Heterodox surplus approach: production, prices, and value theory

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PRICES, AND VALUE THEORY

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ABSTRACT

In this paper I argue that that there is a heterodox social surplus approach that has its own account of output-employment and prices, and its own value theory which draws upon various heterodox traditions. Starting with the Sraffian technical definition of the social surplus and then working with a Sraffa-Leontief input-output framework, the particular distinguishing feature of the heterodox approach is the role of agency in determining prices, the social surplus, and total social product and employment. Thus, in the first two sections, the heterodox model of the economy is delineated with respect to the social surplus and social provisioning, followed in the third and fourth sections with the development of a pricing model and a output-employment model and their structural-theoretical properties delineated. In the fifth section the results of the previous four sections are brought together to develop a model of the economy as a whole. The paper concludes with the delineation of the heterodox theory of value.

HETERODOX SURPLUS APPROACH: PRODUCTION,

PRICES, AND VALUE THEORY*

Economics and especially heterodox economics is about developing theoretical

explanations of the actual (as opposed to a hypothetical or imagined) social provisioning process.

People have diverse social lives; they have families, parents, children, and a history; and they

need to be feed, housed, clothed, married, and schooled. And the needed and desired 'surplus'

goods and services are produced to sustain their socially constructed, meaningful lifestyle. Thus

the social provisioning process is a continuous, non-accidental series of production-based,

production-derived economic activities through historical time that provide diverse 'needy'

individuals and families the goods and services necessary to carry out their sequential

reoccurring and changing social activities through time. Hence, as social activities, economic

activities are interlinked with various societal institutions (such as the legal system, household,

and the state); with cultural values (such as individualism and egalitarianism) that are evaluative

criteria for establishing which social activities are worthwhile and desirable; with norms and

beliefs (such as property rights and the work ethic) that explain or justify particular social

activities; with technology (such as technical and social knowledge necessary for producing

goods and services, and more specifically state money; and which the ecological system (such as

land and raw materials) that provide the material basis for conducting social and economic

activities (Polanyi 1968; Stanfield 1995: ch. 5; Hayden 1982). These components or structures

of the social fabric affect the pattern and organization of economic activities underpinning the

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social provisioning process: they give it meaning which is beyond accumulating money value. This means that the social provisioning process is embedded in a production-with-a-social surplus 'paradigm'. Consequently, the social surplus consists of the goods and services determined by the values and forces that create the social activities which the provisioning process underwrites.

There are a number of variants of the social surplus approach, one being the Sraffian approach and another being the heterodox approach which is the focus of this paper.[1] Like the Sraffian social surplus approach, it starts with some assumed givens that characterized an actual (rather than imagined) capitalist economy: technology, class, capitalist state, and a viable economy. However, unlike the former, the heterodox social surplus approach does not presume that the level and composition of the social product and a self-replacing with a surplus economy. In their place is agency embedded in the social structure qua social relationships qua social institutions. By 'embedded' is meant that agents, either individually or collectively, carry out particular roles assigned by the present social structures. The defining social structures of capitalism are the capitalist state (with its state money), class structure, and the structure of production in the sense that individual workers' economic activities are directed by state and capitalists' production and employment decisions. The embedded agency regarding private sector pricing, investment, output, and employment decisions is the business enterprise qua capitalist class who make the decisions for the purpose of continuing as a going concern or enterprise through making positive monetary profits, while state expenditure decisions (which includes employment and investment decisions) are made by the political elite with the view of

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[1] For a critical comparison of the Sraffian and heterodox social surplus approaches, see Lee and Jo (2010). Also see Roncaglia (1989), Davis (1992), Aspromourgos (2004), and O'Hara (2008).

primarily supporting the interests of the capitalist class. In this context the social surplus is defined as the difference between the total social product and the total amount of intermediate inputs at a point in time; and the total social product is agency-determined by the business enterprise and political elite expenditure decisions and economic activities are organized and directed toward the creation of the surplus. That is, in the heterodox approach with the inclusion of agency (as well as structures), the social product is not given and the surplus is not a residual.[2]

This property suggests that the heterodox surplus approach generates its own theoretical accounts of prices, output and employment, and its own theory of value. The aim of this paper is to delineate the former and their associated theory of value. So, in the first two sections, the productive, financial, and monetary structures of the heterodox model of the economy are delineated with respect to the social surplus and social provisioning. In the following third and fourth sections the pricing model and a output-employment model are developed and their structural-theoretical properties delineated. The fifth section brings together the productive, financial, and monetary structures of the provisioning process with the price and output-employment models to create an emergent, concatenated heterodox model of the going economy and delineates its theoretical core. Drawing upon this, the paper concludes with the heterodox theory of value. The outcome of the paper is that unexpected but not unfamiliar or impossible arguments, claims, and conclusions emerge. To be receptive to the unexpected, the reader needs to be more like the Queen and less like Alice in *Through the Looking Glass*:

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[2] The indispensability of agency to determine the social surplus makes it, contrary to Pasinetti's argument (2005), a necessary core component of the heterodox surplus approach and its theory of value. In addition, because the agents make socially structured decisions in a transmutable hence uncertain world that generate objective, quantitative outcomes, the adjectives of subjective, rational, or optimal are not appropriate or relevant to describe their decision-making activities and outcomes. Thus, agents in the heterodox social surplus approach are distinctly different from the mainstream notion of agent that Sraffa rejected when adopting his objectivist methodology (Kurz and Salvadori 2005; Kurz 2006; Sinha 2010: 307-308).

