

## Walras' law in the context of pre-analytic visions: a note

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Veröffentlichungsversion / Published Version

Arbeitspapier / working paper

### Empfohlene Zitierung / Suggested Citation:

Heise, A. (2016). *Walras' law in the context of pre-analytic visions: a note*. (ZÖSS Discussion Paper, 54). Hamburg: Universität Hamburg, Fak. Wirtschafts- und Sozialwissenschaften, FB Sozialökonomie, Zentrum für Ökonomische und Soziologische Studien (ZÖSS). <https://nbn-resolving.org/urn:nbn:de:0168-ssoar-59889-2>

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Arne Heise

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ZÖSS  
ZENTRUM FÜR ÖKONOMISCHE  
UND SOZIOLOGISCHE STUDIEN

Discussion Papers  
ISSN 1868-4947/54  
Discussion Papers  
Hamburg 2016

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Discussion Paper  
ISSN 1868-4947/54  
Zentrum für Ökonomische und Soziologische Studien  
Universität Hamburg  
Juli 2016

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# Walras' law in the context of pre-analytic visions: a note

by Arne Heise

## ***Abstract***

*Walras' law is central to the formation of economic theory. For mainstream economics, it is a device for testing rigorousness and consistency of model-building; for heterodox economists, the refutation of Walras' law is key to understanding Keynes' revolutionary contribution to a new economic paradigm. The purpose of this short research note is to elaborate on the possibility of a refutation of Walras' law and to inquire into its preconditions. It will be argued that this can only be achieved on the basis of an alternative pre-analytic vision of a genuine monetary economy as foreshadowed by John Maynard Keynes.*

*Key words: Walras' law, equilibrium, disequilibrium, heterodoxy, orthodoxy*

*JEL codes: B 50, D 50, D 51, E 12*

## 1. Introduction

Walras' law is the link between the microeconomics of goods exchange and the macroeconomics of general equilibrium. On the one hand, it holds that there can be no *overall* excess supply or excess demand in an economy comprised of  $n$  markets where goods, labour, capital, bonds, and money are exchanged freely. On the other hand, it is the basis of general equilibrium as the long-term centre of gravity of a laissez-faire exchange economy, i.e. Walras' law is compatible with temporary disequilibria and long-run equilibrating forces.

The acceptance of Walras' law has become crucial in categorising the economic discipline: For many heterodox economists, it is the watershed between mainstream economics, comprising the orthodox dynamic stochastic general equilibrium model as well as many dissenters from evolutionary, complexity or behavioural economics, and heterodox economics, comprising Post Keynesian, Marxian and some of the evolutionary and complexity economics (see e.g. Heise 2014: 77f.). This paradigmatic faultline has been adumbrated by John Maynard Keynes in his *General Theory* (Keynes 1936: 18 – 21) and has been put plainly by Robert Clower (1965: 278) as follows: "...either Walras' law is incompatible with Keynesian economics, or Keynes had nothing fundamentally new to add to orthodox economic theory". In contrast to that, for most mainstream economists, the violation of Walras' law only proves the analytical short-comings of heterodox economics (see Sargent 1979: 67ff.) and prompts some heterodox economists to hastily concede that Walras' law holds even in heterodox (or, at least, Keynesian) economics (see e.g. Palley 1998).

The purpose of this short research note is, therefore, to elaborate on the possibility of a refutation of Walras' law and to inquire into its preconditions. It is organised as follows: In the next section, a short introduction to Walras' law is given and, in section 3, the main theoretical challenges portrayed. As those challenges all share the same pre-analytic vision as the Walrasian general equilibrium theory, the attack was not entirely successful. Therefore, in section 4 an attempt is made to outline yet another assault on Walras' law based on the different pre-analytic vision of a genuine 'monetary economy' as foreshadowed by John Maynard Keynes.

## 2. Walras' law

In the wake of the interpretational debate on 'What Keynes really meant' (see Coddington 1976), Walras' law became the centre of attention. With the publication of the *General Theory*, Keynes pledged to have revolutionized economic thinking, and thus initiated a scientific revolution (see Keynes 1935) in the Kuhnian sense. That revolution appeared in the idea that an economy can be in equilibrium on every market except for the labour market, i.e. there can be equilibrium with involuntary unemployment or, more generally, disequilibrium-equilibrium. This idea, of course, was completely alien to general equilibrium economics and seemed to contradict Walras' law.

