

# An ecological monetary theory

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## ABSTRACT

While money is critical to the modern world, ecological economics does not have a theory of money that is applicable to its theoretical framework and policy prescriptions. Accordingly, the field often defers to an orthodox conception of money that is historically inaccurate and ontologically inconsistent. The dualized nature of Western philosophy informs orthodoxy by defining money according to its function as a medium of exchange. This conceptualization creates logical and historical problems that can be addressed by exploring an interdisciplinary literature that defines money according to its nature as a social relation expressed in a unit of account. This paper develops an ecological monetary theory that is simultaneously rooted in a socio-historical understanding of money's nature, and in an ontology of social and ecological embeddedness. Such a theory provides ecological economists, and others concerned with social and ecological equity, with a framework from which to address monetary systems and policy.

## 1. Introduction

Money is central to the functioning of modern economies with critical implications for how societies are organized. In orthodox economic theory, however, money is treated as a neutral commodity medium of exchange that arose to make barter more efficient. This is a result of the dualism and atomism central to the economic model of barter exchange and manifests in both monetary theory and practice (Ament, 2019, 9). From a theoretical perspective, Western philosophical structures divide reality into dualisms of hierarchically ordered opposites of superiority and inferiority (e.g. male/female, humans/nature). In barter conceptualizations of exchange, this dualism involves denying and inferiorizing the reproductive labor and natural resources inherent in commodities. Atomism emerges from dualism by reducing the complexity of economic exchanges to a summation of their attendant parts. Money is viewed in atomistic economic models as a commodity medium that facilitates equilibrium based upon the value commensurability involved in barter exchange (ibid).

In practice, orthodox monetary policy is, accordingly, enacted as though money were any other commodity, subject to the barter dynamics of supply and demand, and best created and allocated by utility-optimizing individuals. In modern economies, those 'individuals' are commercial banks who create the vast majority of money in circulation by generating interest-bearing loans in pursuit of profit maximization (Svartzman et al., 2019). When the bulk of a nation's money supply

exists as a function of commercial banks' profit motive, wealth is systematically transferred from borrowers to lenders and heavy strain is put on ecosystems to support the profitability of loans.

Ecological economics understands the problems of private money creation well (Soddy, 1935; Daly, 1994; Farley et al., 2013). As of this writing, however, ecological economics has not developed a comprehensive and internally-accepted theory of money. Where ecological economics does consider money, it does so largely in the barter-commodity conception and thus imports the dualization and atomism attendant to that theory and the resultant social and ecological implications.

This paper develops an ecological monetary theory by using an interdisciplinary literature to explore three closely related questions that sociologist Geoffrey Ingham argues are critical to a theory of money: What is money? How does money get its value? How does money get into society? (2004a, 10). In answering these questions, this paper addresses orthodox monetary theory by arguing that barter has never existed as a mode of economic organization and that a commodity medium is not the basis of money. It argues that these errors result from viewing money through its functions—*what money does*—and arise from the atomism inherent in the orthodox theory. Looking at money, instead, by way of its nature—*what money is*—reveals that money is, foundationally, an abstract unit of account for denominating credit and debt exchanges. Social relations are thus an inherent and critical component of money.

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The difference between viewing money through its *function* versus through its *nature* manifests in how value is treated in monetary theory. While a functional, orthodox understanding of money as a medium leads to a biophysical conception, wherein economic value is the foundation of money, conceptualizing of money according to its nature leads to a social understanding, whereby money is the foundation of economic value (Aglietta, 2018). Importantly, however, and often contradictorily, while money is a social relation, the economic value for which it forms the foundation is nevertheless biophysical. That is to say, money is a social abstraction that embodies a tangible claim on resources. This complication is a function of how the dualization and atomism of Western philosophy are reflected in orthodox monetary theory and practice.

An ecological monetary theory must, accordingly, address the philosophical structures of dualism by simultaneously considering money's nature as a social relation as well as the social and ecological relationships inherent in its production and use. This paper does so by outlining an ontology of embeddedness that is rooted in both ecological economics and ecofeminism. It then explores monetary theory through an interdisciplinary lens of sociology, anthropology, philosophy, economics, and history. Finally, it links the ontological with the theoretical to provide a monetary theory that is rooted in socio-history and socio-ecological equity.

While excellent social and ecological studies of money exist, an ecological monetary theory must be capable of addressing both. In fact, the complexities and contradictions inherent in different theories of money are often a function of the perspective taken. The ecological monetary theory proposed herein is able to combine social and ecological perspectives of money by explicitly rooting its theory in an ontology of embeddedness. Such an approach is critical to providing ecological economists—and others concerned with social and ecological equity—with a framework from which to critique, discuss, and propose monetary systems. Such a framework has not been available before this writing.

## 2. Ontological and ideological foundations of a theory

Western society is characterized by dualistic and atomistic philosophical structures. Dualism separates reality into “sharply demarcated sphere[s] of otherness” (Plumwood, 1993, 41) and differs from dichotomy or difference by explicitly ordering opposites in a hierarchical relationship of inferiority and superiority. Importantly, dualisms link superiors and inferiors *by way of* that relationship (ibid, 41–47). Atomism reduces the complexity of interactions by analyzing systems as a function of their component parts and understands the whole by way of the summation, rather than the interaction, of those individual parts.

Dualism and atomism are ontologies of separateness, individualism, and prioritization. In orthodox economic theory, this dualism manifests as a model of barter commodity exchange in which the reproductive (often female) labor and ecosystem structure inherent in the production of commodities are denied. Similarly, atomism reduces the social interactions inherent in economic exchange to an asocial transaction between individual agents.

Money is a reflection of this dualistic philosophy in both theory and practice. In theory, money is a neutral commodity that atomistically represents the value commensurability between other commodities without respect to the social relations inherent in exchange. In practice, money is produced without consideration of the social relation inherent in that production, and exercises a claim without consideration of the ecological relation inherent the goods and services upon which it exercises that claim.