There's no use trying," she [Alice] said: "one *ca'nt* believe impossible things." I

daresay you haven't had much practice," said the Queen. "When I was your age,

I always did it for half-an-hour a day. Why, sometimes I've believed as many as

six impossible things before breakfast. [Carroll 1902: 93]

Modeling the Productive Structure of the Economy and the Surplus

The aim of heterodox economics is to provide a theoretical explanation of the social

provisioning process as it actually takes place under capitalism (Lee 2008, 2010). The social

provisioning process is founded on the social and interdependent production of goods and

services; thus the core framework of economic activity of a capitalist economy consists of its

schema of production and the income flows relative to goods and services for social

provisioning. The schema of production of the economy is represented in classical-Sraffian-

Leontief terms as a circular production input-output matrix of material goods combined with

different types of labor power skills to produce an array of goods and services as outputs (Gehrke

and Kurz 2006; Kurz 2006, 2011; Kurz and Salavdori 2000, 2005, 2006). Many of the outputs

replace the goods and services used up in production, and the rest constitutes the social surplus to

be used for consumption, private fixed investment, and government services.[3] More specifically,

the production schema of the economy is empirically represented in terms of a product-by-

product input-output table (or matrix). The table shows that *m* goods and services are produced,

and that *n* goods and services and *z* labor power skills are used in their production, where the

former constitute the *intermediate inputs* where $m > n$ and the latter constitute the labor power

skills inputs where $z > m$. Thus, letting q_{ij} represent the amount of the *j*th product (good or

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[3] To simplify the analysis, resources are omitted. However, this is not a real shortcoming since
following Institutional analysis, resources are produced means of production just like other
intermediate inputs. Non-produced relatively scarce inputs or factors of production simply do
not exist. [De Gregori 1985, 1987; Zimmerman 1951]

service) and L_{iz} represent the amount of the zth labor power skill to produce Q_i amount of the ith product, the production of the ith good or service can be represented by

(1) $[g_{i1},\ldots, g_{in}, L_{i1},\ldots, L_{iz}] \rightarrow Q_i$ or

       $[\mathbf{G}_i, \mathbf{L}_i] \rightarrow Q_i$

where $\mathbf{G}_i = (g_{i1},\ldots, g_{in})$ is a row vector of n intermediate inputs; and

       $\mathbf{L}_i = (L_{i1},\ldots, L_{iz})$ is a row vector of z labor power skills inputs.

Hence, the production structure of the economy takes the following form:

       $[\mathbf{G}_1, \mathbf{L}_1] \rightarrow Q_1$
(2)   ………………
       $[\mathbf{G}_m, \mathbf{L}_m] \rightarrow Q_m$

Representing the array of $(\mathbf{G}_1,\ldots, \mathbf{G}_m)$ as G a product-by-product input-output table, the array of $(\mathbf{L}_1,\ldots, \mathbf{L}_m)$ as L a labor power skills-by-product table, and the total quantity produced of each product as $\mathbf{Q}$, the production structure of the economy of (2) is be depicted as

(3) $G \oplus L \rightarrow \mathbf{Q}$

       or

(4) $\begin{bmatrix} G_{11} \\ G_{21} \end{bmatrix} \oplus \begin{bmatrix} L_{11} \\ L_{21} \end{bmatrix} \rightarrow \begin{bmatrix} \mathbf{Q}_1 \\ \mathbf{Q}_2 \end{bmatrix}$

where G is a m x n matrix of intermediate inputs constituting of produced goods and services;

       L is a m x z matrix of labor power skills;

       $\mathbf{Q}$ is a strictly positive m x 1 column vector of output and constitutes the total socal

           product;

       G_{11} is a square n x n matrix of intermediate inputs used in the production of $\mathbf{Q}_1$ a strictly

           positive n x 1 column vector of intermediate goods and services;

       G_{21} is a m-n x n matrix of intermediate inputs used in the production of $\mathbf{Q}_2$ a strictly

positive *m-n* x *1* column vector of final goods and services for consumption, investment, and government use;

L_{11} is a *n* x *z* matrix of labor power skills used in the production of $\mathbf{Q}_1$;

L_{21} is a *m-n* x *z* matrix of labor power skills used in the production of $\mathbf{Q}_2$; and

$\oplus$ means both intermediate and labor power inputs are used to produce the output.

One feature of the structure of production is that $G_{11} \rightarrow \mathbf{Q}_1$, meaning that all of $\mathbf{Q}_1$ are produced means of production. This implies that both inputs and outputs are tied to technically specified differentiated uses, production is a circular flow, all intermediate inputs are produced inputs, and the linear production schemas (1) for each output are all linked together on the input side. Consequently, the production of intermediate inputs is a differentiated, indecomposable hence emergent system of production that cannot be segmented, aggregated, disaggregated, reduced or increased. A second feature of the structure of production is that the production of any Q_i must directly involve at least one q_{ij} where $i \neq j$, which means that all of G_{11} is at least indirectly engaged in its production, making all intermediate inputs, $\mathbf{Q}_1$, Sraffian basic goods.

Fixed Investment Goods and the Surplus

Behind the usage of intermediate inputs and the employment of differentiated labor power skills for each product stands an array of differentiated fixed investment goods:

(5) $\mathbf{K}_{Si} = [k_{i1}, \ldots, k_{ik}]$

where $\mathbf{K}_{Si}$ is a row vector of the stock of k_i fixed investment goods used in the production of Q_i. The fixed investment goods are used in production, but they are not used up like intermediate inputs. Rather, they are separate from the intermediate and labor inputs (hence the colon in

equation (6) because they are repeatedly used in the repeated production of the output.[4] Thus,

the combined array of given fixed investment goods ($\mathbf{K}_{Si}$), intermediate inputs ($\mathbf{G}_i$), and

differentiated labor power ($\mathbf{L}_i$) used for the production of Q_i represents the complete technology

of the schema of production:

(6) $[\mathbf{K}_{Si}: \mathbf{G}_i \oplus \mathbf{L}_i] \rightarrow Q_i.$

The technology of the schema embodies a specific set of learn, socially created knowledge which

is an emergent whole. In particular, the fixed investment goods, intermediate inputs, and the

differentiated labor power inputs are the physical manifestations of the uniquely specific social

knowledge or technology used in the production of Q_i. Being linked in an emergent

technological arrangement for the production of Q_i, the schema of production cannot be

separated into parts with each identified with a certain portion of the output; its fixed investment

goods cannot be viewed as separate 'dated output' to be hypothetically sold in the form of joint

products; and the schema itself cannot be treated as joint outputs along with Q_i.[5] Finally, from

equation (6), the entire structure of production can also be represented as

(7) $\begin{bmatrix} K_{S1}: & G_{11} \\ K_{S2}: & G_{21} \end{bmatrix} \oplus \begin{bmatrix} L_{11} \\ L_{21} \end{bmatrix} \rightarrow \begin{bmatrix} \mathbf{Q}_1 \\ \mathbf{Q}_2 \end{bmatrix}$

where K_{S1} is a n x k matrix of the basic sector stock of fixed investment goods used in the

 production of $\mathbf{Q}_1$; and

 K_{S2} is a $m\text{-}n$ x k matrix of the surplus sector stock of fixed investment goods used in the

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[4] The issue of the physical depreciation of fixed investment goods and its relationship to production will not be dealt with in this paper. Rather it will be assumed that $\mathbf{G}_i$ and $\mathbf{L}_i$ include the intermediate goods, services, and labor power required to ensure that each element of $\mathbf{K}_{Si}$ maintains constant efficiency.