For those who took Walras' law as the 'entropy law' of economics, i.e. a simple truism resulting from accounting necessities, the idea was obviously going to be rejected on analytical grounds. For those who took Walras' law as the major obstacle to a more

realistic perspective on economic thinking, refuting Walras' law became pivotal, and the refutation needed to be rigorous.

Before we start scrutinizing the arguments put forward in that debate, let us first take a closer look at the meaning and derivation of Walras' law. Leon Walras' intention was to show (or, rather, to prove mathematically) that there may exist a system of relative prices ( a price vector) which will simultaneously equilibrate all markets – for consumer goods, capital goods, labour, and money, i.e. to create a general equilibrium. In such an equilibrium state, where supply equals demand, excess demand must necessarily be zero. Although Walras' pre-analytic vision of the economic system was not only one of an exchange economy where initial endowments with goods, factors of production, and money are intertemporally allocated, he also assumed the equilibrium prices to commonly prevail due to a tâtonnement process prior to the actual contract settlement. Yet, even if some prices deviate from their equilibrium values, there still would be no overall, i.e. economy-wide, excess demand, but the excess demand (or excess supply respectively) in some markets would be cancelled out by an excess supply (or excess demand) in some other markets:

The importance of Walras's law ... is that it apparently rules out the possibility of a general glut of commodities. For every excess supply there must be an equal (value) of excess demand, somewhere in the system. Corresponding to an excess supply of labour there must be an excess demand for goods. The former will drive down the level of money wages while the latter raises money prices. The resulting fall in the real wages will increase demand for labour and lead the economy back to full employment (Gale 1983: 18).

This symmetrical reaction, which allowed for temporary partial disequilibria within a model of general equilibrium, was the necessary outcome of the application of budgetary constraints that the economic actors – (intertemporal) traders – face. And, therefore, it became a 'plausibility check' for economic modelling: if Walras' law does not hold in an economic model, the model should be rejected on analytical grounds.

Of course, the mathematical proofs of the existence of a unique 'equilibrium' price vector and the absence of economy-wide excess demand rest on several assumptions: e.g. the homogeneity and continuity of the excess demand both function by building on the acceptance of the gross substitution axiom on the one hand, but also, on the other hand, on the pre-analytic vision<sup>1</sup> of an exchange economy as the basis for the market rhetoric of intertemporally exchanging value-equivalences.

### 3. Challenging Walras' law

All the modern predators of Walras' law somehow stem from Keynes' work. Either they appear, at least from the distance, to simply violate Walras' law, as in the case of 'hydraulic Keynesianism' of the IS-LM-type, or they try to re-invigorate Keynes'

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<sup>1</sup> Immanuel Kant distinguishes between analytic and synthetic *a priori* judgements. Analytic *a priori* judgments describe attributions to objects or systems which are inherent ('the grey horse is white') or tautological, while synthetic *a priori* judgements describe attributions which are attached to objects or systems on a presumptive base ('the horse eats grass') and can be challenged theoretically and empirically (see Kant 1781/1983: 176ff.). Such synthetic *a priori* judgements need to be granted to open systems and can be termed as 'pre-analytic vision'.

message based on a refutation of Walras' law, as in the case of the 'new microeconomists' of 'reconstituted reductionism'. Or, moreover, they refer to the concepts of a 'monetary economy' as in Keynes' *General Theory* or in preliminary work emphasising the non-acceptance of the axiom of gross substitution with respect to money and the distinction between a 'real exchange economy' and a 'monetary economy' as in the case of 'fundamental Keynesianism'<sup>2</sup>.

### *Hydraulic Keynesianism*

The (in)famous 'hydraulic Keynesianism' of the ISLM scheme seemed to contradict Walras' law: the IS curve portrayed various equilibria on the (capital) goods market (in relation to different interest rate (i)-income (Y) settings) while the LM curve depicted various equilibria on the money market (equally in relation to different i-Y settings). At the intersection of the IS and the LM curve, the equilibrium levels of the (real) rate of interest and (real) income were determined, specifying a unique equilibrium on the goods and on the money market. However, equilibrium (real) income – taking the money supply, the nominal wages, the capital stock, and the technology as exogenously given – need not correspond necessarily to full employment as determined on an 'ordinary' labour market. Thus, in this three-market-model, Walras' law appears to be refuted as it combines equilibrium on two markets with disequilibrium on one market. Yet, Walras' law implies in an n-market-model that the n-th market ought to be in equilibrium, if n-1 markets are in equilibrium. Palley (1998) has shown that this judgement rests on a misconception of 'hydraulic Keynesianism': If one takes into account that every demand for labour as much as every supply of labour corresponds to a supply of and demand for money income in a monetary economy, a situation of unemployment (i.e. excess supply of labour) matches an excess demand for money income, re-instating Walras' law again.