An ecological monetary theory that is capable of simultaneously addressing social and ecological issues must, thus, rest upon an ontology of embeddedness rather than separateness. This means addressing dualism by eliminating hierarchies of superiority and inferiority, and addressing atomism by considering the complex interactions

between components of the whole. Regarding money as a unit of account for denominating credit and debt relationships, a theory must address the presuppositions behind how social relations are expressed in the unit of account; by whom, for whom, and for what purposes credits are issued; and by whom, upon whom, and upon what debts are levied. An ontology of embeddedness perceives of these issues from the perspective of equity and interconnectedness between and amongst humans and the natural world, and informs both monetary theory and practice.

Ecological economics and ecofeminism each offer frameworks for such an ontology. The following sections explore the approaches of these two fields and how, together, they are capable of forming the basis of an ecological monetary theory.

### 2.1. Ecological economics

Ecological economics' core premise is that the economy is an embedded subsystem of complex social and finite ecological systems that continually co-evolve (Daly, 1977; Kallis and Norgaard, 2010). As a transdisciplinary area of study, the movement has long advocated for methodological pluralism since diverse and interconnected systems make a core methodology difficult to define (Spash, 1999, 425; Norgaard, 1989). And while such an approach is certainly important, I argue that the “continual low-grade identity crisis” (Ricketts, 2018) from which ecological economics has suffered is due, in part, to the potential for ontological divergence within pluralistic methodologies.

In many of the early writings in the field, ideology and ethical considerations were made explicit (Munda, 1997). In order to avoid ontological divergence in an interdisciplinary exploration of monetary theory, this paper understands ecological economics through an ontology of embeddedness in which an objective biophysical reality exists independent of humans, ecological and social processes are interconnected and co-evolutionary, and facts about social and environmental reality are inseparable from values (Spash, 2012, 45).

These ontological presuppositions yield and interact with a core set of normative values and ideological beliefs that are inseparable from ecological economic analysis (Spash, 2012, 44). These include, at the most broad, the explicit recognition of inter-species, inter-human, and inter-generational equity. Accordingly, distributional equity is a primary concern. Similarly, since economic processes consist entirely of ecological processes (Röpke, 2004, 296), resource use is to be limited by the regenerative capacity and structural integrity of the ecosystem.

### 2.2. Ecofeminism

Ecofeminism is a transdisciplinary movement that integrates ecological concerns about human-dominated ecosystems with feminist concerns about gender subordination, arguing that a patriarchal economic system presupposes both (Mellor, 2010, 23; Mellor, 2009, 251). It integrates concerns about gender, race, class, and environmental oppression (Plumwood, 1993, 1) by arguing that the dualistic structure of Western philosophy creates complex systems of oppression that crosscut and intersect specific systems of oppressions (Mellor, 1997, 13; Gaard and Gruen, 1993, 248).

Ecofeminists thus see the social and ecological “destructiveness of the Western socioeconomic system...as the result of the dualist nature of western society...that prioritize[s] one aspect of society through the denigration of its opposite” (Mellor, 1997, 16). Two crucial dualisms engender that denigration: 1) the masculine is prioritized over the feminine, and 2) human society is prioritized over the natural world (ibid). By linking the masculine with the human by way of their respective superiority, and conversely linking the feminine with the natural, dualistic philosophical structures prioritize productive and linear masculine labor that develops culture above reproductive and circular feminine labor that is natural and required daily.

Thus, ecofeminists argue that both liberal and socialist feminist

arguments for equality within an implicitly dualized system fail to integrate how class, race, and the environment intersect with gender in destructive patriarchal economies. Mellor writes that while environmentally-minded economists aim to internalize the externalized ecological and social impacts of patriarchal economies, if the “market itself is seen as the source of the problem” (2009, 251), internalization simply embeds reproductive labor and natural resources into the destructive machinations of capitalist economies.

### 2.3. Ecological economics and ecofeminism as an ontology of embeddedness

Ecofeminism provides a useful framework for ecological economics due to the holistic approach it takes to wicked social, ecological, and economic problems. While ecological economics ultimately rests upon a framework of physical and social embeddedness, ecofeminism's critique of dualism provides a framework by which to link the physical with the social.

Making ontology explicit is important in theory development, as presuppositions are implicit in science whether made explicit or not (Spash, 2012, 45). Failing to explicitly state an ontology with respect to monetary theory risks importing gendered, classist, racist, and extractive dualizations in which humans are superior to nature and linear, productive labor is superior to circular, reproductive labor. This can be seen in the manner in which the dualistic structure of Western thought is manifest, though unacknowledged, in orthodox monetary theory (Ament, 2019).

Incorporating social and environmental equity into monetary theory thus becomes an exercise in evaluating the ontological presuppositions inherent in the relationships between and amongst human society and nature. Specifically, this means addressing the unit of account and the systems of credits and debts that constitute money from an explicitly anti-dualistic perspective that yields an ethics of responsibility vis-à-vis our interactions with each other and the natural world.

The following outlines some basic tenets of an ontology of embeddedness upon which an ecological monetary theory may rest.

- Non-humans, unborn generations, and historically/currently marginalized groups have inherent value and moral standing.
- Economic activity must occur within the regenerative capacity of global, regional, and local ecosystems.
- Resources must be distributed equitably between and amongst humans of all races, classes, genders, and nationalities.
- Relationships of power—amongst humans and between humans and nature—must be explicitly considered.
- Economic efficiency is only an appropriate goal insofar as equitable distribution and regenerative scale have been adequately addressed.

## 3. Money in orthodox theory

### 3.1. Barter, commodity, and value exchange

In orthodox economic theory, barter is the dominant mode of exchange throughout history and involves the asocial and final swapping of things of inherent value. Money arose, in this tradition, to address barter's double coincidence of wants problem. For Aristotle, this problem was temporal wherein purchases and sales were merged into one transaction (Meikle, 1994, 26); for Adam Smith it was a spatial problem of specialized labor forces lacking what they need while holding an excess of what they create (Ament, 2019, 5). According to orthodoxy, precious metal emerged from this dynamic as a universally-acceptable commodity to become money and allow exchange to function efficiently.

