



# Modern post-Keynesian approaches: continuities and ruptures with monetary circuit theory

Éric Berr and Virginie Monvoisin

## ABSTRACT

Stock-flow-consistent models (SFC) and modern monetary theory (MMT) are growing in popularity. Both are part of post-Keynesian theory and provide it with a modeling tool for the former and political proposals for the latter. However, these new modern post-Keynesian approaches share features with monetary circuit theory: their accounting framework, the hierarchy of agents and economic flows, and the importance of the Keynes's finance motive. This article examined the fundamental elements of these new approaches to establish their links with monetary circuit theory.

## KEYWORDS

Macroeconomics;  
accounting; economic  
policies; financing

## Introduction

Many theoretical and political questions about money have been raised in recent years. From a macroeconomic approach to the monetary economy of production, a post-Keynesian analytical approach seems suitable for explicating complex macroeconomic dynamics at work today and for providing relevant economic policies. Furthermore, the post-Keynesian school of thought is particularly rich in the context of monetary issues. Putting to an end the dichotomy between real and monetary spheres and the theory of endogenous money are essential elements of post-Keynesian theory. But it can also be used to analyze any macroeconomic phenomenon via its connection to monetary and financial phenomena, such as the evolution of the growth regime, which cannot be understood without reference to the financialization of the economy.

Today, this school of thought has developed in two notable ways: Stock-Flow Consistent (SFC) modeling and Modern Monetary Theory (MMT). Ever since the early 2000s, both these models have been used with increasing frequency and have become a popular with post-Keynesian scholars, while the latter is increasingly appreciated an ever-growing audience in the field of economic policy, leading modern monetary theorists to inspire prominent politicians in the U.S.A. and feed economic policy debates. In recent

---

Éric Berr is at Bordeaux School of Economics – CNRS – Université de Bordeaux, France.  
Virginie Monvoisin is at Alternative Forms of Markets and Organizations, Grenoble École de Management, France.

years MMT has been described as a threat in four resolutions in the U.S. Congress (Wray, 2021).

While SFC models, like MMT, are anchored in post-Keynesian economics, we show that they are also close to circuitist analysis. Monetary Circuit Theory (MCT) is a marginal and heterodox theory, but it can be discerned in the background of these two approaches. However, the convergences and divergences between MCT, on the one hand, and the SFC models and MMT, on the other, have not been given much attention. After a brief presentation of the foundations of MCT (section “The foundations of monetary circuit theory”), we highlight the links between the SFC models (section “Stock-flow consistent modeling (SFC): an operationalization of monetary circuit theory”) and the MMT (section “MMT: a circuitist approach that forgets the hierarchical banking system”). Thus, we will see that MCT, although it has been partially forgotten, remains one of the pillars of the renewal of monetary thought and policy.

### The foundations of monetary circuit theory

The first reflections on circuit theory can be found in the work of Bernard Schmitt (1960, 1984, 1996). These ideas were developed in the 1970s and 1980s at the *Center d'Étude des Relations Économiques Fondamentales*, at the initiative of Alain Barrère, as well as during the *Dynamiques Économiques et Techniques Avancées* seminars initiated by Bernard Ducros, Alain Parguez, and Frédéric Poulon.<sup>1</sup> While Schmitt was thus the historical founder of MCT, Parguez can be considered as the person who initiated post-Keynesian circuit theory (Poulon, 2018, pp. 132–133).<sup>2</sup>

This school of thought arose mainly in France. However, it has benefited from important contributions by Augusto Graziani (1990a, 1990b, 1991, 2003) in Italy and by Marc Lavoie (1984, 1985, 1987, 1990) and Mario Seccareccia (1996, 2012, Parguez and Seccareccia, 2000) in Canada, and it was subsequently passed on to the U.S.A. (Kregel, 1996; Nell, 2004; Nell and Deleplace, 1996). Even if the approaches of Schmitt, Parguez, and Poulon differ on certain points, they all follow the Keynesian monetary economy of production tradition. They do this by analyzing the intertwined process of the production and the creation of money by tracing

<sup>1</sup>See Barrère (1990); Parguez (1980, 1984, 1986); Parguez and Seccareccia (2000); Poulon (1980, 1982, 1985, 1998, 2018).

<sup>2</sup>Although in the following we will talk about money circuit theory, we must recognize that there are in fact three approaches of MCT: that of Schmitt, that of Barrère, Graziani and Parguez, and finally that of Poulon. For example, Schmitt separates two forms of money, contrary to Parguez and Poulon. Credit and the financing of production is not enough to endogenously create money, because money only really becomes money when it takes on purchasing power through the payment of wages and therefore of labor. The Marxist inspiration is clear. In the same way this currency deflates from this purchasing power by the consumption of the workers before being ultimately destroyed. According to Schmitt, the monetary circuit cannot be confused with the action of banks.

macroeconomic and monetary flows between different agents, relying on Keynesian notions of effective demand and expectations.

However, the principle of reflux makes possible to move from an analysis in terms of the *circulation of flows* to one in terms of the *circuit of flows*. This idea was not new, give that John Fullarton of the Banking School had already put it forward in the nineteenth century and it was then taken up by Thomas Tooke. For these authors, “[t]he creation of money by banks is never clear; compensation would lose its *raison d’être*: banking money is subject to reflux” (Mondello, 1985, pp. 518). In addition, very early on some post-Keynesians, such as Nicholas Kaldor and Joan Robinson, but also Jacques Le Bourva, an economist close to the Banque de France, added the principle of reflux to the Keynesian framework and asserted that any excess supply of money would be “automatically” extinguished by reflux to the banks (Lavoie, 1999, pp. 107). This makes it possible to describe macroeconomic phenomena at the same time as monetary and financial phenomena: the creation of money corresponds strictly to a period of production and expenditure, at the end of which goods are consumed and debts are repaid.

Lavoie (1990, pp. 107) notes that MCT is based on the following foundations:<sup>3</sup>

1. The circuit rests on the specific organization of the economy in which the functions of the agents, money flows, money, and time are articulated and ranked. The organization establishes a hierarchy within and between these elements (Monvoisin, 2003).
2. Among these agents, a distinction must be made between the producing firm and the bank as a financial institution. The level of effective demand, and thus the level of employment and income, depends on the firm and its decision to produce. The bank performs two functions: it creates the money needed to finance the economy and serves as a financial intermediary by collecting savings and liquid assets and redistributing them.
3. The circuit begins with the creation of money.<sup>4</sup>
4. This initial finance is distinct from the final finance.