### *Reconstituted Reductionists*

At this stage, Robert Clower (1965) and other 'reconstituted reductionists' such as Edmond Malinvaud (1977) and Axel Leijonhufvud (1968) argued that Walras' statement is based on the idea that every market actor – as price taker – can always sell his initial endowment at the ruling market price. The ensuing budgetary constraints underlying Walras' law are dubbed 'notional', i.e. fictitious, by Clower since they only hold good in equilibrium (i.e. when the ruling market price equals its equilibrium value) but not in a situation when transactions are allowed at prices that are unequal to its equilibrium values (i.e. in disequilibrium or when trading at 'false price' occurs). Such a situation, which is described as 'non-Walrasian' disequilibrium, produces budgetary constraints that are dubbed 'effective'. As the 'short' market side (either the sellers or the buyers) will be rationed once a 'false price' is contracted, the resulting 'effective' budgetary constraint will differ from the 'notional' budget constraint either in 'Walrasian equilibrium' (when contracts are only concluded at equilibrium prices and quantities) or in 'Walrasian disequilibrium' (when contracts are concluded at disequilibrium prices but unrationed quantities). If the budgetary constraints differ due to

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<sup>2</sup> 'Hydraulic Keynesianism', 'reconstituted reductionism', and 'fundamental Keynesianism' are the three different categories of Keynes interpretations that Alan Coddington (1976) provides in his seminal work. However, Coddington's account of 'fundamental Keynesianism' is rather critical (accusing 'fundamental Keynesians' of theoretical nihilism), while here the more positive interpretation of Davidson (2003) is followed.



‘false price trading’ on one market, so will the effects on other markets (‘spill over’), as the economic agents would have to revise their buying decisions accordingly – this is what Clower terms ‘dual decision hypothesis’. Moreover, in this he claims to have established the central message of Keynes’ *General Theory*: “In short, Keynes either had a dual-decision-hypothesis at the back of his mind, or most of the *General Theory* is theoretical nonsense” (Clower 1965: 290). The point that Clower tries to make is that Walras’ law purportedly holds only in Walrasian equilibrium and disequilibrium, but not in non-Walrasian disequilibrium:

...the dual decision hypothesis effectively implies that Walras’ law, although valid as usual with reference to *notional* market excess demands, is in general irrelevant to any but full employment situations. *Contrary to the findings of traditional theory, excess demand may fail to appear anywhere in the economy under conditions of less than full employment* (Clower 1965: 292).

It is one thing to argue about whether Clower has provided a fair interpretation of Keynes’ *General Theory* and another to argue whether his rejection of Walras’ law is consistent. Although the former is not the centrepiece here, it should be noted that Clower did not challenge the Walrasian pre-analytic vision of economic reality as basically an exchange economy as Keynes had called for in the prelude to writing his *General Theory*<sup>3</sup>. Therefore, the ‘revolutionary contents’ of Keynes’ *General Theory* would have to reside in an ‘inconsistency proof’ with respect to the claim of Walrasian theory to having established a *general* equilibrium theory. For this, the latter, i.e. the consistency of the refusal of Walras’ law, is pivotal. Many post Keynesians with a ‘fundamentalist’ background (see e.g. Davidson 1984, Edwards 1985, Rhodes 1984) deny that Clower’s approach is consistent. As Thomas Palley points out:

Just as for the case of notional demands and supplies, Walras’ law will continue to hold for the case of effective demands and supplies. This is because the logic of exchange continues to hold, which implies that a decision to buy involves an offer that is an act of supply, while a decision to supply involves a willingness to accept payment that is an act of demand. Consequently, Walras’ law holds for economies in which agents face quantity constraints. (1998: 335)