The idea that money is a technical tool to efficiently communicate underlying value dominates orthodoxy (Ritter, 1995, 134). Classically, both Mill and Say argued that money represented the fundamental laws of value in which goods ultimately pay for goods (1974, 341; 1852,

178). In the neoclassical tradition, Samuelson wrote that “if we...peel off the obscuring layer of money...trade...largely boils down to barter” (1948, 49). Contemporarily, Mankiw writes that in all societies “some form of commodity money arises to facilitate exchange” (2013, 84). Even Marx argued that “the principal difficulty in the analysis of money is surmounted as soon as it is understood that the commodity is the origin of money” (1970, 64).

In this tradition money is treated as a “commodity which serves three purposes” (Barwell, 2016, 12). It is a medium of exchange, a unit of account, and a store of value. As a commodity that facilitates barter exchange, however, the medium of exchange is the key function from which the others follow. The unit of account function solves the spatial inconveniences of barter and the store of value function solves the temporal, yet both functions are realized by a commodity medium.

The barter-commodity formulation of money is explicit in the Walrasian equilibrium model in which money does not exist. Price, rather than money, serves as a value commensurability relation between two commodities and a third commodity of invariable value known as the numeraire (Walras, 1954, 188; Cirillo, 1986, 215). It is this commodity that serves as both money and a medium of exchange (Walras, 1954, 189) to solve barter's inability to commensurably exchange value by providing a unit of account such that the value inherent in exchange may be stored.

It is critically important to note that in the commodity-medium-barter theory of money's origins, value is the foundation of money. Economic transactions involve exchanging value and money is simply a neutral technical medium that conveys information about the value inherent in the goods being exchanged. It is a tool without which exchange would suffer from the inconveniences of barter, but it has no other role, as value is the ultimate foundation of money.

### 3.2. Fiat money and commodity policy

Modern money is fiat in that it is made legal tender by government decree and detached from any specific medium, created almost entirely by commercial banks when they generate loans. Yet, the idea that money is a commodity that represents value continues to dominate orthodox theory (Ingham, 2004a, 7). Fiat money, in this tradition, evolved from commodity money as governments attempted to reduce the transaction costs of holding commodities like gold (Mankiw, 2013, 84). Banks, accordingly, act as intermediaries between savers who have cut back on spending and investors who want to increase spending (Krugman, 2012; Mankiw, 2013). Thus, even commercial fiat money is to be managed as a commodity since “it can be understood...by means of...supply and demand” (Ingham, 2004a, 7) between savers and borrowers.

While modern money is not a commodity per se, orthodoxy nevertheless views it as a value intermediary that is rooted in a commodity and conceives of economic value as the ultimate base of the money supply. As Wheelan writes, “in theory, money is not even necessary” (2010, 228) and the machinations of the banking system are simply complex apparatuses for allocating value within an economy in much the same way a barter system might.

The idea that money is a commodity that arises to overcome the inconveniences of barter and that modern money is an evolution of that system is a reflection of the dualistic and atomistic presuppositions of our economic system (Ament, 2019, 9). First, conceiving of value as foundational to money is dualistic in its treatment of the social and material inputs to the creation of that value. Conversely, the idea that economic actors ultimately exchange value for value—through either simple barter transactions or complex banking systems—is atomistic in its asocial focus on equilibrium (ibid, 10).

### 3.3. Money in ecological economics

Frederick Soddy laid some of the philosophical groundwork for

ecological economics by articulating the contradiction between goods and services that are subject to entropy, and money as a non-entropic measure of those goods and services (1930). Similarly, Daly writes that the “lack of symmetry in behavior between the...[value]...measured and the measuring rod has serious consequences” (1994, 408). Each of these critiques is rooted in the idea that money is a device for measuring the value inherent in the goods and services.

Soddy and Daly also explicitly conceptualize of money as a commodity that arises from barter. Soddy wrote, reminiscent of Aristotle, that money replaced barter due to the fact that, with money, one agent gives up things of real value in exchange for money that can then be exchanged for other things of real value (1935, 25–27). Daly writes that “barter...is the simplest and oldest method of exchange” and that “money...[is]...the standardization of one commodity as an instrument of exchange” (1994, 409, 414).

Given the importance that Soddy (1930, 163) and Daly (1994, 407) each placed on the study of money, it is surprising that ecological economics has not spent more time thinking about the subject (Douai, 2009, 258). Where it does consider money, it follows Soddy and Daly by doing so largely in the orthodox barter-commodity-value conception.

Lawn writes that one is “happy to use money...because it allows you to overcome the inconvenience...of bartering” (2010, 932). Roma and Pirino use an equilibrium model “in which every good can be bartered against [every] other” to critique neoclassical substitutability assumptions vis-à-vis thermodynamic laws (2009, 2601). Jordan and Fortin write that pre-industrial economies utilized “bartering and local trade” (2002, 364) in arguing for ecologically sustainable economies.

Roma writes that “commodity money has been the economic standard for thousands of years” (2006, 544) in defending his model's use of a Walrasian energy numeraire. Nelson cites Marx's articulation of money as a “commodity albeit of a special kind” (2001, 502) to give monetary insight to ecological economists. Alexander and Blum cite the “common example [of] the development of money as a medium” (2016, 243) to articulate the evolution of sub-systems. Russ argues that modern money has been decoupled from the value it once embodied and argues for a new money “based on knowledge and energy” (2016, 331).

Thus, while ecological economics, from its inception to present, is critical of the modern money system, its critique is nevertheless largely rooted in the orthodox idea that money is a commodity medium that overcomes the inefficiencies of exchanging value with barter. The following section addresses this orthodoxy.

## 4. What is money?

### 4.1. Money's nature vs. money's function

In the commodity-medium tradition discussed above, money is defined by its ability to function as a medium of exchange, a store of value, and a unit of account. While these three functions are important for a particular money form, viewing money by way of its form blurs the distinction between *function* and *nature* and confuses what money *does* with what money *is* by implying that *nature* is embodied in *function*. Following this implication, Ingham asks the following: “Do all the functions of money have to be performed before ‘moneyness’ is established? If not, which are the definitive functions?” (2004a, 5).