[5] The Sraffian position (Sraffa 1960; Lager 2000, 2006) that fixed investment goods can be treated as joint products is unsustainable for two reasons: the first is that state tax codes and business enterprise accounting practices do not treat them in this manner; and secondly, when enterprise purchase investment goods, they are not viewed as commodities to be (if only hypothetically) sold.

production of $\mathbf{Q}_2$.

The social surplus of the economy consists of the excess of total goods produced over what is used up in production:

(8) $\quad (\mathbf{eQ_d})^T - (\mathbf{eG^*})^T = \mathbf{Q} - \mathbf{G^*} = \mathbf{S^*}$

where $\mathbf{e}$ is a unit vector;

$\quad$ Q_d is a *m x m* diagonal matrix of the total social product;

$\quad$ $(\mathbf{eQ_d})^T = \mathbf{Q}$ is the total social product;

$\quad$ G* is an augmented G matrix with the n + 1 to m columns consisting of zeros;

$\quad$ $(\mathbf{eG^*})^T = \mathbf{G^*}$ is a semi-positive *m x 1* column vector of intermediate inputs; and

$\quad$ $\mathbf{S^*}$ is a semi-positive *m x 1* column vector of the social surplus.

The social surplus includes 'extra' intermediate inputs and final goods and services that go into inventory. However, since the inventory of goods and services constitute less than one percent of total economic activity, they will be ignored by assuming that all of Q_{d1} is used up in production or

(9) $\quad (\mathbf{eQ_{d1}})^T - (\mathbf{eG})^T = 0.$

This means that the surplus of the economy is essentially technically defined (but as will be argued below is class created) and are Sraffian non-basic goods and services:[6]

(10) $\quad \mathbf{S} = \mathbf{Q}_2.$

The surplus is differentiated by its 'final' destination—government goods $\mathbf{Q}_{2G}$ for the state, consumption goods ($\mathbf{Q}_{2C}$) for the household, and fixed investment goods ($\mathbf{Q}_{2I}$) for the business enterprise:

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[6] This basic-non-basic model of the economy has been widely noted but not really theoretically explored or used to articulate the surplus approach—see for example Pasinetti (1986); for an exception see Bortis (2003).

(11) $S = Q_2 = Q_{2G} + Q_{2C} + Q_{2I}$

where Q_{2C}, Q_{2I}, and Q_{2G} are semi-positive ($m – n$ x 1) column vectors of surplus goods and

services.

Since the different destinations are engaged with broadly different economic and social

activities, the array and composition of the three vectors differ. In particular, Q_{2I} not only differs

in its array of goods from Q_{2G} and Q_{2C}, it is also a differentiated array of goods and services due

to the different technologies used to produce Q_{2G} and Q_{2C}, which themselves are an array of

differentiated goods and services. Moreover, Q_{2I} is connected as a flow of basic sector fixed

investment goods K_{F1} to the stock of basic sector fixed investment goods K_{S1} and as a flow of

surplus sector fixed investment goods K_{F2} to the stock of surplus sector fixed investment goods:

K_{S2}:

(12) $Q_{2I} \rightarrow K_{F1,F2} \rightarrow K_{S1}, K_{S2}$

Thus, the economy is productively linked together by the circular flow of the production of

intermediate inputs *and* by a second circular flow via the surplus from the production of fixed

investment goods to their use directly and/or indirectly in their own production as well as in the

production of all intermediate inputs and final goods and services, which makes them 'quasi-

basic goods' in the Sraffian sense. The array of differentiated goods in Q_{2G} indicates the range

of social activities supported by the state and its composition indicates their relative social

importance. But to make its contribution in terms of government services (GS), the state must

draw upon government fixed investment goods and employ differently skilled workers,

managers, and politicians and combined them with Q_{2G} and government payments (GP):

(13) K_{S3}: $Q^T_{2G} \oplus L_{31} \oplus GP \rightarrow GS, K_{F3} \rightarrow K_{S3}$

where K_{S3} is a row vector of the stock of k government fixed investment goods used in

providing of government services (obtained through past government purchases);

$\mathbf{Q}^{T}_{2G}$ is a (*1 x m − n*) row vector of surplus goods and services used in providing government services;

$\mathbf{L}_{31}$ is a m + 1 row vector of z labor power skills used in providing government services;

GP is the amount of dollars of government payments, such as unemployment or social welfare benefits to dependent individuals and households that do not have current employment hence wage income or other forms of income, and interest payments to enterprises and households that hold government bonds; and

$\mathbf{K}_{F3}$ is a row vector of the flow of k government fixed investment goods into $\mathbf{K}_{S3}$.

Finally, the array of differentiated goods and services in $\mathbf{Q}_{2C}$ indicates the range of social activities undertaken by households, while its composition indicates their relative social importance:

(14) $\mathbf{Q}^{T}_{2C} \rightarrow$ HSA

where $\mathbf{Q}^{T}_{2C}$ is a (*1 x m − n*) row vector of surplus goods and services that contribute to household social activities (HSA).