### *Fundamentalist Keynesianism*

The last assault on Walras’ law came from those ‘fundamentalist Keynesians’ who promised to take Keynes’ reasoning seriously: the particular nature of money – zero (or negligible) elasticities of production and substitution – renders the axiom of gross substitution futile and, as a consequence, violates an assumption necessary to prove the existence of Walrasian general equilibrium (see Arrow/Hahn 1971: 361). The economic intuition is that in a monetary economy where

...‘commodities do not buy commodities’ and hence there is always the necessity to transform commodity value into money value to purchase other commodities.... the excess supply of commodities in the goods market might fail to be matched by an excess demand for money. Hence, Walras’ Law does not hold and disequilibrium might not be compensatory, ... (Tunez Arena 2015:

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<sup>3</sup> See Keynes (1933a), Keynes (1933b), Keynes (1933c).

A ‘monetary economy’ in this sense appears to be characterized by the existence of a money good which  $\alpha$ ) separates the act of selling from the act of buying,  $\beta$ ) shows peculiar properties and  $\gamma$ ) is responsible for the violation of Walras’ law. However, several important questions arise: 1) is it really money’s function as medium of exchange (as in  $\alpha$ ) which distinguishes a barter or exchange economy from a monetary economy? 2) It is really the introduction of a medium of exchange which explains the peculiar properties (as in  $\beta$ ) as Tunes Arena (2015: 106; my italics) asserts: “Money is, therefore, the only *medium of exchange* to buy commodities. Hence, money buys commodities but commodities do not buy commodities. Therefore, the Gross Substitution Theorem does not apply which is a more realistic abstraction of monetary market economies.” Moreover 3), does the introduction of a money good as medium of exchange really entail the refutation of Walras’ law (as in  $\gamma$ )? According to Hahn (1977) it is the function of money as store of value (‘resting place for savings other than reproducible assets’) which explains its properties and which is essential for non-Walrasian results. However, non-Walrasian results based on the considerations of non-homogeneity and discontinuity of excess demand functions imply the questioning of the existence of general equilibrium (i.e. Walrasian equilibrium) but not necessarily the validity of Walras’ law (i.e. non-Walrasian disequilibrium) as demonstrated by Palley (1998: 338f.). Moreover, although this non-Walrasian disequilibrium will look different from a Walrasian disequilibrium, it still rests on the pre-analytic vision of an exchange economy (with money) and has to comply with its accounting principles.

#### **4. The non-applicability of Walras’ law in a genuine monetary economy**

Keynes’ *General Theory* was definitely conceived as an assault on Say’s law of markets (see Keynes 1936: XXXV and 26; Sweezy 1947: 105), but it can only be inferred that he also had in mind a refutation of Walras’ law. Taking this for granted and maintaining that the refutation of Walras’ law is central to the revolutionary nature of Keynes’ contribution and, thus, marks the demarcation line between orthodox and heterodox epistemology, the meaning of the following statement of Keynes may be crucial for his approach: “For if orthodox economics is at fault, the error is to be found not in the superstructure, which has been erected with great care for logical consistency, but in a lack of clearness and of generality in the premisses” (Keynes 1936: XXI). If the premisses of Walrasian economics is the pre-analytic vision of an exchange economy, his idea of a monetary economy, “in which money plays a part of its own and affects motives and decisions and is, in short, one of the operative factors in the situation, so that the course of events cannot be predicted, either in the long period or in the short, without a knowledge of money between the first state and the last” (Keynes 1933a: 408) must be based on a different pre-analytic vision.

Keynesians of the ‘fundamentalist’ stripe have come up with just such an alternative pre-analytic vision of a hierarchic relationship of creditors and debtors, substituting the homologous exchange of value-equivalences as basic constituent of economic interaction<sup>4</sup>. Thus a genuine ‘monetary economy’ is not simply a social construction in