Orthodoxy maintains that money's definitive function is that of a medium of exchange, under which its functionality as a unit of account and store of value are subsumed (Ingham, 2004a, 6). Three logical and historical difficulties, however, are inherent in conflating what a particular money form does with that form's money-ness or embodied nature.

- Logically, a unit of account cannot arise from a medium of exchange.
- Historically, there is no evidence of economies based on barter.

- Exchange is neither asocial nor final; power and temporality are fundamental.

The following sections consider money's *nature* as something separate from its *functions*—neither embodied within, nor embodying, those functions—and allow us to address these difficulties. Money is more broad than a medium of exchange, and its nature is in something deeper than its functions. Ingham argues that money's nature is embodied in an “abstract money of account [that] is logically anterior to money's forms and functions” (2004a, 6). In other words, money as a unit of account confers money's *nature*, under which the *functions* medium of exchange and store of value are subsumed as advantageous attributes of a given money form (Ingham, 2004a, 6; Di Muzio and Robbins, 2017, 58).

This paper defines money according to this nature. Money is a sovereign unit of account for denominating credits that are capable of settling all debts public and private. The following explores how the Credit and State Theories of money work together to uphold that definition and address the difficulties of the orthodox conception.

### 4.2. The credit theory of money

Alfred Mitchell Innes argued, in two definitive publications on monetary theory, that “money...is credit and nothing but credit” (1913, 402). This section explores how Credit Theory addresses the problems attendant to the orthodox conception of money, and elucidates that credit is the foundation of money and exchange.

#### 4.2.1. Difficulty one: a unit of account as a logical solution to the exchange rate problem

Innes' broad argument was that the commodity and barter theories of money as a medium of exchange reconstructed “civilisation's early economic history along individualistic lines” (Hudson, 2004, 116). Citing archaeological and numismatic studies of the composition and value of coins, he argued that since the metallic content was extraordinarily varied and the value and weight were always incongruent, coins were representative tokens of a unit of account rather than a commodity medium of exchange (Innes, 1913, 379–82). Regarding ancient Greece, Europe, China, the Americas, New Zealand, the Islamic world, and South Africa, the story is the same: all coins were tokens of arbitrary value, divorced from and incongruent with their commodity content (*ibid*, 382).

This arbitrary value reflects the fact that money's *form* as coin or other tokens simply provides functionality to money's *nature* as an abstract unit of account. As Grierson writes, “behind the phenomenon of coin there is the phenomenon of money” (1977, 33). Money as an abstract unit of account predates coin money as an exchange media by thousands of years (Ryan-Collins et al., 2012, 34). In fact, a money of account must exist before exchange with a medium can take place due to the near impossibility of a stable exchange rate emerging from subjective preferences (Ingham, 2004b, 181).

The neoclassical approach to this problem was the *numeraire* commodity that served as a medium of invariable value to which two commodities were compared (Cirillo, 1986, 215; Walras, 1954, 188–89). This, however, implies that a *numeraire* can be “at once a commodity itself and a special representor of commodities” (Ament, 2019, 7) leading to the “obvious absurdity” of the *numeraire* being denominated in itself (Innes, 1913, 378). It also assumes that a unit of account will spontaneously arise from that commodity, something Aglietta (2018, 19–22) and Ingham (2004a, 25) each argue would require a pre-determined exchange rate that would render such emergence redundant.

Georg Simmel addressed this logical trap by arguing that measures need not exhibit the same quality as the objects they measure (2004, 131–32). For Simmel, the unit of account in any monetary standard must be an abstract *measurement*, relative to which two objects *being measured* are made proportional (*ibid*, 146). Accordingly, the logical



difficulties attendant to viewing money through one of its functions as a medium of exchange disappear when “money’s nature is conferred by money of account” (Ingham, 2004a, 71).

This becomes more clear when we consider that specific money forms are multiple and heterogeneous, and dissociated from money’s nature. That is to say, money forms such as coins and bills provide function to, and represent, money but are not money themselves (Martin, 2015, 14). An abstract money of account for clearing credit accounts homogenizes that heterogeneity—and the heterogeneity of the relations inherent in money—in a way that a commodity cannot (*ibid*). This will be explored now.

#### 4.2.2. Difficulty two: debt and credit as a historically-accurate solution to the barter problem

Beyond solving the exchange rate difficulties of viewing money through its function as a medium, viewing money through its nature as a unit of account is crucial for two reasons related to debt: seasonality and production stages. Since most products involved in exchange are seasonal by nature, direct unilateral exchange is often impossible. Similarly, most goods involve adding value to raw materials in sequential production stages (Gardiner, 2004, 130). Accordingly, merchants frequently have nothing to exchange for the raw materials they will transform into finished products.

Systems of debt and credit, both in preparation for the productive season and for access to the raw inputs of value-added production, are thus vital to exchange. All societies, from Bronze Age Mesopotamia to ancient Egypt and China, have conducted exchange by running up debts balances denominated in an abstract unit of account to bridge the gap between planting and harvesting, and raw materials and finished products (Hudson, 2004, 117). And since debt is itself abstract, the unit of account used for tracking debts must also be abstract. Such systems of debt are, in fact, so foundational to society that they predate writing and literacy (Graeber, 2014, 220; Martin, 2015, 43).

Given this conception of debt underpinning historical market exchange, and the logical difficulties of barter systems generalizing a rate of exchange, anthropologist Caroline Humphrey argues that “no example of a barter economy...has ever existed, let alone the emergence from it of money” (1985). Graeber (2014), Ingham (2004a), Aglietta (2018), and Hudson (2004) all agree: debt, rather than barter, and a unit of account, rather than a medium of exchange, form the basis of money.

But debt is not money and is not synonymous with credit. Credit lies opposite debt and is a claim while a debt is an obligation. Possessors of credits are owed something: either goods or services, the debts of others, or, since creditors are often debtors themselves, the elimination of their own debts (Innes, 1913, 303; Bjerg, 2016, 64). Accordingly, all money is credit; but not all credit is money. Credit only exists as money if it is capable of extinguishing any debt incurred by the issuer (Ingham, 2004a, 12). For this to be possible, debts and credits must first be transferable (*ibid*) and depersonalized (*ibid*, 115).

