhoff, S., and D. K. Foley. 2006. 'Karl Marx's Theory of Money and Credit.' In *A Handbook of Alternative Monetary Economics*, edited by P. Arestis, and M. Sawyer. Cheltenham: Edward Elgar.

Campbell, M. 2013. 'The Transformation of Money into Capital.' In *Marx's Laboratory: Critical Interpretations of the Grundrisse*, edited by R. Bellofiore, G. Starosta, and P. D. Thomas. Chicago, IL: Haymarket.

Crotty, J. 2017. *Capitalism, Macroeconomics and Reality*. Cheltenham: Edward Elgar.

Evans, T. 1997. 'Marxian Theories of Credit Money and Capital.' *International Journal of Political Economy* 27 (1): 7–42.

Faure, A. P. 2013. *Money Creation: An Introduction*. Accessed June 12, 2019, from www.bookboon.com.

Feldman, G. D. 2015. 'A Sraffian Interpretation of Classical Monetary Controversies.' *The European Journal of the History of Economic Thought* 22 (4): 634–661.

Foley, D. K. 1983. 'Money.' In *A Dictionary of Marxist Thought*, edited by T. Bottomore. Oxford: Blackwell.

Garegnani, P. 1978. 'Notes on Consumption, Investment and Effective Demand: I.' *Cambridge Journal of Economics* 2: 335–353.

Germer, C. M. 1997. 'Credit Money and the Functions of Money in Capitalism.' *International Journal of Political Economy* 27 (1): 43–72.

Goodhart, C. A. E., and M. A. Jensen. 2015. 'A Commentary on Patrizio Lainà's 'Proposals for Full-Reserve Banking: A Historical Survey from David Ricardo to Martin Wolf'.' *Economic Thought* 4 (2): 20–31.

Green, R. 1992. *Classical Theories of Money, Output and Inflation*. Basingstoke: Macmillan.

Heinrich, M. 2012. *An Introduction to the Three Volumes of Marx's Capital*. New York: Monthly Review Press.

Lapavitsas, C. 2016. *Marxist Monetary Theory*. Chicago, IL: Haymarket.

Le Maux, L. 2012. 'The Banking School and the Law of Reflux in General.' *History of Political Economy* 44 (4): 596–618.

Marcuzzo, M. C., and A. Roselli. 1994. 'Ricardo's Theory of Money Matters'.' *Revue Économique* 45 (5): 1251–1267.

Marx, K. 1968. *Theories of Surplus Value, Part II*. Moscow: Progress Publishers.

Marx, K. 1970. *A Contribution to the Critique of Political Economy*. London: Lawrence and Wishart.

Marx, K. 1976. *Capital*, Vol. 1. Harmondsworth: Penguin.

Marx, K. 1978. *Capital*, Vol. 2. Harmondsworth: Penguin.

Marx, K. 1981. *Capital*, Vol. 3. Harmondsworth: Penguin.

Nelson, A. 1999. *Marx's Concept of Money*. London: Routledge.

Pasinetti, L. L. 1981. *Structural Change and Economic Growth: A Theoretical Essay on the Dynamics of the Wealth of Nations*. Cambridge: Cambridge University Press.

Pasinetti, L. L. 1993. *Structural Economic Dynamics. A Theory of the Economic Consequences of Human Learning*. Cambridge: Cambridge University Press.

Pasinetti, L. L. 1994. 'Economic Theory and Institutions.' In *Political Economy of Diversity: Evolutionary Perspectives on Economic Order and Disorder*, edited by R. Delorme and K. Dopfer. Aldershot: Edward Elgar.

Persky, J. 2018. 'Say's Law, Marxian Crisis Theory, and the Interconnectedness of the Capitalist Economy.' *Review of Political Economy* 30 (3): 269–283.

Say, J. B. 1803. *Traité*. 1st ed. Paris: Deterville.

Stirati, A. 1994. *The Theory of Wages in Classical Economics*. Cheltenham: Edward Elgar.

Toporowski, J. 2018. 'Marx, Finance and Political Economy.' *Review of Political Economy* 30 (3): 416–427.

Trigg, A. B. 2020. 'Marx, Say's Law and Commodity Money.' *Contributions to Political Economy* 39 (1): 23–41.

Trigg, A. B., and F. S. Lee. 2005. 'Pasinetti, Keynes and the Multiplier.' *Review of Political Economy* 17 (1): 29–43.

Vasudevan, R. 2009. 'From the Gold Standard to the Floating Dollar Standard: an Appraisal in the Light of Marx's Theory of Money.' *Review of Radical Political Economics* 41 (4): 473–491.

Weeks, J. 2010. *Capital, Exploitation and Economic Crisis*. London: Routledge.