What emerges from above is that the structure of the social provisioning process in terms of goods, services, and labor power consists, in part, of the structure of production required for the production of the social surplus (equation 7), and of the allocation qua contribution of the surplus to social provisioning through enabling government services and household social activities to occur and maintaining state and private sector productive capabilities (equations 12-14). This can be qualitatively represented in terms of a stock-flow, social accounting model of the productive structure of the social provisioning process:

Stock-Flow, Social Accounting (SFSA) Model of the Productive Structure of the

Social Provisioning Process

Basic Goods Sector K_{S1}: $G_{11} \oplus L_{11}$ → Q_1

Surplus Goods Sector K_{S2}: $G_{21} \oplus L_{21}$ → $Q_2 = Q_{2G} + Q_{2C} + Q_{2I}$

(15)

State $\mathbf{K_{S3}}$: $\mathbf{Q^T_{2G}} \oplus \mathbf{L_{31}} \oplus GP$ → GS, $\mathbf{K_{F3}}$ → $\mathbf{K_{S3}}$

Household $\mathbf{Q^T_{2C}}$ → HSA

Enterprise $\mathbf{Q^T_{2I}}$ → $\mathbf{K_{F1,F2}}$ → $\mathbf{K_{S1}}$, $\mathbf{K_{S2}}$

Modeling the Relationship Between the Social Surplus and Income

The social provisioning process takes place through linkages between the money incomes of workers, managers and other members of society, profits of enterprises, and government spending on consumption, fixed investment, and government goods and services. The particular forms that the linkages take involve exchange, markets, and state money, but they are based on a set of social relationships specific to capitalism. That is, under capitalism there exists a set of property rights that vest the ownership of the produced means of production and output in a group of individuals, either business people or the corporate enterprise; and an associated set of legal right that validate and 'empower' a hierarchical organizational structure which enables the board of directors and senior management of business enterprises to unilaterally direct their activities. These two groups of individuals—business people/corporate enterprise and members of boards of directors/senior management—constitute the *capitalist class*. In addition, the state, as opposed to the *political elite*, owns its activities and 'property' while the elite have the legal authority to direct its activities. Thus, the combination of the capitalist class and the political elite constitutes the *ruling class*, which own the means of production and output and directs the economic and political activities of enterprises and the state. In contrast, there is a second class of people who engage in the production of the output but do not own it or the means of production by which it is produced and who engage in activities that provide government

services; and neither can in any substantive sense direct, determine, or control the 'working'

activities in which they are engaged. These private and public sector employees constitute the

working class. Finally there is a third class of individuals who are not engaged in social

provisioning activities, such as children, retirees, the unemployed, and others that constitute the

dependent class.

As noted in the previous section, it takes the entire economy as a whole to provide for

social provisioning and thus ensure the survival and reproduction qua continuation of

individuals, business enterprises, and the state. This combined with the dominance of the ruling

class means that the social provisioning process involves market exchange, which has three

implications. First, all goods and services, **Q**, are produced for exchange, but since they are

brought for their usefulness, they cease for the most part to be commodities, that is, to be offered

for further exchange. Secondly, exchange is carried out in markets and involves prices hence the

only analytical-theoretical starting point is a system of systematic, coordinated, and unending

multiple exchanges involving state money. The third implication is that prices are state money

prices denominated in the state monetary unit and hence are abstract indexes of credit qua debt

obligations that are not grounded intrinsically in the commodities themselves (Wray 1998,

2003a, 2004; Bell 2001; Goodhart 1998). Finally, the last implication is that exchange, whether

money for goods, services, or labor power or vice versa, arises from the need of households to

gain access to a state-money monetized social provisioning process. The social relationship

between the ruling class and the working and dependent classes combined with the former's

control and use of state money produces a particular symbiotic relationship that defines

capitalism. That is, the social relationship between the ruling class and the working and

dependent classes is that the former owns the productive and administrative capabilities

underpinning social provisioning, have the social power to direct it, and control the access to state money that is necessary for access to social provisioning, while the latter have none of the above. This tripartite social relationship defines what is meant as *capitalism* as a social, political, and economic system embedding the provisioning process; and in doing so, it determines the particular structural form of the linkages between the money incomes of workers, managers and other members of society, profits of enterprises, and state 'money income' and expenditures on the social surplus.

Since all outputs are commodities that are exchanged in markets, they must have prices in terms of state money. Letting $\mathbf{p} = (p_1,\ldots,p_m)$ be a column vector of state money prices of all *m* goods and services produced in the economy, $\mathbf{p_1} = (p_1,\ldots,p_n)$ be a column vector of prices of intermediate inputs, and $\mathbf{p_2} = (p_{n+1}, \ldots, p_m)$ be a column vector of all surplus goods and services, then the total value of the social product is $\mathbf{Q^Tp}$, $\mathbf{Q^T_1p_1}$ is the total value of the intermediate inputs, $\mathbf{Q^T_{2I}p_2}$ is the total value of fixed investment goods, $\mathbf{Q^T_{2G}p_2}$ is the total value of goods and services purchased by government, $\mathbf{Q^T_{2C}p_2}$ is the total value of consumption goods and services, and the total value of the surplus is

(16) $\mathbf{Q^T_2p_2} = \mathbf{S^Tp_2} = \mathbf{Q^T_{2G}p_2} + \mathbf{Q^T_{2C}p_2} + \mathbf{Q^T_{2I}p_2}$.

Consequently, to gain access to social provisioning, it is necessary that all household incomes, enterprise revenues, and government expenditures be denominated in state money.

In terms of state money, government expenditures are equal to its purchases of final goods and services, to the wages and salaries of government employees and politicians, to government payments that are politically qua administratively determined to the dependent class (GP_d), and to government interest payments to business enterprises (GP_{ib}) and households (GP_{ih})

for holding state state financial assets that is government bonds:[7]

(17) $GOV_E = \mathbf{Q}^T_{2G}\mathbf{p_2} + \mathbf{L}_{31}\mathbf{w} + GP_d + GP_{ih} + GP_{ib} = \mathbf{Q}^T_{2G}\mathbf{p_2} + \mathbf{L}_{31}\mathbf{w} + GP_3$

where GOV_E is total government expenditures;

$\mathbf{Q}^T_{2G}\mathbf{p_2}$ is government expenditures on goods and services;

$\mathbf{w} = (w_1,\ldots,w_z)$ be a column vector of state money wage rates;

$\mathbf{L}_{31}\mathbf{w}$ is the government's wage bill (W_g); and

$GP_3 = GP_d + GP_{ih} + GP_{ib}$.