Money thus becomes money when “a bilateral debt [can] be used in the settlement of a third party debt” (Ingham, 2004b, 200) and exists as “the transferability of debt to the point where it could serve as a general impersonal means of payment” (*ibid*, 199). Accordingly, money can be thought of as “a bill of exchange from which the drawee is lacking” (Simmel, 2004, 177). This is why Gardiner argues that the *monetization* of trade credit is the most important invention in the history of commerce (2004, 133).

#### 4.2.3. Difficulty three: power as central to credit/debt

While barter transactions are asocial and final, assuming equality amongst participants and completeness between transactions, as we have seen, money is constituted by relationships of credit and debt. These relationships are necessarily relationships of owing and being owed and, at the macro-level, exist in perpetuity. Money is thus a social relationship of power and inequality between debtors and creditors

(Ingham, 2004a, 91; Henry, 2004, 79).

Simmel argues that exchanges that use money are structurally different from barter exchanges in that they are constituted by this social relation (2004, 177). Since the historical and anthropological evidence suggest that barter has never existed as an economic mode (Graeber, 2014, 28), it follows that money’s nature as expressed in this paper must be structurally different from its function as expressed in the orthodox account. Money must, instead of a neutral medium of exchange that facilitates barter, be thought of as a social relation that embodies the spatio-temporality of debt and the power inherent in credit.

#### 4.2.4. Credit: the foundation of money and exchange

Contrary to the orthodox conception of a commodity medium arising to address the inefficiencies of asocial barter, the prior sections have shown that a unit of account arises to account for credit/debt relationships of power. Together they make the logically- and historically-accurate claim that social systems of credit are foundational to money and exchange. While Adam Smith argued that the division of labor gave rise to commodity money in response to merchants’ spatial asymmetries, the division of labor, in fact, required systems of transferable credit denominated in an abstract measure. And while Aristotle argued that barter merged purchases and sales, in fact, systems of credit/debt allowed these transactions to be separated in time.

Innes argued that Smith’s account of commodity money in Scottish and Newfoundland villages, where nails and fish were used for purchasing food and supplies, respectively, was flawed. What Smith believed to be bilateral exchanges of commodities were in fact systems of credits and debts denominated in the British unit of account. Fish and nails were simply token money forms for expressing the tally of shillings and pence on a vendor’s books (Innes, 1913, 378). The same regards other popular commodity money forms such as cacao, cowrie shells, or cigarettes: the commodity medium is only a token of the unit of account used to denominate systems of credit and debt. Thus when Innes argued that “there is no such thing as a medium of exchange” (1914, 168), he meant that all mediums of exchange are simply exchangeable money forms of money’s underlying nature.

For Innes, then, commodities are exchanged for neither commodities, as in the orthodox theory, nor for any particular money form. Commodities are exchanged for credits that can extinguish accumulated debts (*ibid*). As he wrote: “the object of commerce is the acquisition of credits” (*ibid*). Markets are simply mechanisms for acquiring credits and extinguishing debts and can be thought of as accounting clearing-houses. This strongly opposes the conventional wisdom that markets are a place for exchanging the value inherent in goods and services.

Considerable trust is involved in these transactions that is not required for bilateral commodity exchange. A seller must trust that the credit she receives in exchange for a commodity will be redeemable, not by the proximal, but by the ultimate issuer of the credit. Money is thus dependent upon the legal systems that both support the transferability of debts and credits and that enforce the networks of trust such systems require (Gardiner, 2004, 130). Referring to the definition of money as a unit of account for denominating credits that are capable of settling debts, a central question arises: Who or what is capable of determining the unit of account and enforcing the laws money requires? It is here that we find the Credit Theory’s natural corollary: State Theory.

### 4.3. The state theory of money

Frederick Knapp argued in his *State Theory of Money* that “money is a creature of law...[and therefore exists]...not in the material of the pieces, but in the legal ordinances which regulate their use” (1924, 1–2). This section uses an interdisciplinary literature to explore the role of the State in upholding systems of credit.

#### 4.3.1. Primordial debt and wergild

While the trade debt discussed above is central to monetary theory,

money has in fact evolved from three traditions of debt: primordial debts related to social existence, *wergild* debts to compensate for injury, and administrative debts created by States (Hudson, 2004, 99). Thus, while this paper's definition of money is approximately five thousand years old, its foundations lie much earlier.

Bruno Théret writes of birth as the “original debt incurred by all men” (1999, 60). It is the primordial debt that all living humans owe to those who laid the foundation for our existence and to the society that secures that existence (Ingham, 2004a, 90). Systems of *wergild* payments, where victims of violence were compensated for their injury, emerged from this context as punishment for transgressions against this primordial social obligation (Ingham, 2004a, 92). The etymological evidence that the word for debt in nearly all languages is synonymous with ‘sin’ and ‘guilt’ (Hudson, 2004, 102) suggests that *wergild* evolved to mediate between the contemporary and primordial. These ‘worth payments’ were levied based upon the injured party's social role (Grierson, 1977, 33) and imply that, long before it is a market, society is a moral community that exists, not by barter, but by reverence to an existential social obligation (Ingham, 2004a, 93).

Primordial debts and *wergild* systems do not constitute money, however, as egalitarian communities have no use for comparing debts (Henry, 2004, 79). But as egalitarian order gave way to specialization and social hierarchy, and the value of individual roles diverged, “*wergild* codified elements of social structure into a hierarchy of value, and thereby transformed them into elementary moneys of account” (Ingham, 2004a, 93). In ancient Egypt, for example, control of the Nile for irrigation, coupled with the agricultural surpluses that such control allowed, led to specialization and inequality amongst previously egalitarian agriculturalists (Henry, 2004, 84). Over centuries, this specialization led to a new social organization in which the primordial life debts were converted into tax debts that were levied upon agricultural surplus and redistributed to the ruling class' bureaucracy (ibid, 90–91).