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<sup>4</sup> See e.g. Heise (1991), Davidson (1996), Minsky (1996), Baisch/Kuhn (2001), Steiger (2008). It must be confessed, though, that creditor-debtor-relationships are not always emphasized in due form but rather

which the intertemporal exchange of goods, services, and factors of production is facilitated and, for that matter, sometimes (and only temporarily) interrupted by the use of money, but instead is a social provisioning process based on nominal obligations (denominated in terms of the money good which, therefore, primarily serves as a medium of deferred payments or unit of account) which need to be settled in the future. Money is created *pari passu* with nominal obligations, compelling the debtor to start a money-income-generating process (usually production) and rendering the creditor illiquid for the time being (who is, thus, asking for a compensation in terms of nominal interest payments according to his liquidity preference). The rhetoric of market exchange focusing on allocational issues is replaced by a rhetoric of obligations focusing on issues of resource utilization and nominal income and employment creation<sup>5</sup>. In contrast to orthodox exchange economics, the budgetary constraints in monetary economics are not explained by initial endowments but by the willingness (or necessity) to engage in creditor-debtor-relationships on the part of economic actors. It is, therefore, the operations on the money and credit markets<sup>6</sup> generating nominal income which determine the operations in the commodity and employment markets, taking technology, preferences, the nominal wage rate(s), and the state of confidence as given. Due to simple national accounting principles (assuming, for the sake of simplicity, a closed economy), the nominal income generated as wage and profit income will always be equal to the nominal value of consumption and investment goods supplied at any level of income. Equilibrium in a genuine monetary economy is characterized as much by an equilibrium of supply and demand as by the fulfillment of expectations (about cash flows and the price level in order to ‘real’-ize nominal rewards).

In order to be able to formulate a stable equilibrium, the money good must be either a naturally scarce commodity (such as precious metals) or a good controlled by a public authority (such as a central bank in case of fiat money) because otherwise there would be no check against a (hyper)inflationary increase of nominal income (see e.g. Heise 1992: 290ff.). The zero (or negligible) elasticity of production of the money good is, thus, a precondition for the unit of account not to be stripped of its function as medium of deferred payments. The zero (or negligible) elasticity of substitution of money, on the other hand, is the indication of the peculiar status of the most liquid asset – money – in an economy based on nominal obligations instead of exchange activities.

But how does that relate to the acceptance or refutation of Walras’ law in markets?

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introduced by the side-door, see e.g. Lavoie (2014: 186ff).

<sup>5</sup> see Keynes (1936: 245); Keynes (1937a: 209); Keynes (1937b: 219); Keynes (1937c: 119)

<sup>6</sup> I use the term ‘credit market’ very reluctantly and only for want of a better expression, as it is commonly referred to as the market on which savings (as a supply of unspent income as a flow magnitude or a demand for bonds as stock variable) and investment (as a demand for unspent income as a flow variable or a supply of bonds as stock variable) are equalibrated. In a monetary economy, however, the credit market is made up of ‘finance’ (i.e. the supply of liquid resources (money) for a specified period of time as a flow magnitude) and ‘investment’ (i.e. the demand for liquid resources (money) for a specified period of time as a flow magnitude) – income and savings have not yet been generated: “Dr. Herbert Bab has suggested to me that one could regard the rate of interest as being determined by the interplay of the terms on which the public desires to become more or less liquid and those on which the banking system is ready to become more or less illiquid. This is, I think, an illuminating way of expressing the liquidity theory of the rate of interest; but particularly so within the field of ‘finance’. (...) In any case, given the state of expectation of the public and the policy of the banks, the rate of interest is that rate at which demand and supply of liquid resources are balanced. Saving does not come into the picture at all” (Keynes 1937b: 219 and 222).