“The problem of the so-called financing of investments can only arise after [it has received its initial financing]. When the income has been created, it is possible to

<sup>3</sup>Schmitt having a special place within MCT, he would not fully agree with point 5 (see also note 2 on the link between money and labor).

<sup>4</sup>According to Vallageas (2022), the “circuitists” can be classified based on the position they take on the amount of credit that banks need to extend to firms in order for the economy to function. Consequently, he defines three groups of circuitist economists: (i) credit finances wages (Graziani and Schmitt); (ii) credit finances all distributed income (in the form of wages or profits) (Poulon and Vallageas); (iii) credit finances production costs (wages and investment) (Parguez and Seccareccia).

have corresponding savings, which can be absorbed by the investment of securities” (Graziani, 1985, pp. 169).

5. Thus money is endogenous and comes from bank credit. Firms apply to banks for credit to finance production. When they draw on their credit lines, money is created.
6. There are fundamental macroeconomic identities ( $I = S$ ): “The prevalence of the idea that saving and investment, taken in their straightforward sense, can differ from one another, is to be explained, I think, by an optical illusion due to regarding an individual depositor’s relation to his bank as being a one-sided transaction, instead of seeing it as the two-sided transaction which it actually is.” (Keynes, 1936, pp. 81).
7. The notion that time is irreversible completes the circuit.

These foundations naturally lead to the integration of MCT into post-Keynesian theory, whose analyses rest on five presuppositions that are perfectly compatible with the foundations of MCT stated above: (i) the principle of effective demand; (ii) the predominance of radical uncertainty; (iii) irreversible historical time as a characteristic of economic processes; (iv) an analytical framework in which money is endogenous in the monetary economy of production; and (v) the importance of distributional conflicts (Lavoie and Ponsot, 2018, pp. 116).

The main contribution of MCT consists in presupposing that the circuit is a tool; thus freeing economic analysis from the tutelage of the market. As Poulon (1988, pp. 12) claims, in this model it is not a question of denying the role of the market as such, but of rejecting the Walrasian vision according to which the economy is represented by a set of interdependent markets. This interdependence presupposes the absence of a hierarchy between markets, and therefore between the economic agents who operate in these markets. As we have seen, the theory of circuit analysis envisages a hierarchy among economic agents and the operations they carry out. The model is thus incompatible with market approaches. In this way, circuit analysis opposes and rejects the market paradigm and offers heterodox approaches as a rival tool for macroeconomic analysis.<sup>5</sup> Both SFC and MMT use this tool, as we shall see.

### **Stock-flow consistent modeling (SFC): an operationalization of monetary circuit theory**

SFC modeling has developed significantly since the 2000s. Its objective is to provide a credible alternative to dynamic stochastic general equilibrium

---

<sup>5</sup>Barrère (1990, pp. 20) reminds us of Henri Guitton’s question. In his book entitled *Imperfection in Economics* (1979), he wondered whether the concept of the circuit was intended to take the place of the concept of the market.

models that are based on interdependent markets and describe fictitious economies composed of representative agents maximizing their intertemporal utility, from which money is absent and adjustments are made exclusively through prices (Le Héron, 2018, pp. 258).

SFC models propose a more realistic situation. To do so, they use a circuitist approach, deepening it to meet their purposes.<sup>6</sup> In accordance with MCT, and thus with post-Keynesian theory, money is seen as endogenous and plays a central role, leading to the distinction between banks and firms. Radical uncertainty leads, in the tradition of Keynes and Kalecki, to an emphasis on the short term, the long term being only a series of short terms. Above all, the circuitist character of the SFC models stems from the fact that they adopt an accounting framework that ensures their overall consistency (sub-section “The importance of the accounting framework”), based on a fundamental macroeconomic identity (sub-section “The fundamental macroeconomic identity”) and incorporates the distinction between initial and final finance (sub-section “Initial and final finance”). These last three points are elaborated below.

### ***The importance of the accounting framework***

National accounts systems provide both MCT and SFC models with a framework compatible with the hierarchy of economic agents. Moreover, it is not surprising that MCT theory has developed mainly in France, where national accounts systems are widely taught in universities. The TEE provides a detailed representation of the national economy.<sup>7</sup> On their part, Godley and Lavoie (2012), who originated the development of the SFC model and are the reference on the subject, recognize influences coming from the accounting framework. In particular, Morris Copeland and Jean Denizet sought to integrate monetary and financial flows into the national accounts, based on the work of Richard Stone, that were presented by the UN presented in the 1950s. Therefore, it was Copeland and Denizet who put an end to the dichotomy between the real and monetary spheres of neoclassical economics (Godley and Lavoie, 2012, pp. 23–24).

In this achievement, Godley and Lavoie follow Tobin’s (1982) advice when he explained how his thought differed from neoclassical economics in his speech on receiving his Nobel Prize. For him:

---

<sup>6</sup>If Marc Lavoie can be considered a “Circuitist” and one of the founders of SFC models, most of the authors in SFC modeling (Wynne Godley, Francis Cripps, Lance Taylor, Claudio Dos Santos, Jacques Mazier) are not familiar with MCT. The exceptions are Gennaro Zezza who knew and admired Augusto Graziani and Edwin Le Héron who took part in the debate on MCT in France during the 1980s.

<sup>7</sup>The TEE, named after the *Tableau économique* by the Physiocrat François Quesnay, was introduced in 1955. It is the main tool of the French national accounts, and therefore of the System of National Accounts.

(i) [A]ny model must include a multiplicity of sectors and a multiplicity of assets with their different yield rates; (ii) monetary and financial operations must be modeled, especially those conducted by the central bank and the behavior of banks; (iii) stocks and associated flows must be fully integrated, and their accounting must be done in a consistent way; (iv) there can be no “black hole”, any flow must come from somewhere and go somewhere. All budget and addition constraints must be respected, both in results and in behavior. (Lavoie et al., 2021, pp. 46).