With the development of numeracy, the social obligation was transformed into an abstract unit of account for measuring tax debts and equivalencies between commodities (Ingham, 2004a, 91). As discussed above, such an abstract unit is capable of homogenizing otherwise heterogeneous debts and factoring them out of interpersonal relations (Maucourant, 1993). In this manner, primordial social debts were broken into systems of fines, fees, and taxes subject to individual expiation (Graeber, 2014, 60–61).

#### 4.3.2. The state's role

It was the State that codified and homogenized *wergild* and primordial debts into moneys of account (Théret, 1999, 61). In the transition from reciprocity and hospitality that once governed distribution, to the hierarchical taxation and redistribution of surplus, the State detached the economy from society and codified money (Ingham, 2004a, 90). Such bureaucracy required an elaborate accounting system upheld by a unit of account that the sovereign specified arbitrarily, much like it does with weights and measures (Huber, 2014, 50; Henry, 2004, 92).

Hierarchical societies are thus fundamentally monetary societies held together by arbitrarily-denominated networks of credit and debt. As such, money is underpinned and constituted by sovereignty and cannot be understood without reference to an authority (Ingham, 2004a, 12). Knapp argued that to consider money without the authority of the State was absurd. I argue that the State is integral in establishing the unit of account and upholding the system of credits that constitute money for four reasons subsumed under two main categories: political and economic.

**4.3.2.1. Political.** First, as discussed, primordial debt theorists argue that social debt constitutes “one of the fundamental...bonds between the individual and society” (Ingham, 2004a, 90). The legitimacy of the State to determine the arbitrary unit of account was, and is, ultimately linked to its guardianship over the primordial debt that all individuals

have to one another and to those who came before them (Graeber, 2014, 56). In this role, the State is entrusted with mediating the social debt and, through the tax apparatus, transfers belief into currency (Théret, 1999, 61).

Second, as we have seen, money is fundamentally a creature of the law (Dodd, 1994, 27). Just as a division of labor requires systems of debt and credit, systems of debt and credit require legal enforcement. This is especially true given that credits are drawn upon unknown initial issuers and can be redeemed by any individual bearer. Such transferability is the result of years of legal development that allowed credits to be assigned to others without consent of the original issuing parties (Gardiner, 2004, 132; Ingham, 2004a, 97).

**4.3.2.2. Economic.** Third, while money is a credit capable of settling a debt, the largest and most important portion of debts are taxes owed to the State (Ingham, 2004a, 47; Hudson, 2004, 117). Accordingly, Knapp argued that it was “not the issue, but the acceptance [in payment of taxes] which is decisive” in establishing money (1924, 95). For five thousand years, States have created money by spending credits denominated in the unit of account it will accept in payment of the tax debts it levies. As Ingham notes, “the State issue and reacceptance of tax debt is the most important development in the development of money” (2004b, 178).

Fourth, and closely related, the State is, and has always been, the single largest purchaser of goods and services in the economy (Dodd, 1994, 30; Ingham, 2004a, 84; Innes, 1914, 168). This affords the State the power to determine the money of account with which it will issue credits in payment of those goods and services. While Weber argues that “it might be possible to establish a private monetary network” (Dodd, 1994, 29–31), the State's unrivaled purchasing power nevertheless guarantees its role as arbiter of the unit of account.

Since the State is simultaneously the largest economic entity and the only entity capable of legally levying taxes, it emerges as the de facto arbiter of the unit of account. When the State issues credits in exchange for goods and services, it promises that those credits can eliminate tax debts. And when it accepts those credits in payment of taxes, it eliminates the debt it holds itself as a unit of tax relief to the bearer of the credit. This spend-and-tax cycle is the “logical [precondition] for money's existence” (Ingham, 2004a, 49). As Ingham (2004a, 84) and Wray (2004, 246) both argue, this confers upon States great power in determining, not only money's functional value as expiator of tax debts, but its substantive value given the economic direction that the State determines.

## 5. Ecological monetary theory

As I have argued elsewhere, an ecological monetary theory must be simultaneously rooted in an understanding of money's socio-history and in a non-dualized ontological approach to human-human and human-natural relations (Ament, 2019). Failing on the former risks importing a flawed understanding of money, while failing on the latter risks applying theory in a socially and/or ecologically inequitable manner. Such an ecological monetary theory can act as a filter through which we may judge past, current, and proposed monetary systems vis-à-vis their money-ness and their alignment with social and ecological equity.

In framing an ecological monetary theory, this paper has explored the three questions that a theory of money must satisfactorily answer: What is Money? How does money get its value? How does money get into society? This section answers those questions in the context of Section 4 and outlines an ecological monetary theory by integrating those answers with the embedded ontology outlined in Section 2.

### 5.1. Three questions a theory of money must answer

#### 5.1.1. What is money?

Money is not a neutral commodity medium that emerged from

barter, as is implied when viewing money according to its *functions*. Money is a sovereign unit of account for denominating credits that are capable of settling all debts public and private. Viewing money this way allows us to define money according to its *nature* as a unit of account under which its *functions* as a store of value and medium of exchange are subsumed as advantageous, though not necessary, attributes.

Orthodoxy implies that asocial agents choose to accept a money form given its ability to store value or serve as a medium. Considering this choice from the perspective of money's *nature*, it is the State's taxation capacity, purchasing power, role as legal arbiter, and guardianship of social debt that *requires* that agents accept credits of account with which they can pay tax debts. Since systems of credit and debt are social relations, and the unit of account is decreed by the State as guardian of the social debt, money is a social relation mediated by the State. This dynamic can be seen when currencies lose their ability to store value and trade continues with credit-based systems of exchange denominated in the State's unit of account (Fayazmanesh, 2012, 87). Thus, while they are different, it is impossible to separate the State and Credit theories, as each is dependent upon the other throughout history and crucial in defining money's *nature*.

The credits that a unit of account denominates are fundamentally claims upon the goods and services that constitute the social product. Money is, thus, also a social claim on resources. Credits, however, are abstract claims on resources, not the resources themselves. Similarly, a unit of account is an abstract measure of value, not value itself. Money is therefore not biophysical, and, as an abstract denomination of abstract credits, cannot be.