Because government expenditures are credited to the state bank accounts (it is assumed that there

is no private sector banking or financial activities), enterprises, individuals, and households must

use state money for provisioning and reproduction purposes, and all enterprises must accept it

and utilize the state banking system for making payments and receiving revenues. In addition,

since the state does not actually produce $\mathbf{Q}_{2G}$, the consumption goods and services purchased by

state employees, politicians, and the dependent class, or the fixed investment goods purchased by

enterprises, government expenditures are directly and indirectly spent on outputs own by

capitalists and corporate enterprises and show up as a component of their profits and hence in the

total profits for the economy—so the more the state spends the more profits the capitalist class

receives. Because profits are also generated by expenditures on fixed investment goods, total

profits are equal to fixed investment and government expenditures.[8] This means government-

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[7] Because the interest payments (hence the interest rate) are determined in the political sphere and then administered to the market (so to speak), they are purely a political-state money phenomena.

[8] To simplify the analysis, it is assumed that there are no taxes on profits and incomes (see Graziani 2003: 106-110). Chartalists generally argue that debt relationships to centralized authorities (such as the temple or the state) in the form of tribute or taxes are necessary for the existence and continual use of state money. However, the 'demand' or acceptance and use of state money can also be effectuated through 'required' purchases of various state goods, services, and financial assets and/or the required acceptance of state money when the state purchases or

generated profits are converted into financial assets through the purchase of government bonds by business enterprises and by households via the distribution of dividends out of profits and are held in the state banking system.

The symbiotic relationship of the state and its governing activities and the capitalist class regarding state money creates banking activities distinct from the basic and surplus goods sectors that (to simplify the analysis since nothing of theoretical importance is affected by the assumption) are managed by the state. So the state provides enterprises and households with loans (Q_{3L}) which become state financial assets. Thus the productive structure of the social provisioning process (equation 15) is broadened to include a qualitative representation of the financial structure of the economy and the stock-flow, social accounting relationships of financial assets and liabilities:

SFSA Model of the Productive and Financial Structure of the Social Provisioning Process

$$
\begin{array}{lll}
\text{Basic Goods Sector} & K_{S1}, FA_{S1}, LB_{S1}: & G_{11} \oplus L_{11} \rightarrow \mathbf{Q_1} \\
\text{Surplus Goods Sector} & K_{S2}, FA_{S2}, LB_{S2}: & G_{21} \oplus L_{21} \rightarrow \mathbf{Q_2} = \mathbf{Q_{2G}} + \mathbf{Q_{2C}} + \mathbf{Q_{2I}} \\
\text{State} & \mathbf{K_{S3}}, FA_{S3}, LB_{S3}: & \mathbf{Q^T_{2G}} \oplus \mathbf{L_{41}} \oplus GP_3 \rightarrow GS, \mathbf{K_{F3}} \rightarrow \mathbf{K_{S3}} \\
& & \rightarrow Q_{3L} \rightarrow FA_{S3}, \rightarrow LB_{1,2,4} \\
\text{Household} & FA_{S4}, LB_{S4}: & \mathbf{Q^T_{2C}} \rightarrow HSA \\
\text{Enterprise} & & \mathbf{Q^T_{2I}} \rightarrow K_{F1\text{-}2} \rightarrow K_{S1\text{-}2} \\
\end{array}
$$

(18)

Financial Structural Balances	National Debt State Bank Loans:	$LB_{S3} = FA_{S1,2,4}$ $FA_{S3} = LB_{1,2,3}$

acquires private sectors goods, services, and assets, such as the case of eminent domain purchases or exclusively state goods (such as battleships or machines to print state money). The basis for the use and demand of state money becomes even more complex when the ruling class consists of both the political elite and the capitalist class with overlapping membership. In this case, households and enterprises purchase state financial assets with state money, accept state money when taking out state loans or receiving payments from the state, and when repaying the state loans with state money. Through all of this (and more), state money becomes a social institution and thus complements taxation as the basis for its continual use [Wray 1998, 2003a, 2003b, 2004; Guttmann 2003; Semenova 2009, 2011]

where FA_{S1} and LB_{S1} are *n x 1* vectors of the stock of financial assets--government bonds

(FA_{S1})--and liabilities—state bank loans (LB_{S1})--associated with the production of

intermediate inputs or basic goods;

FA_{S2} and LB_{S2} are *m-n x 1* vectors of the stock of financial assets--government bonds

(FA_{S2})--and liabilities—state bank loans (LB_{S2})--associated with the production of

the social surplus;

FA_{S3} and LB_{S3} are scalars and the stock of state financial assets—loans to enterprises and

households--and liabilities (LB_{S4}) is the stock of financial liabilities (outstanding

government bonds qua national debt) associated with providing government

services; and

FA_{S4} and LB_{S4} are scalars and are the stock of financial assets--government bonds

(FA_{S5})--and liabilities--bank loans (LB_{S5})—associated with household social

activities.

To simplify the analysis, gross profits are defined as the difference between intermediate

and labor input costs and revenues; thus, it includes depreciation and the interest income on

government bonds. So gross profits are:

(19) $\mathbf{\Pi} = Q_d\mathbf{p} - G\mathbf{p_1} - L\mathbf{w}$

(20) $\Pi = \mathbf{e\Pi} = \Pi_N + D_E + GP_{ib}$

where $\mathbf{\Pi}$ is a *m x 1* vector of gross profits for each product;

$Q_d\mathbf{p}$ is the revenue by product;

$G\mathbf{p_1}$ is the value of the intermediate inputs by product;

$L\mathbf{w}$ is the wage bill by product;

Π is total gross profits of the economy;

Π_N is total net profits;

D_E is total depreciation for the economy; and

GP_{ib} is government interest payments to enterprises.

The capitalist class allocates a portion of its profits to dividends (Π_d), and the rest is retained to purchase fixed investment goods, reduce liabilities, and acquire new government bonds. So total gross profits are distributed between dividends and retained earnings:

(21) $\Pi = \Pi_{re} + \Pi_d$

where Π_{re} is gross profits retained for purchasing fixed investment goods and government

bonds, and retiring liabilities.