But where MCT proposes an analysis in terms of flows (and thus ignores Tobin’s third point), the SFC models initiated by Godley and Lavoie integrating flows and stocks in their analysis.<sup>8</sup> Although they claim to exhibit a circuitist logic,<sup>9</sup> these dynamic models are not “simple models of the national accounting circuit, but integrate markets, behaviors, reaction functions, economic policies, [and] portfolio trade-offs” (Le Héron, 2018, pp. 261). They have led to the development of matrix accounting combining a matrix of stocks, which present sectoral balance sheets, with a matrix of transaction flows, which is the equivalent of the TEE. Thus, Godley considers that the combination of the inventory matrix and the matrix of transaction flows constitutes the skeleton upon which it is possible to model the monetary economy of production, which is the basis of post-Keynesian economics.

### ***The fundamental macroeconomic identity***

Godley also bases his analysis on what he calls the “three-sector financial balances model,” which can be represented as follows (Lavoie, 2014, pp. 259–263):

$$\begin{aligned}(S - I) &= (G - T) + (X - M) & (1) \\ \text{Or } (S - I) + (T - G) + (M - X) &= 0 & (1')^{10}\end{aligned}$$

where  $S$  is private savings,  $I$  is private investment,  $G$  is public expenditure,  $T$  is tax revenue,  $X$  is exports and  $M$  is imports.

For Godley  $(S - I)$  encapsulates the net accumulation of financial assets by the private sector, that is, its net financial savings, while  $(G - T)$  is the budget deficit or what it can also be called the financing needs of the public sector, and  $(X - M)$  is the foreign trade balance which, simplified, is reduced here to the trade balance. Equation 1 shows that the wealth

<sup>8</sup>According to Le Héron (2020), MCT develops money as a flow (referring to Keynes’s finance motive) and does not attach much importance to the liquidity preference, i.e., money as a stock. SFC models develop the two dimensions of money: flow (endogenous money through production) and stock (according to a portfolio arbitrage between money and securities where the liquidity preference has a role to play).

<sup>9</sup>Admitting he has adhered to MCT since the 1970s, Lavoie (2021) shows that there is strong compatibility between Godley’s and Graziani’s analyzes, the latter being considered as the leader of the Italian MCT.

<sup>10</sup>This relationship, in the form (1) or (1’), is the basis of MMT analysis (Kelton, 2020, chapter 4). Stephanie Kelton acknowledges the influence Godley has had on her own thinking (Kelton, 2020, pp. 128–129).

accumulated by the private sector is the counterpart of a foreign trade surplus either with or without a public deficit. If we look at the global level, that is to say, in the case where  $(X - M) = 0$ , private wealth appears as the counterpart of the public deficit.

Equation 1' can be deduced from the TEE. It indicates that the sum of the financing capacities or needs from the different sectors of the economy (the private sector, the public sector and the rest of the world) is necessarily equal to zero. It represents what Lavoie (2014) calls “fundamental identity,” that is, the identity between investment and savings, which can be deduced from the following two equations (Berr et al., 2018, pp. 313):

$$Y = C + I + G + X - M \quad (2)$$

$$Y = W + P + T \quad (3)$$

with  $Y$  being the global income of the economy, that is to say the GDP,  $C$  being final household consumption,  $W$  being disposable household income, and  $P$  being firms' (undistributed) profits.

Equation 2 defines the aggregate income of an economy in terms of demand—what the aggregate income is used for—while Equation 3 defines it in terms of income—how it is distributed. By combining these two relations, we have:

$$I = S_h + (T - G) + P + (M - X) \quad (4)$$

$$I = S_h + S_{pub} + S_{firm} + S_{foreign} \quad (5)$$

where  $S_h$ —which is equal to the difference between  $W$  and  $C$ —represents household savings,  $S_{pub}$  represents public savings, as defined by the budget balance  $(T - G)$ ,  $S_{firm}$  represents the undistributed profit of firms, and therefore their savings, and  $S_{foreign}$  represents foreign savings, equal to  $(M - X)$ .

Thus, Equation 5 represents the fundamental identity between investment and savings. From the form given by Equation 4, and assuming that private savings  $S = S_h + P$ , we can easily retrieve expression (1) or (1'). Therefore, Godley's “discovery” of relation (1) is not really a discovery, as this relation is the basis of the TEE developed in France.

For Le Héron (2018, pp. 266), the two matrices and the accounting identities derived from them “mean nothing more than the circuit of matrix accounting.” To make it an accurate macroeconomic model, behavioral relationships must be added.<sup>11</sup> For firms, this means determining prices, and therefore the level of their margin over costs, the level of production, investment, and its financing, and which variables influence these quantities. Banks adopt an “horizontalist” conception of endogenous money and

<sup>11</sup>While neoclassical theory seeks the microeconomic foundations of macroeconomics, post-Keynesians provide a macroeconomic basis for microeconomic behavioral relationships.

adapt their money supply to the demand for credit. Households decide how much of their income they will consume and how their savings will be divided between an invested portion (in securities) and a stored portion (bank deposits). While it is true that SFC models allow for greater precision in the integration of behavioral relationships and provide an operationalization of the MTC, notably through numerous applications to the economies of different countries, the latter also permits the macroeconomic effects of economic policies to be considered.

### ***Initial and final finance***

Lavoie (2004, 2021) and Zezza (2012) emphasize the concordance of views between their views and those of Godley and Graziani—and thus with MCT—on the question of financing the economy.<sup>12</sup> For Graziani (1991), as for all the circuitist authors, the economic process begins when banks grant credit to firms<sup>13</sup> to finance production. So, they can buy the means of production and a workforce, which are per se the remuneration of households (Bradley et al., 1993, pp. 68; Lavoie, 1987, pp. 69; Poulon, 1980, pp. 382).<sup>14</sup> This is what Graziani calls the initial finance, involving the creation of money.

However, firms must repay the money they obtain by selling goods and services to households and by issuing securities that these same households will subscribe. This is the final finance. Graziani (1991, pp. 39) states that the role of financial markets is not to finance investment but to allow firms to recover part of household savings to reduce their indebtedness to banks. This is a Keynesian idea—and is at the heart of the Keynesian “revolution”: investment precedes savings and not the reverse, or, in other words, it is loans that make deposits and not the other way around.

The final finance stage can be likened to what is called the reflux. This characterizes how money returns to the banks, either through the repayment of loans by firms, which gives rise to the destruction of the repaid money, or in the form of household savings, that is, bank deposits. While it is *indeed* loans that make deposits, Lavoie (2004, pp. 138) notes that it is the bank deposits of households (their savings) that determine the amount of loans that are not repaid, and thus the financing that firms will ask banks to renew.

---

<sup>12</sup>See, for example, Godley (2004).