It is only through the social organization that money is able to store and transport value, abstracted not only from any sort of materiality, but also from the spatio-temporality of a particular transaction (Ingham, 2004a, 72). Money's constitution as a social claim on resources is, thus, presupposed by the power relations inherent in the social organization.

### 5.1.2. How does money get its value?

Money's value consists of its ability to cancel a debt (Ingham, 2004a, 12). As a unit of account for denominating credits that are capable such cancellation, money's ultimate value is a function of the nature of the relationship between users of money and the entity that determines the unit of account, issues credit, and levies debts. Since credit and debt relationships are relationships of inequality, and since the unit of account is decreed by the same entity that levies debts, the nature of the money relationship is one of power.

As guarantor of the social debt, the State mediates the social relation by decreeing the unit of account and levying tax debts. This gives the State tremendous power in controlling what has value in society through its ability to issue credits for the economic mix it desires, in the money of account it determines and that it demands in payment of taxes. And while only the State may determine the unit of account and levy taxes, the prerogative of credit creation has been shared throughout history with commercial interests (Graeber, 2014, 213–14). This dual nature of money, in which private entities are capable of creating credits that become State money when accepted in payment of tax debts, is incredibly important when considering how money gets its value.

As discussed above, an orthodox understanding of money as a medium of exchange implies that value is the foundation of money. Since value is not inherent in money's nature as an abstract denomination of credit, however, value cannot be the foundation of money. The foundation of money is to be found, rather, in the socio-political conflict over what is valuable and how much value that which is valuable has. In other words, money is a result of the conflict between States, citizens, and commercial interests over the direction of the socio-economy (Ingham, 2004a, 66, 80). Accordingly, and following Aglietta (2018), this paper argues that money is the foundation of what has value in an economy.

Specifically, the foundation of value is to be found in the system of credits and tax debts—and the unit of account in which they are both denominated—that constitutes money. What is valuable in society, and how money gets its value, is thus a function of the normative order of society that determines by whom, for whom, and for what purposes credits are created; by whom, upon whom, and upon what taxes are levied; and how the unit of account quantitatively expresses socio-natural relations.

Rather than acting as a positive lubricator of exchange, money reflects the ontological presuppositions of society and normatively drives what is valuable. The distinction between value laying the foundation of money and money laying the foundation of value has radical implications for how money gets into, circulates, and leaves a society, especially vis-à-vis socio-ecological equity. This will be explored now.

### 5.1.3. How does money get into society?

Knapp wrote that it was not the issuance but the “acceptation... which is decisive” (1924, 95) in conferring *money-ness* upon a particular money form. While this is certainly true regarding money's nature and ultimate value, the manner in which money is issued is of vital importance for the social and ecological issues with which this paper is concerned.

As discussed above, society's ontological presuppositions lay the foundation of money, and money lays the foundation of value. Within a dualized and atomistic socio-economic model, what is ascribed value is, thus, ultimately a function of a philosophy in which humans are superior to nature and productive labor is superior to reproductive labor (Plumwood, 1993). Accordingly, money gets into society as a result of a monetary system that determines a unit of account, issues credits, and levies tax debts based upon a dualized conception of what is valuable. Since modern monetary systems reflect the conflict between State and commercial interests, this occurs in two ways.

States create money by issuing credits to purchase the economic mix they desire. That mix is a function of a modern economic system that prioritizes growth over social or ecological equity (Ament, 2019, 4). Commercial interests create money by issuing credits in the form of interest-bearing loans. The profitability of these loans prioritizes “socially- and ecologically-harmful activities...over sufficiency activities” (*ibid*, 10).

The unit of account that denominates both State and commercial credits as well as the tax debts that ultimately give them value each express a fundamentally dualized social and natural relation. Money itself is thus a dualism that embodies the tension inherent in being a socially-constructed store of abstract value whose production and distribution is privately appropriable.

As Chick writes, “money confers on those with authority to issue new money the power to pre-empt [social and ecological] resources” (1992, 141). Thus, while money is a social relation and is not biophysical, the manner in which money gets into and circulates within society has powerful social and biophysical implications. An ecological monetary theory must be capable of addressing this contradiction in a manner consistent with the answers to the questions What is Money? and How does money get its value?

## 5.2. A mediated circuit theory

There is tension in the fact that money is social yet is created by individuals, is abstract yet commands the biophysical, and manifests as forms by which it is not defined. Such tension is inherent to viewing money from a strictly social or biophysical point of view, or when avoiding ontological presuppositions. This paper proposes a two-tiered ecological monetary theory in which this tension is mediated through an ontology of embeddedness (Fig. 1).

While Fig. 1 explicitly separates the social from the biophysical, the two are intricately linked through the fact that money is a social claim on resources. This is important: while historical analysis articulates

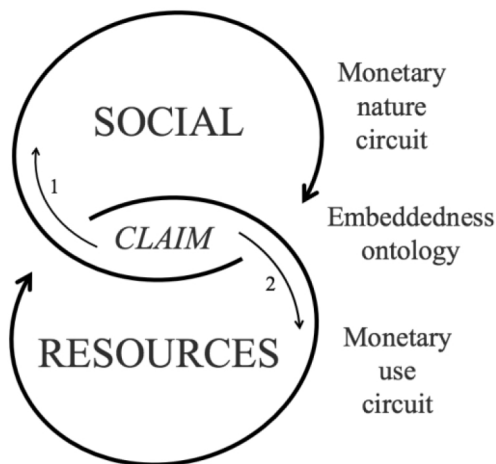


Fig. 1.

money's nature as a social claim, that history is an unjust and extractive one. Ecological monetary theory must, therefore, define money according to its history while considering its claim from the perspective of socio-ecological equity. A two-tiered theoretical approach brings the social alongside the biophysical in a manner rarely seen in the literature. While sociology, anthropology, philosophy, and history provide excellent framing for money's nature as a social relation, they largely lack a comprehensive exploration of the biophysical impacts that such a social relation entails. And while examples exist that outline the biophysical impacts of our monetary system, they largely fail in their conception of money's nature, either rooting it in the biophysical or removing it from society.