From the above, the link between retained profits and fixed investment goods, assets, and liabilities is

(22) $\Pi_{re} = \mathbf{Q}^T_{2I}\mathbf{p_2} + FA_{BE} + LB_{BE}$

where FA_{BE} is the amount of government bonds purchased by enterprises from the

state banking sector; and

LB_{BE} is the amount of state banking sector loans (including both principle and

interest) paid off by the enterprises.

In addition, dividends are distributed to ruling class households which use them to purchase government bonds (FA_{4RC}):

(23) $\Pi_d = FA_{4RC}$.

Thus total gross profits resolves itself into the purchase of investment goods and supporting production ($\mathbf{Q}^T_{2I}\mathbf{p_2} + LB_{BE}$) and the purchase of government bonds ($FA_{BE} + FA_{4RC}$). So the more enterprises demand investment goods and the state spends, the greater enterprise profits will be.

Finally, turning to households and their incomes, working class and dependent class

households do not own state financial assets but can have state liabilities (loans from the state bank). Hence, they spend their entire wage income and GP_d on consumption goods and services and paying off bank loans (LB_{4WDC}). On the other hand, the ruling class households spend only their salary and interest income on consumption goods and services and paying off state bank loans (LB_{4RC}) and utilize their dividend income to purchase government bonds (which increases their interest income). Thus, the link between total household income and consumption goods and services is

(24) $e(L*\mathbf{w}) + GP_d + GP_{ih} + \Pi_d = \mathbf{Q}^T_{2C}\mathbf{p_2} + FA_{4RC} + LB_4$

where $e(L*\mathbf{w}) = e(L\mathbf{w}) + \mathbf{L}_{31}\mathbf{w}$ is the total wage bill of the economy; and

   LB_4 is the amount of state banking sector loans (including both the principle plus interest)

      paid off by households ($LB_{4WDC} + LB_{4RC}$).

The linkages between income-profit-government spending and the surplus implies that the incomes of the ruling, working and dependent classes, which consist of wages, government payments, dividends from profits, and interest payments on government bonds equals the value of the surplus $\mathbf{Q}^T_2\mathbf{p_2}$ plus the purchase of government bonds and the paying off of state loans.

   Combining the productive and financial structure of the social provisioning process (16-18) and the above income-surplus linkages (19-24), the SFSA model of the monetary structure of the social provisioning process is the following:

SFSA Model of the Monetary Structure of the Social Provisioning Process

Basic Goods Sector K_{S1}, FA_{S1}, LB_{S1}: $G_{11}\mathbf{p_1} + L_{11}\mathbf{w} + \mathbf{\Pi_1} = Q_{d1}\mathbf{p_1}$

Surplus Goods Sector K_{S2}, FA_{S2}, LB_{S2}: $G_{21}\mathbf{p_1} + L_{21}\mathbf{w} + \mathbf{\Pi_2} = Q_{d2}\mathbf{p_2} \rightarrow \mathbf{Q^T_{2G}p_2} + \mathbf{Q^T_{2C}p_2} + \mathbf{Q^T_{2I}p_2}$

State $\mathbf{K_{S3}}$, FA_{S3}, LB_{S3}: $\mathbf{Q^T_{2G}p_2} + \mathbf{L_{41}w} + GP_d + GP_{ih} + GP_{ib} \rightarrow GS$, $\mathbf{K_{F3}} \rightarrow \mathbf{K_{S3}}$,

$\rightarrow Q_{3L}(1 + i) \rightarrow FA_{S3}$, $LB_{S1,2,4}$

(25)   Household FA_{S4}, LB_{S4}: $\mathbf{e}(L*\mathbf{w}) + GP_d + GP_{ih} + \Pi_d = \mathbf{Q^T_{2C}p_2} + FA_{4RC} + LB_4 \rightarrow HSA$, FA_{S4}, LB_{S4}

Enterprise $\Pi_{re} = \mathbf{Q^T_{2I}p_2} + FA_{BE} + LB_{BE} \rightarrow K_{S1,2}$, $\rightarrow FA_{S1,2}$, $LB_{S1,2}$

Financial Structural Balances	National Debt	$LB_{S4} = FA_{S1, 2, 4}$
	State Bank Loans:	$FA_{S3} = LB_{S1,2, 4}$
Current Financial Balances	Government Deficit	$GOV_E - (LB_4 + LB_{BE}) = FA_{BE} + FA_{4RC}$
	Total Gross Profits	$\Pi = \mathbf{Q^T_{2I}p_2} + LB_{BE} + FA_{BE} + FA_{4RC}.$

where $\mathbf{\Pi_1}$ is a *n x 1* vector of profits for each intermediate input;

$\mathbf{\Pi_2}$ is a *m-n x 1* vector of profits for each surplus product; and

i is the interest rate on state loans.

With the provisioning process as continuous economic activity, the flow of state money ties together the market transactions and non-market social activities. This ensures the continuation of consumer social activities and government services through time, but instead of a Sraffian replicating, self-replacing economy, one with a partial degree of viability, replication, and reproduction (Lee and Jo 2010; Chiodi 1998, 2010).

Pricing Model and Theory of Prices

The business enterprise is a specific social organization for coordinating and carrying out economic activities in a manner that mirrors the social relationships in capitalist society and, most importantly, reproduces the capitalist class itself. It consists of a organizational component, a production and cost component, a series of routines that transmit information (such as costs, sales, and prices) to enable workers and managers to coordinate and carry out their activities, and a management that has agency to make strategic decisions about prices, investment, production, and employment. The organization of the business enterprise is a social technique for the production of goods and services. Hierarchical in structure and authoritarian in terms of social control, the organization of the enterprise enables senior management to make decisions that, in turn, are carried out by lower management and workers. The enterprise has three tools by which to affect economic activity and hence the social provisioning process for its own interest: setting prices, undertaking fixed investment, and making production and employment decisions. When making decisions, the management of an enterprise is motivated by different goals, the most fundamental being the survival and continuation of the enterprise, followed by various strategic goals, such as growth of sales, developing new products, entering new geographical regions or markets, generating dividends for shareholders, and attaining political power. Given that the enterprise has an unknown but potentially very long life span, the time period to achieve each of

the goals is likely to differ, and management cannot be sure that it can achieve them. Thus the goals are not ends in themselves, but are established so as to direct the activities of the enterprise in a transmutable uncertain environment. As a result, profits are not an end goal for management, but rather an intermediate objective that facilitates the directing of its desired activities.