<sup>13</sup>Firms demands for credit depends on their expectations of the demand for goods and services that they think they must satisfy, and in particular, on the effective demand that determines the level of employment, and therefore the income to be paid to households.

<sup>14</sup>This comes from interpretations of the Keynes's finance motive—the 1980s debate in post-Keynesian theory. For MCT, all the money borrowed by firms (for the purchase of commodities, capital or labor) ends up as household income. To illustrate this, imagine that any firm allocates half of its resources to the payment of income to households and the other half to the purchase of means of production from other firms, which will do the same. Thus, step by step, all the money borrowed will be paid to household income.

However, Godley differs slightly from circuit theorists on one point. Even if the MCT states that finance is directed only toward productive investment, Godley acknowledges that credit can also be granted, whether to households or other financial intermediaries, to acquire financial securities or to speculate, and thus for nonproductive purposes (Lavoie 2021, pp. 13). Zezza (2012, pp. 169) also notes that while the approaches of Godley's and circuit theorists to financing are comparable, the former focuses on the stock of outstanding credit at the end of the period while the latter focuses on initial finance. As a result, by focusing on net variables, SFC models neglect operations whose financing was repaid before the end of the period and which nevertheless represented a cost during this period. Cottin-Euziol et al. (2022) note that the SFC models does not make it possible to distinguish between new investments and the repayment of bank loans that financed past investments.<sup>15</sup>

### **MMT: a circuitist approach that forgets the hierarchical banking system**

As we have already mentioned, the audience for MMT is growing. However, this approach is less simple than it seems. Indeed, although it claims to be a modern monetary theory, its supporters are primarily concerned with proposing economic policies rather than theoretical principles, and focusing on fiscal—rather than monetary—issues. Essentially, MMT endeavors to develop a model policy for financing public expenditures through applied and pedagogical rather than academic diffusion (Kelton, 2020; Tcherneva, 2020).

Let us note that its general framework is and remains Keynesian economics and effective demand theory, with the concern for employment at the center of the analysis. Wray (2019, pp. 13), Forstater (1998) and other modern monetary theorists rely on the fundamental notions of the General Theory: inflation has no monetary origin, saving is not a prerequisite for investment, and public spending is a tool for economic policies.<sup>16</sup>

Nonetheless, MMT comes from several broader traditions. They explicitly or implicitly rise from its seven main foundations (Wray, 2020). which can be summed up as four pillars:

- monetary analysis through (i) chartalist theory, (ii) the theory of endogenous money, and (iii) the institutional history of money;

<sup>15</sup>According to Cottin-Euziol and Le Heron (2021), SFC models are not interested in the monetary financing of expenditures within the period considered. Monetary financing only appears for what exceeds this short-term period, i.e., the financing of net investment. This is consistent for example with the analysis of Paul Davidson, according to whom initial finance only finance investment but not all costs of production as for MCT.

<sup>16</sup>"[A]t the aggregate level the causation goes from spending to income, from injections to leakages" (Wray 2019, pp. 15).

- accounting analysis using (iv) the double-entry approach and (v) Godley's sectoral balances;
- (vi) Minsky's theory;
- (vii) Abba Lerner's functional finance.

In fact, the last two points are common to all post-Keynesians—indeed, to Keynesians in general—circuitists and modern monetary theorists included. Berr et al. (2018, pp. 319) summarize Lerner's contribution thus:

The concept of functional finance was developed by Abba Lerner (1943) and feeds into post-Keynesian fiscal policies. Lerner opposed the dogma of “sound finance” put forward by neoclassical economists, which was based on the search for a balanced government budget. For him, the main economic objective of a State is to promote economic prosperity. Therefore, government should set public spending and taxes at levels such that the economy can reach full employment without inflation, without worrying about the position of the budget balance—in surplus or deficit—and putting the question of public debt in the background.

Minsky is also one of the founding authors of the post-Keynesian school of thought. By linking uncertainty and the financial instability that is endogenous to the economy, the role of money and liquidity preference (Nasica, 2018, pp. 88), Minsky's work has become indispensable for understanding the destabilizing nature of finance in a monetary economy of production.

Having shown how SFC models rest on circuitist features, we observe that MMT and MCT have a lot in common. We note the existence of essential convergences between the MCT and MMT (sub-section “Essential convergences”), explaining how it can be seen as a political extension of circuitist principles (sub-section “MMT as a political extension of the monetary circuit?”), and demonstrating that the elements that separate the two approaches are more a matter of the degree to which the state is taken into account than a fundamental divergence between them (sub-section “Insurmountable differences? The temptation of Leviathan”).

### ***Essential convergences***

MCT and MMT converge on many specific points. First, the authors of MMT often refer to the MCT to explain the endogenous process of money creation and how money has been linked to effective demand since the 1990s:

Lavoie (1985) helped to revive a circuit approach to money that was based on earlier work by French economists; this became the Franco-Italian circuitist approach. Its view of banking recalled the real bills doctrine (money is created to finance the production process) and was consistent with the monetary theory of production. (Wray, 2020, pp. 7)

This is easy to grasp. The theory of endogenous money can be understood through two axes: one axis links commercial banks and the central bank in questions of liquidity, the interest rate and the institutional functioning of money creation; the other axis links firms and banks in question of effective demand (Monvoisin, 2013). English-speaking post-Keynesians have examined the first axis for about twenty years, opposing horizontalists and structuralists. The French and Italian circuit school of thought focused on the link between money and production (effective demand). Wray, who was a leader of the structuralists, then naturally turned to the circuit when he broadened his field of analysis.<sup>17</sup> It allowed him to emphasize that money is created *ex nihilo*, without recourse to prior savings, but that it also meets the needs of the economy (Bailly, 1992; Gnos and Schmitt, 1990; Graziani, 1996; Parguez, 2002).

Moreover, both MMT and MCT put forward two very specific elements: double-entry bookkeeping and money as a debt and unit of account. First, circuitists make extensive use of accounting presentation (Poulon, 1982; Rossi, 2008; Schmitt, 1996); and better still, it is sometimes at the heart of macroeconomic mechanisms.<sup>18</sup> As we have seen, MMT attempts to account for financial flows between the main economic agents. Referring to Godley's fundamental identity between sectors, Wray (2020, pp. 19) explains that "the most important takeaway is that the balances must balance, meaning that we cannot think about the government's budgetary outcome independently of the other two balances." Public deficits correspond to private sector surpluses, which makes it possible to justify massive intervention by the state.