The monetary theory proposed herein addresses these shortcomings. The framework presented in Fig. 1 can be read from top to bottom as follows: Money is a social claim on resources. The 'monetary nature' circuit regards money's nature as explored in Sections 4 and 5.1.1. This circuit is concerned with money's specific money-ness as an abstract social relation. The 'monetary use' circuit regards money's ability to claim resources. This circuit is concerned with the tangible biophysical relation inherent to a particular money form.

The 'claim' represents the overlap between the two circuits and works to mediate the manner in which the social relation claims resources. Drawing from Ingham who calls for an "ontology of money" (1996, 509), this mediation is rooted in the ontology outlined in Section 2.3 and operates in two important ways.

- The social claim, arrow 1, is rooted in a non-dualized conceptual framework that eliminates the inferiorization of gender, class, and race. It considers who benefits from money's production (including the unit of account, and systems of credits and debts) and the social direction in which the money issuer drives the economy.
- The resource claim, arrow 2, is rooted a non-dualized conceptual framework that eliminates the inferiorization of nature. It considers the monetary relation to the environment and the environmental direction in which the money issuer drives the economy.

### 5.3. Testing ecological monetary theory

Ecological monetary theory can be seen as a filter through which a monetary system's desirability may be tested vis-à-vis its money-ness, and social and environmental equity. While money's acceptance in exiation of tax debts is critical to money's "essence" (Dodd, 1994, 28), since a money's issuer influences what gets done in society (Dittmer, 2015, 12; Ingham, 2004a, 84), money under "law"—the particular monetary constitution—is a critical reflection of that society's social and environmental disposition. Huber makes this essence/legal

distinction clear when he argues that modern money is money in essence in that it is denominated in a sovereign unit of account, but, having acquiesced the legal prerogative to issue money, States have lost the benefit of first use that comes with such issuance (2014, 50).

The two-tiered ecological monetary theory presented herein provides a framework for considering this contradictory dynamic. Importantly, it allows for the consideration of three questions, derivative of the initial questions this paper asked, when considering monetary policy.

1. Is it money? (Monetary nature circuit)
2. Is its value a function of an equitable socio-ecological power structure? (Claim mediation)
3. Is it issued into and removed from society by means of socio-ecological equity? (Monetary use circuit)

Testing the modern monetary system through the two-tiered filter reveals that it is indeed money by nature. Its issuance by private entities in the interest of profit, however, engenders social inequity as money is transferred from borrowers to lenders and necessitates extraction to earn credits and eliminate debts (Ament, 2019, 10). Further, a restrictive value boundary is placed around profitable activities. It thus fails as a desirable monetary system.

Conversely, while many local currencies are issued and circulate by means of social and ecological equity, the unit of account in which they are denominated is often a commodity rather than an abstraction (Russ, 2016; Roma, 2006; Ingham, 2004a, 183). Further, complementary currencies are rarely able to expiate tax debts. Complementary currencies, thus, often fail the money-ness test.

These examples display how ecological monetary theory can serve as a tool for testing monetary theories, systems, and proposals according to their money-ness and desirability. This includes considering Modern Money Theory (Wray, 2015), Full-Reserve Banking (Farley et al., 2013), and proposals for sovereign money (Dyson et al., 2011), among others. The theory can also serve as a frame for designing alternative monetary systems at both local and national scale. Similarly, Fig. 1 and the questions above may be used to assess monetary research such as Jackson and Victor's consideration of the growth imperative (2015) and Campiglio's consideration of the role of banking in an energy transition (2016).

## 6. Conclusion

This paper has made a somewhat simple argument with novel and radical implications for monetary policy. Viewing money through its *function* as a medium of exchange implies that the value inherent in exchange is the foundation of money. Viewing money through its *nature* as a unit of account implies that money is a social relation of debt and power that informs what is valued in an economy. While the former, orthodox view yields a monetary system whose goal is to efficiently allocate finite stocks of value-based money to yield social optimality, the latter implies that a society's ontological presuppositions determine how we spend and destroy money. The irony is that the latter is true regardless of how money is conceived in theory, i.e. while orthodox conceives of money as a medium, the system it informs is nevertheless a function of its ontological presuppositions.

The idea that value is the foundation of money informs the misconception that in order to address social and ecological issues, we must assign those things value and money will follow, e.g. monetizing household labor or payments for ecosystem services. Understanding that money is the foundation of value reveals that the leverage point for ascribing value to inferiorized and non-moneyed spheres is in the ontological presuppositions that lie behind the unit of account and the socio-ecological relation of credit-debt that constitutes money. Specifically the leverage point is in how, to whom, and for what credits are issued; upon whom and what tax debts are levied; and how social



relations are expressed in the sovereign unit of account.

An ecological monetary theory must, thus, be rooted in a non-dualized holistic normative order that yields a social understanding of money and a monetary system that gives value to gender, class, race, and the natural world. The two-tiered monetary theory proposed herein does this by resting upon four pillars subsumed under the ontological and the monetary. The ontological is rooted in ecological economics' pre-analytical vision and ecofeminism's non-dualized philosophy. The monetary is rooted in the Credit and State Theories and how their crucial interplay defines money according to its nature.

The following is a non-exhaustive list of the tenets of an ecological monetary theory.

- Money is a social relation that establishes a claim upon resources; its lifecycle should be consistent with social and ecological equity.
- Since the State determines the unit of account and levies the taxes that drive money, it should determine, and benefit from, how credits are issued.
- Humans and nature are part of a single co-evolutionary system. Money should be issued and accepted in a manner that enhances that relationship.
- Circular and reproductive activities should be included in the monetary space in order that their undertaking may be able to eliminate debts.

As has been shown, money has a pre-analytical and pre-distributive function; at the point of its production, money reflects the ontological presuppositions of society. As Ingham writes, economic analysis may only proceed once money has been produced (2004a, 198). The theory proposed herein provides a tool with which those concerned with social and ecological equity may consider how a system produces money in order to proceed with subsequent economic analysis.

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## Declaration of Competing Interest

None.

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