Walras' law is based on the idea of the supply of initial endowments in order to demand a different bundle of commodities according to utility maximisation principles. In a genuine monetary economy based on nominal obligations, however, the (degree of) utilization of initial endowments is determined by the expectations to settle obligations, including pre-fixed interest payments in a future which is fundamentally uncertain. The resulting budgetary constraint allows for equilibrium on the money, credit, and commodity markets once expectations are fulfilled and is compatible with partial, compensating disequilibrium if expectations are not met. However, this accountancy truism is not to be confused with Walras' law simply because in a genuine monetary economy, a labour market does not exist as an operating supply and demand mechanism adjusting according to real rewards (i.e. real wages; see e.g. Lavoie 2014: 275, Seccareccia 1991). The existence of such a market would presume that the share of income being rewarded to labour (and, *pari passu*, the share of income being rewarded to capital) could be fixed in advance – such would be the vision of what Keynes termed 'real-wage', 'cooperative', or 'neutral economy' (see Keynes 1933b, Keynes 1933c) corresponding to the pre-analytic vision of an exchange economy. In an 'entrepreneur' or 'money wage economy' "...that we actually live today" (Keynes 1993b: 78), however, employment is not determined by an adjustment of real wages to supply-demand discrepancies as declared by Walras' law, but by the conformity of expected aggregate demand (ultimately depending on the propensity to consume and the liquidity preference of wealth owners) and aggregate supply (ultimately depending on technological conditions) on the one hand and on the other hand the willingness on the part of the labourer to work at the ruling nominal wage rate.<sup>7</sup> The amount of employment provided by companies and the amount of employment supplied by labourers may coincidentally become equal, yet there is no operational mechanism (i.e. no market) based on a re-adjustment of real remuneration rates that would automatically close a potential gap between job offers from companies and employment offers from labourers as implied by Walras' law (see e.g. Stockhammer 2012: 167). A stable position of the economy including cleared money, credit and commodity markets, and excess labour supply<sup>8</sup> (i.e. unemployment) would merely need the assumption of fulfilled revenue expectations on the part of the companies and of price level or inflation expectations on the part of the wealth owners and labourers.

## 5. Conclusion

It has been argued that the validity of Walras' law rests on the pre-analytic vision of the economic system being an exchange economy. Taking for granted the intertemporal exchange of initial endowments as a basic constituent, the ensuing budgetary constraints and accounting truism render a situation of dis-equilibrium-equilibrium impossible. Walras' law is inescapable, general equilibrium (i.e. a simultaneous equilibrium on

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<sup>7</sup> For a detailed discussion see Davidson (1994: 164ff.); Davidson (2009: 68ff.). Of course, the 'ruling' nominal wage rate needs to be explained. Among other factors, inflation expectations, the actual unemployment rate and the institutional imprint of the collective bargaining system are very likely to play a determining role. However, as the nominal wage rate will be fixed before the production process starts, analytically it can be taken as exogenously given. This is no concession to any 'rigid wage' arguments of unemployment because flexible (i.e. falling in case of unemployment) nominal wages do not causally determine real wages (as would be necessary for the argument). Rather the rigidity of nominal wage rates in the face of unemployment is a necessary feature ('nominal anchor') of a genuine monetary economy in order to guarantee stability (see Herr 2009).

<sup>8</sup> We could also envisage excess labour demand (as during the 1960s in West Germany), but there are good reasons to believe that a situation of excess labour supply is more common in mature economies.

every market) is the necessary long-run centre of gravity in an exchange economy<sup>9</sup>; partial disequilibrium on single markets, while possible (and very likely), is compensated by partial disequilibrium in other markets.

Any refutation of Walras' law has to rely on a different pre-analytic vision based on creditor-debtor-relationships as a basic constituent. In this vision, the decision to part with liquid means for a specified period of time (i.e. creating credit) explains the degree of factor utilization in order to generate (nominal) income sufficient to repay interest-bearing obligations. The ensuing budgetary constraints and accounting truism maintain the general rule ('law') that money, credit and commodity markets will simultaneously clear once expectations are fulfilled. To turn this statement into a re-affirmation of Walras' law would assume that expectations are not merely fulfilled but take a magnitude that is compatible with the exact absorption of the labour supplied at the ruling nominal wage rate (i.e. full employment). Though this may coincidentally be the case, there is no operative mechanism in a monetary economy to bring it about automatically as Walras' law would require – therefore, a Walrasian general equilibrium<sup>10</sup> can only be the random outcome in a genuine monetary economy, but is inapplicable as a generally binding budgetary constraint and accountancy truism.

Walras' law epitomizes a theoretical understanding of economic activity which does not allow for a 'general glut' of commodities and 'involuntary unemployment' as equilibrium outcomes. Any economic paradigm which attempts to challenge this heuristic dimension must reject Walras' law. The refutation of Walras' law, therefore, lies at the root of heterodox scientific research programmes and, as demonstrated, must replace the common pre-analytic vision of an exchange economy with that of a genuine monetary economy.

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<sup>9</sup> This is not to deny stability and uniqueness problems as demonstrated by complexity economics and the Sonnenschein-Mantel-Debreu theorem; see e.g. Kirman (2004).

<sup>10</sup> It may be arguable whether this would constitute a 'Walrasian' general equilibrium as it would still not be based on an exchange economy vision.

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