Then, MMT (Bell, 2001) and MCT (Rochon, 1999) show that money is not only a claim but also a debt, because they reason using an accounting method. This analysis allows them to emphasize the link between money creation and effective demand through credit. For both schools, this approach is complemented by Keynes's argument in the *Treatise on Money* about the classification of money (1930, pp. 6–9). In this book, the primary function of money lies in its capacity to harmonize the evaluation of prices and contracts, that is, its function as an accounting unit: "Money-of-Account, namely that in which Debts and prices and General Purchasing Power are expressed, is the primary concept of a Theory of Money" (Keynes, 1930, pp. 3). Because money is above all a unit of account, a "number," its function is therefore independent of its medium. For MCT, it is a question of wondering about the meaning of the number itself and

<sup>17</sup>The horizontalist/structuralist controversy died out of its own accord in the early 2000s (Fontana 2003).

<sup>18</sup>For example, the Circuit of "Dijon" uses double-entry accounting to show the immediacy of certain transactions. The identity of savings and investment and the time of the circuit are clarified (Bradley et al. 1993).

its amount<sup>19</sup> (Schmitt, 1984); for MMT scholars it is a question of establishing that the unit of measurement is accepted, thanks to the state. However, given that this last point is at the origin of many debates and controversies, let us first examine the complementarity of the two schools.

### ***MMT as a political extension of the monetary circuit?***

Beyond these convergences, MCT and MMT differ greatly in their fundamental aims. The circuitists' project clearly aims at building a global macroeconomic theory—even if this means adopting arguments and demonstrations that are not easily accessible even to the most seasoned economists; and these discussions essentially remain in the academic sphere. The MMT project aims at proposing alternatives for public action to the widest possible audience and to political actors. As Fullwiler (2010) acknowledges, “MMT’s description of the monetary system is its elaboration of the system’s operational realities.” More precisely, MMT scholars recognize that it is developing a specific case for scientific debates and a general case for the general public<sup>20</sup> (Fullwiler, 2010)—which mobilizes most of its defenders. Can we then see in MMT an operational extension of the circuit?

MMTers construct political proposals that are in line with the circuitist tradition of state intervention. In fact, MMT revives some essential elements of the MCT theoretical corpus:

- a. rehabilitation of the role of the state based on an analysis of economic flows;
  - b. opposition to austerity policies, Lerner and functional finance;
  - c. importance of understanding the monetary creation in order to understand the financing needs of the economy.
- 
- a. Indeed, we have seen above the elements of MCT reasoning concerning flows and the hierarchy of agents. This reasoning allows MMT to go further. By resting on the classification of economic agents, the state once again becomes a major player with large-scale policies—guaranteed employment, *Green New Deal*, monetary policy, etc. Moreover, both

<sup>19</sup>The Circuit of Dijon has often been criticized for focusing on the unit of account function. Indeed, for MCT in general, the question is to establish that money corresponds to household income. The school of Dijon goes further: it distinguishes a money, a pure number (which has changed its name over time), from a “real” money, which is the equivalent of household income. For them, the latter is the only money with a liberating power, that is to say, purchasing power.

<sup>20</sup>“First, there is the story for the sophisticated reader or the scholarly researcher, what Fullwiler et al. (2012)—three key contributors to MMT—call the specific case. This is the story which is exactly right and with which I am in full agreement. Different countries have different institutions with different specificities, and small differences or small changes may lead to substantial consequences with regards to the monetary and fiscal nexus. Then there is a second story, which MMT writers call the “general” case, which is designated for a more popular consumption, for instance blog readers” (Lavoie 2019, pp. 98).

approaches adopt the same policy orientation. Circuitists have always been fiercely opposed to austerity policies (Parguez, 2012) one of MMT's primary vocations is to demonstrate its limits, even its dangers. Thus, it can be stated that:

Authors writing from The Monetary Circuit (TMC) perspective share points of both agreement and disagreement with MMT. Parguez/Seccareccia's [...] and Graziani's [...] discussions of TMC appear to be theoretically consistent with MMT advocates in their policy opposition to austerity. (Nesiba, 2013, pp. 49).

- b. MMT does not hesitate to mobilize Lerner's work and the theory of functional finance to support the argument about the relevance of public spending and state intervention. This entails deepening Keynes's approach by deconstructing the myth of sound finance (Kelton, 2020). Moreover, Colander (1984) wonders whether Keynes was more Keynesian or Lernerian.
- c. Finally, circuitists have studied the process of money creation at length to reveal its implications for effective demand. MMT scholars start from the postulate of endogenous money to explain the initial or final financing needs of the economy, the institutional functioning of money creation (in redefining the role of banks) and why monetary policy is not negative. But their concern is also to show that money cannot constitute a constraint for the economy, either when it is abundant—this quantitative issue being attacked by all the post-Keynesians—or when it is scarce. This last point is fundamental for MMT:

[I]f banks need reserves for clearing (or to meet legal requirements), the reserves are supplied on demand by the central bank. Banks can never “run out of money” since they create it when they make loans, and central banks can never “run out of reserves” since they lend them into existence. (Wray, 2019, pp. 14).

### ***Insurmountable differences? The temptation of Leviathan***

Thus, MCT and MMT converge and complement each other on many points; such as the method of analysis using accounting, the importance of the endogeneity of money and its function as an accounting unit, macroeconomic analysis, and opposition to austerity. Nevertheless, they divide according to the place that the state occupies in economic theory and policy.

First, let us return to the notion of the unit of account for MMT. The state is necessary to establish the acceptability of money:

MMT insists that the usual case has been that each nation state chooses its own money of account, issues currency denominated in that money of account, and imposes obligations (such as taxes) payable in the currency.<sup>21</sup> (Wray, 2020, pp. 7)

---

<sup>21</sup>The emphasis in the source.