Management view price setting as a strategic decision designed to meet its goals. In particular, management utilizes cost-plus pricing procedures that involve first calculating the costs of producing the product at normal capacity utilization[9] (or normal average total costs) and then multiplying it by a profit mark up to set the price.[10] The resulting price remains fixed for a period of time (and many transactions) and does not change when sales increase or decrease. Its two most important properties are its potential, depending on the state of demand (sales), to generate a cash flow for the enterprise that will cover its costs of producing the product(s) and to generate profits; and its strategic capabilities, such as penetrating markets and altering market shares. Once set, the price is then administered to the market as the enterprise's market price. However, the business enterprise sells its goods and services in markets that include products from other competing enterprises; thus there needs to be a market arrangement by which the market price is set. For simplicity's sake, it is assumed that the market price is set by a price leader or cartel. Hence the *price equation for the ith market* is not significantly different from the enterprise pricing equation (Lee 1998):

(26) $[\mathbf{m}_i\mathbf{p}_{1t} + \mathbf{\mathit{l}^*}_i\mathbf{w} + d_i\,][1 + z_i][1 + r_i] = p_{it+1}$

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[9] Normal capacity utilization is derived in many different ways: it can be based on some average of past capacity utilization, on expected capacity utilized, or a combination of both. In any case, 'normal' carries no more meaning than a predetermined degree of capacity utilization with only some connection to the actual capacity utilization experienced by the business enterprise. This clearly suggests a disjuncture between price and output-costs.

[10] There is, contrary to some Sraffian claims (Pivetti 1985), little evidence that a component of product costs is interest costs say on working capital; if such costs arise they are generally dealt with in the profit and loss accounts of the product.

where $\mathbf{m}_i = (m_{i1},..., m_{in})$ is a row vector of material pricing coefficients at normal capacity

utilization;

$\mathbf{p_{1t}}$ are a given column vector of input prices at time t;

$l^*_i = (l^*_{i1},..., l^*_{iz})$ is a row vector of labor pricing coefficients at normal capacity

utilization;

d_i is the depreciation pricing coefficient (in terms of state money);

z_i is the mark up for overhead costs;

$[\mathbf{m}_i\mathbf{p_{1t}} + l^*_i\mathbf{w} + d_i][1 + z_i]$ is normal average total costs (NATC$_i$);

r_i is the profit mark up; and

p_{it+1} is the actual market price for the ith good at time t + 1.

Since market refers to all the transactions of a specific product, the economy consists of as many

markets as there are products. Thus there are m markets that can be classified as intermediate,

government, fixed investment, and consumption goods markets. Common to all the markets is

that the *relationship between the market price and market sales is nonexistent*; so a reduction in

the market price by itself will generate little if any increase in market sales. Finally, the *price*

model of the economy is:

(27) $[R_d][Z_d][M\mathbf{p_{1t}} + l^*\mathbf{w} + \mathbf{d}] = \mathbf{p_{1t+1}}$

or disaggregated

(28)   Prices-Basic Goods Sector $[R_{d1}][Z_{d1}][M_{11}\mathbf{p_{1t}} + l^*_1\mathbf{w} + \mathbf{d}_1] = \mathbf{p_{1t+1}}$
          Prices-Surplus Goods Sector $[R_{d2}][Z_{d2}][M_{21}\mathbf{p_{1t}} + l^*_2\mathbf{w} + \mathbf{d}_2] = \mathbf{p_{2t+1}}$

where R_d is a $m \times m$ matrix of profit mark ups and the ith element is (l+r$_i$);

Z_d is a $m \times m$ matrix of overhead mark ups and the ith element is (1+z$_i$);

M is a $m \times n$ matrix of material pricing coefficients that are invariant with respect to

short-term variations in output and the ith row is $\mathbf{m_i}$;

$l*$ is a $m \times z$ of labor pricing coefficients that are invariant with respect to short terms

variations in output and the ith row is $l*_i$; and

d is a $m \times 1$ vector of depreciation pricing coefficients.

The *structural properties* of the price model and its prices are well-known and can be

briefly stated:

(i)   because M_{11} is based on G_{11}, it may be decomposable to some degree, but has an

irreducible sub-matrix that has a positive maximum eigenvalue less than one;

(ii)   given 'reasonable' values for R_d, Z_d, **w**, and the material, labor, and depreciation pricing

coefficients, prices are determined and **p** is strictly positive, which means that the price

model is internally, structurally coherent:[11]

(29) $\mathbf{p_1} = [I - R_{d1}Z_{d1}M_{11}]^{-1}R_{d1}Z_{d1}[l*_\mathbf{1}\mathbf{w} + \mathbf{d_1}]$
        $\mathbf{p_2} = [R_{d2}Z_{d2}M_{21}] [I - R_{d1}Z_{d1}M_{11}]^{-1}R_{d1}Z_{d1}[l*_\mathbf{1}\mathbf{w} + \mathbf{d_1}] + R_{d2}Z_{d2}[l*_\mathbf{2}\mathbf{w} + \mathbf{d_2}];$

(iii)   that the material and labor pricing coefficients cannot be reduced to a homogeneous

quantity of labor;

(iv)   that, with given values for **w** and **d**, different compositions of M, R_d, Z_d, and $l*$

produce different prices; and

(v)   because **d** and **w** are in terms of state money, so are prices.