The conception of money as a “creature of the State,” according to Lerner, is supported by recurrent references to Georg Knapp and Mitchell Innes and by the study of monetary history. Circuitists do not especially focus on the latter but may have different interpretations; such as Rochon and Rossi (2013), who see monetary history as a history of the link between money and its liberatory power more than a link between money and the state. The MMT position holds true only in economies with a developed banking system and a structured state, which significantly narrows the scope of this analysis from a historical and geographical perspective. But above all, MMT scholars confuse two major issues. They say that

- the central bank can be assimilated to the state because “state money” is issued by the central bank
- the “state’s money” can be assimilated to the state’s debt. So, the central bank can be compared with the treasury (Gnos and Rochon, 2004; Sawyer, 2019).<sup>22</sup>

The first confusion and the dissolution of the central bank into the state makes the banking system and commercial banks disappear. Apart from the factual issue that this “simplification” flies in the face of institutional and social reality, it also poses conceptual issues. As mentioned above, at this level of endogeneity, it is effective demand that is at stake. The analysis of endogenous money in the circuit rests on the existence of bank money and credits granted by banks to finance production. It is assumed that firms determine their plans of production, the bank evaluates them—with more or less sensitivity to risk, as Minsky taught us—and may leave out a “fringe of unsatisfied borrowers” (Keynes, 1930, pp. 190). If the banks disappear, what happens to the demand from firms for financing? How is production financed? The whole theory of effective demand in such circumstances would have to be revised.

The answer of MMT advocates lies in their second confusion. The central bank merges with the public treasury. The state’s debt is the state’s money; it finances the economy. Indeed, in the theory of endogenous money, money is a debt. But it is also a claim; that is, it presupposes a counterparty. In other words, the bank circulates an instrument of payment that is a claim on itself. In MMT, with the disappearance of the hierarchical banking system, economic agents would use the state’s debt to pay

---

<sup>22</sup>[F]irst, the chartalist assertion whereby this *thing* is necessarily state money, and synonymous with the debt of the state. Chartalist writers ground this assertion simply in the fact that every modern banking system is endowed with a central bank or ‘high-powered money.’ Hence, they write, central bank money is *de facto* the creature of the state. Second, we wish to challenge the assumption that the central bank and the treasury are treated as if they were the same institution” (Gnos and Rochon 2004, pp. 43).

taxes and the state would pay its expenses with its own debt. This simply raises the problem of the liberating power of money (Rossi, 2008).

Finally, let us come back to the state as the financier of the economy. If it is the state that identifies financing needs, then, the state as an “entrepreneur” is consistent with circuitist (Cingolani, 2019) and post-Keynesian theory. But more broadly, the MMT model poses a major problem: the disappearance of the private sector. The authors do not talk about firms—effective demand—or the banking system—commercial banks. Consequently, MMT is moving from an endogenous money, as developed by MCT and SFC models where effective demand and firms play a crucial role, to endogenization through the public deficit. Let us remember that the first monetary circuits (Poulon) or SFC models (Godley and Lavoie) were three-sector (banks-firms-households), thus without the State. And when the State is added in SFC models (Zezza and Dos Santos), we go to five sectors where the central bank is clearly separated from the State. In fact, MMT scholars propose a purely normative analysis, a “specific case” that has little connection with historical, social, and institutional reality.

This is where the problem lies. The methods, references, and orientations between the MCT and MMT are very similar, but the break occurs when MMT makes the state all-powerful and omnipresent. The radical nature of the MMT framework and proposals sometimes makes dialogue with other authors difficult. Moreover, the MMT project is part of a purely U.S. problems (with its absence of a real system of unemployment benefits and redistribution); such that it becomes almost impossible to generalize this model to other societies.

## Conclusion

The SFC and MMT models have a definite anchorage in post-Keynesian thought. The latest academic development of the SFC method and the latest political development of MMT both seem to be far removed from the MCT that peaked in the 1980s and has been marginalized ever since.

However, after recalling its foundations, the degree of kinship between this school of thought and these two approaches is greater than it seems at first. In SFC models, the convergence is based on the fundamental elements of the accounting framework, accounting identities and the distinction between initial and final finance. It is thus possible to see in these models an operationalization of the circuit. For MMT, the convergence takes place on the fundamental elements that are—again—accounting, the dual nature of debt and claim of money, and the importance of its status as a unit of account. It is thus possible to see in MMT a political extension of the circuit, even if the place of the state remains an important point of

divergence. Thus, if the circuit theory no longer has the resonance it had a few years ago, it is proving to be more relevant than ever, as the two main post-Keynesian developments are based on these principles.

## References

- Bailly, Jean-Luc. "Nouvelles considérations sur le motif de 'finance' de John Maynard Keynes." *Économie Appliquée*, 1992, 65 (1), 105–127.
- Barrère, Alain. "Signification générale du circuit: une interprétation." *Économies et Sociétés*, 1990, 24 (2), 9–34.
- Bell, Stephanie. "The Role of the State and the Hierarchy of Money." *Cambridge Journal of Economics*, 2001, 25 (2), 149–163.
- Berr Éric; Monvoisin, Virginie; and Ponsot, Jean-François, eds. *L'économie Post-Keynésienne. Histoire, Théories Et Politiques*. Paris: Seuil, 2018.
- Bradley, Xavier; Monvoisin, Virginie; and Ponsot, Jean-François. "La 'Finance' Et le Circuit De la Monnaie." *Revue Française D'économie* 1993, 8 (1), 67–88.
- Cingolani, Massimo. "Necessary Public Investment: The Role of Public Banks." *International Journal of Political Economy*, 2019, 48 (3), 275–300.
- Colander, David. "Was Keynes a Keynesian or a Lernerian?" *Journal of Economic Literature*, 1984, 22 (4), 1572–1575.
- Cottin-Euziol, Edouard; Bougrine, Hassan; and Rochon, Louis-Philippe. "The Reflux Phase: What SFC Models Can Learn from the Monetary Circuit Theory." *European Journal of Economics and Economic Policies: Intervention*, 2022, (19), 1–16.
- Cottin-Euziol, Edouard, and Le Heron, Edwin. "Dynamique d'un modèle post keynésien stock-flux cohérent avec financement des dépenses courantes de production." *Économie Appliquée*, 2021, 2, 83–114.
- Fontana, Giuseppe. "Post-Keynesian Approaches to Endogenous Money: A Time Framework Explanation." *Review of Political Economy*, 2003, 15 (3), 291–314.
- Forstater, Matthew. "Toward a New Instrumental Macroeconomics: Abba Lerner and Adolph Lowe on Economic Method, Theory, History and Policy." *Levy Economics Institute Working Paper*, 1998 254 (xx), 1–10.
- Fullwiler, Scott. 2010. "Modern Monetary Theory—A Primer on the Operational Realities of the Monetary System." *Mimeo*. <http://www.moslereconomics.com/wp-content/pdfs/MMT-Scott-Fullwiler.pdf>.
- Fullwiler, Scott, Stephanie, Kelton, and Randy, Wray. *Modern Money Theory: A Response to Critics*. Political Economy Research Institute, University of Massachusetts Amherst, Working Paper Series No. 279, 2012.
- Gnos, Claude, and Schmitt, Bernard. "Le Circuit, Réalité Exhaustive." *Économies Et Sociétés*, 1990, 24 (2), 63–74.
- Gnos, Claude, and Rochon, Louis-Philippe. "Money Creation and the State: A Critical Assessment of Chartalism." *Journal of Political Economy*, 2004, 32 (3), 41–57.
- Godley, Wynne. "Weaving Cloth from Graziani's Thread. Endogenous Money in a Simple (but Complete) Keynesian Model." In Richard Arena and Neri Salvadori (Eds.), *Money, Credit and the Role of the State. Essays in Honour of Augusto Graziani*. Aldershot: Ashgate, 2004, pp. 127–135.
- Godley, Wynne, and Lavoie, Marc. *Monetary Economics. An Integrated Approach to Credit, Money, Income, Production and Wealth*. 2nd edition. Basingstoke: Palgrave Macmillan, 2012.

- Graziani, Augusto. "Le débat sur le 'motif de financement' de J.M. Keynes." *Économie Appliquée*, 1985, 38 (1), 159–175.
- Graziani, Augusto. "La théorie du circuit et la théorie macroéconomique de la banque." *Économies et sociétés*, 1990a, 24 (2), 51–62.
- Graziani, Augusto. "The Theory of the Monetary Circuit." *Économies Et Sociétés*, 1990b, 24 (6), 7–36.
- Graziani, Augusto. "La Théorie Keynésienne De la Monnaie Et le Financement De L'économie." *Économie Appliquée*, 1991, 64 (1), 25–41.
- Graziani, Augusto. "Money as Purchasing Power and Money as a Stock of Wealth in Keynesian Economic Thought." In Edward Nell and Ghislain Deleplace (Eds.), *Money in Motion. The Post Keynesians and the Circulation Approaches*. Basingstoke: Macmillan, 1996, pp. 139–154.
- Graziani, Augusto. *The Monetary Theory of Production*. Cambridge: Cambridge University Press, 2003.
- Kelton, Stephanie. *The Deficit Myth*. New York: PublicAffairs, 2020.
- Keynes, John Maynard. "Treatise on Money, The Pure Theory of Money." In *The Collected Writings of John Maynard Keynes*, Volume V. Cambridge: Cambridge University Press, 1930.
- Keynes, John Maynard. "The General Theory of Employment, Interest and Money." In *The Collected Writings of John Maynard Keynes*, Volume VII. Cambridge: Polity Press, 1936.
- Kregel, Jan. "The Policy Implications of the Current Bank Crisis, or, 'Is Free Market Capitalism Compatible with Endogenous Money?'." In Edward Nell and Ghislain Deleplace (eds.), *Money in Motion. The Post Keynesians and the Circulation Approaches*. Basingstoke/New York: Macmillan/St Martin's Press, 1996, pp. 651–671.
- Lavoie, Marc. "Un modèle post-keynésien d'économie monétaire fondé sur la théorie du circuit." *Économies et Sociétés*, 1984, 18 (2), 233–258.
- Lavoie, Marc. "Credit and Money: The Dynamic Circuit, Overdraft Economics, and Post-Keynesian Economics." In Marc Jarsulic (ed.), *Money and Macro Policy*. Hingham: Kluwer, 1985, pp. 63–84.
- Lavoie, Marc. "Monnaie Et Production: une Synthèse De la Théorie du Circuit." *Économies Et Sociétés* 1987, 21 (9), 65–101.
- Lavoie, Marc. "Le Circuit Dans la Pensée Economique Post-Keynésienne Américaine." *Économie*, 1990, 6, 105–118.
- Lavoie, Marc. "The Credit-Led Supply of Deposits and the Demand for Money: Kaldor's Reflux Mechanism as Previously Endorsed by Joan Robinson." *Cambridge Journal of Economics*, 1999, 23 (1), 103–113.
- Lavoie, Marc. "Circuit and Coherent Stock-Flow Accounting." In Richard Arena and Neri Salvadori (eds.), *Money, Credit and the Role of the State. Essays in Honour of Augusto Graziani*. Aldershot: Ashgate, 2004, pp. 136–151.
- Lavoie, Marc. *Post-Keynesian Economics: New Foundations*. Cheltenham, UK and Northampton, MA: Edward Elgar Publishing, 2014.
- Lavoie, Marc. "Modern Monetary Theory and Post-Keynesian Economics." *Real World Economics Review*, 2019, (89), 97–108.
- Lavoie, Marc. "Wynne Godley's Monetary Circuit." *Journal of Post Keynesian Economics*, 2021, 44 (1), 6–23.
- Lavoie, Marc, and Ponsot, Jean-François. "Les courants et fondements théoriques de l'analyse post-keynésienne." In Éric Berr, Virginie Monvoisin, and Jean-François Ponsot (eds.), *L'économie post-keynésienne. Histoire, théories et politiques*, 2018, pp. 105–125. Paris: Seuil.

- Lavoie, Marc, Virginie Monvoisin, and Jean-François Ponsot. 2021. *L'économie post-keynésienne*. Paris: La Découverte, collection Repères.
- Le Héron, Edwin. "La modélisation post-keynésienne stock-flux cohérente contemporaine." In Éric Berr, Virginie Monvoisin, and Jean-François Ponsot (eds.), *L'économie post-keynésienne. Histoire, théories et politiques*. Paris: Seuil, 2018, pp. 257–277.
- Le Héron, Edwin. "Endogenous Money, Liquidity Preference and Confidence: For a Qualitative Theory of Money." In Louis-Philippe Rochon (ed.), *Credit, Money and Crises in post-Keynesian Economics*. Aldershot: Edward Elgar, 2020, pp. 133–51.
- Lerner, Abba. "Functional Finance and the Federal Debt." *Social Research*, 1943, 10 (1). 38–51.
- Mondello, Gérard. "Étude de la liaison monnaie-revenu. Demande effective: les théories de Thomas Tooke et J. M. Keynes." *Revue économique*, 1985, 36 (3), 509–554.
- Monvoisin, Virginie. "La nature de la monnaie endogène chez les post-keynésiens: les enjeux d'une théorie monétaire contemporaine." PhD Thesis, CEMF, Université de Bourgogne, 2003.
- Monvoisin, Virginie. "What's the Use of Banks, Especially after the Crisis?" *Review of Keynesian Economics*, 2013, 1 (2), 195–209.
- Nasica, Éric. "Hyman Minsky: Le théoricien de l'instabilité financière." In Éric Berr, Virginie Monvoisin, and Jean-François Ponsot (ed.), *L'économie post-keynésienne. Histoire, théories et politiques*. Paris: Seuil, 2018, pp. 87–104.
- Nell, Edward. "Monetising the Classical Equations: A Theory of Circulation." *Cambridge Journal of Economics* 2004, 28 (2), 173–203.
- Nell, Edward, and Deleplace, Ghislain, eds. *Money in Motion. The Post Keynesians and the Circulation Approaches*, Basingstoke: Macmillan, 1996.
- Nesiba, Reynold. "Do Institutionalists and Post-Keynesians Share a Common Approach to Modern Monetary Theory (MMT)?" *European Journal of Economics and Economic Policies* 2013, 10 (1), 44–60.
- Parguez, Alain. "Profit, épargne, investissement. Éléments pour une théorie monétaire du profit." *Économie Appliquée*, 1980, 2, 425–455.
- Parguez, Alain. "La dynamique de la monnaie." *Économies et Sociétés*, 1984, 18 (4), 83–118.
- Parguez, Alain. "Au coeur du circuit ou quelques réponses aux énigmes du circuit." *Économies et Sociétés*, 1986, 20 (8–9), 23–39.
- Parguez, Alain. "A Monetary Theory of Public Finance; the New Fiscal Orthodoxy: From Plummeting Deficits to Planned Fiscal Surpluses." *International Journal of Political Economy*, 2002, 32 (3), 80–97.
- Parguez, Alain. "The Fundamental and Eternal Conflict: Hayek and Keynes on Austerity." *International Journal of Political Economy*, 2012, 41 (4), 54–68.
- Parguez, Alain, and Seccareccia, Mario. "The Credit Theory of Money: The Monetary Circuit Approach." In John Smithin (ed.), *What is Money?* London: Routledge, 2000, pp. 101–123.
- Poulon, F. "Graphe, crise et circuit keynésien." *Revue d'Économie Politique*, 1980, 69 (2), 371–409.
- Poulon, Frédéric. *Macroéconomie approfondie. Équilibre, déséquilibre, circuit*. Paris: Cujas, 1982.
- Poulon, Frédéric. "Réponses de la théorie du circuit à quelques questions relatives au temps, à l'équilibre macroéconomique et au libre-échange." *Économies et Sociétés*, 1985, 19 (8), 69–84.
- Poulon, Frédéric. "Circuit et marché." *Les Cahiers de DECTA III*, 1988, 2, 9–28.

- Poulon, Frédéric. "Le circuit keynésien: principaux concepts." In Christian Bidard, Afif Hendaoui, and Frédéric Poulon (eds.), *Keynes et Sraffa. Recherche de passerelles*, 1998, pp. 189–204. Paris: Cujas.
- Poulon, Frédéric. "Le circuit keynésien: *unde, ubi et quo*." In Éric Berr, Virginie Monvoisin, and Jean-François Ponsot (eds.), *L'économie post-keynésienne. Histoire, théories et politiques*. Paris: Seuil, 2018, pp. 127–144.
- Rochon, Louis-Philippe. "The Creation and Circulation of Endogenous Money: A Circuit Dynamic Approach." *Journal of Economic Issues*, 1999, 33 (1), 1–21.
- Rochon, Louis-Philippe, and Rossi, Sergio. "Endogenous Money: The Evolutionary versus Revolutionary Views." *Review of Keynesian Economics*, 2013, 1 (2), 210–229.
- Rossi, Sergio. *Macro-économie monétaire, théories et politiques*, Zurich: Schulthess Verlag, 2008.
- Sawyer, Malcom. "Modern Monetary Theory: Is There Any Added Value?" *Real-World Economics Review*, 2019, 89, 167–179.
- Schmitt, Bernard. *La formation du pouvoir d'achat*. Paris: Sirey, 1960.
- Schmitt, Bernard. *Inflation, chômage et malformation du capital*. Paris: Economica, 1984.
- Schmitt, B. "A New Paradigm for the Determination of Money Prices." In Edward Nell and Ghislain Deleplace (eds.), *Money in Motion. The Post Keynesians and the Circulation Approaches*. Basingstoke: Macmillan, 1996, pp. 70–89.
- Seccareccia, Mario. "Post Keynesian Fundism and Monetary Circulation." In Edward Nell and Ghislain Deleplace (eds.), *Money in Motion. The Post Keynesians and the Circulation Approaches*. Basingstoke: Macmillan, 1996, pp. 400–416.
- Seccareccia, Mario. "Financialization and the Transformation of Commercial Banking: Understanding the Recent Canadian Experience before and during the International Financial Crisis." *Journal of Post Keynesian Economics*, 2012, 35 (2), 277–300.
- Tcherneva, Pavlina. *The Case for a Job Guarantee*. Cambridge: Polity Press, 2020.
- Tobin, James. "Money and Finance in the Macroeconomic Process." *Journal of Money, Credit and Banking*, 1982, 14 (2), 171–204.
- Vallageas, Bernard. *Exploitations Marxiste Et Keynésienne*. Bordeaux: Mimeo, 2022.
- Wray, Randall. "Alternative Paths to Modern Money Theory." *Real-World Economics Review*, 2019, 89, 5–22.
- Wray, Randall. "The 'Kansas City' Approach to Modern Money Theory." *Levy Economics Institute Working Paper*, 2020, 961, 1–40.
- Wray, Randall. "What is MMT's State of Play in Washington?" *Levy Economics Institute. e-Pamphlet*, 2021, August, 1–34.
- Zezza, Gennaro. "Godley and Graziani: Stock-Flow Consistent Monetary Circuits." In Dimitri Papadimitriou and Gennaro Zezza (eds.), *Contributions in Stock-Flow Modeling: Essays in Honor of Wynne Godley*. Basingstoke: Palgrave Macmillan, 2012, pp. 154–172.

Copyright of Journal of Post Keynesian Economics is the property of Taylor & Francis Ltd and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.