In contrast, the *theoretical properties* are, perhaps, not so well-known, but can also be briefly

stated. First, with irreducible material and labor pricing coefficients, prices cannot be reduced to

and hence conceived of as a comparable homogeneous substance such as a homogeneous

quantity of labor power. Consequently, the relative comparability of prices is not governed by

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[11] There is an upper limit to the values for R_{d1} and Z_{d1} above which the price model becomes structurally incoherent. This occurs when the maximum eigenvalue of $R_{d1}Z_{d1}M_{11}$ is greater than one. In this case, $[I - R_{d1}Z_{d1}M_{11}]^{-1}$ ceases to be a strictly positive matrix and hence will have negative elements. This means that some prices will be negative.

the relative amounts of a measurable common substance supposedly embodied in them. And even if it is possible to do such a reduction process, prices would still not be reduced to an amount of the common substance such as quantity of labor power because of the existence of depreciation.[12] Secondly, price models with structurally different pricing equations produce different prices, which imply that price models must structurally represent the range of pricing equations actually used in the economy if their prices are to be theoretically accurate and hence relevant for theoretical and applied research. Thirdly, because prices exist as long as the profit mark ups and the wage rates are both are positive, then it is the 'basic' price system that determines the 'basic' prices, $\mathbf{p_1}$; while it is the price system as a whole that determines the 'non-basic' prices, $\mathbf{p_2}$, that is the prices of the goods and services that comprise the social surplus. However, since the price system reflects and is embedded in the social system of production, it is the latter that determines prices or, more accurately, provides the material and social basis for their existence. Lastly, the price model and prices are embedded in a monetary production economy denominated in the state monetary unit (and hence dominated by state money and not commodity money) and wages are denoted in terms of it. Consequently, wage rates in terms of the monetary unit and the profit mark up (which is denominated differently as a percentage on costs) are determined independently of each other and hence can independently vary. So in the absence of a commodity *numeraire*, the state-money prices of goods and services are free to vary in response to changes in the wage rate or the profit mark up. Thus an increase in wage rates does not require a structural reduction in profit mark ups and vice versa (Pivetti 1985; Nell

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[12] This property has, perhaps, a quite unexpected implication that it makes the Marxian realization problem a non-problem.

2003).[13] In particular, an equal percentage increase in wage rates will not appreciably alter the price-wage rate ratio (p_i/w_{iz}) or affect at all the profit mark up or the price-cost ratio ($\underline{p_i - NATC_i}/NATC_i$), whereas an equal percentage increase in the profit mark up will do so.[14] This asymmetrical outcome occurs because money wages do not equal real wages, whereas due to its nature of being a percentage of costs the profit mark up appropriates in a sense real goods and services and thus is equivalent to the real wage but for capitalists.[15] Hence, as will be argued in the penultimate section that in the context of distribution, the profit mark up has a more significant impact on the economy relative to the money wage rate.

The structural-theoretical properties do not completely determine the outcomes of the price model; there is also a role for *agency*. In particular, actual prices (p_i) are set, changed, and re-set through agency. Price changes occur only when enterprises decide to vary money wage rates or profit mark ups or by altering the pricing coefficients (which is predicated on changing the underlying technology, an alteration in the capital-labor relationship within the enterprise, or changes in the laws and/or rules governing depreciation). Thus, prices in the economy reflect agency, the costing-pricing structures of the business enterprise, and the structures of the social system of production. Price setting as an act of agency within a set of structures raises an

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[13] This clearly implies that commodity *numeraire*-based relative prices as an analytical concept are theoretically useless. It also implies that even though prices are determined by the social system as a whole, they can also be characterized as a cost-based or 'cost of production' prices. Thus, prices relative to the state monetary unit can vary, but do so because of changes in the values of the various components that make up the price equation, only one of which represents the difficult of production, while a second represents the state legal system (depreciation and wage rates), a third represents socially constructed cost accounting practices, and a fourth represents agency (profit mark up as well as mark ups for overhead costs, determination of normal capacity utilization, and wage rates). In particular, prices generally increase relative to the state money unit (inflation).

[14] See Appendix I for 'proofs' of these two arguments.

[15] This is implied by the fact that increases in the mark up reduces the amount of surplus available for wages.

important theoretical issue of structurally determined prices relative to agency-structure determined prices or what is known as the issue of convergence of agency-set market prices to structural-solution short-period or long-period prices. As argued in Lee (1996), agency can decide to change prices at various time periods, such as every six months or a year, with the result that it can take a long time for structural-solution prices to be reached. However if agency, when setting the market prices, also change the pricing coefficients, overhead/profit mark ups, and/or wages rates, then structural-solution prices are never attained and actual prices are not 'imperfect production prices' (Lavoie 2010). This suggests that instead of carrying out economic analysis in terms of actual-price convergence to structural price solutions (or long-period/short-period positions) which implies a closed system methodology, economic analysis should be in terms of open-systems and agency-structure interaction, that is, as a historical analytical story.[16] This is why the price model (equations 27, 28) has input prices at time t and output prices at time t + 1 and the two prices are not the same. In short, the heterodox theory of prices so far consists of the pricing equation, the price model, the structural, theoretical, and agency properties of the model, and the accompanying narrative, all of which explains how prices are set and changed relative to the state monetary unit. What remains to be articulated is the purpose of prices, which will be dealt with in the going economy section below.

Output-Employment Model and the Social Surplus

Agency hence decisions to produce the surplus reside with the capitalist class and the political elite or the ruling class (Lee 2010). For the economy as a whole, the total demand for investment goods Q_{2I} is determined by business enterprises and based on a range of criteria most of which are more important than the rate of interest, the rate of profit, or the difference between

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[16] For further discussion of the convergence issue, see Caminati (1990), Roncaglia (1996), Lee (1996), and D'Olrando (2005).

them.[17] In addition, although the dependent, workers, and ruling class households demand consumer goods, they do not directly order the production of the goods they consume. So, they partake in the social surplus, but not entirely of their own choosing. Drawing upon past and initiating possibly new consumption patterns of various kinds of households differentiated by income qua class,[18] enterprises make production and employment decisions that result in the production of a differentiated array of consumption goods for the dependent class ($\mathbf{Q}_{2Cd}$), working class ($\mathbf{Q}_{2Cw}$), and the ruling class ($\mathbf{Q}_{2Cr}$), where $\mathbf{Q}_{2C} = \mathbf{Q}_{2Cw} + \mathbf{Q}_{2Cd} + \mathbf{Q}_{2Cr}$. Being produced ahead of payments, households exercise limited agency by only choosing among the already produced goods for them. This implies a global 'real wage' for each class, but does not imply a particular real wage for any individual household within the working, dependent, or ruling class. Finally, the political elite also demands government goods ($\mathbf{Q}_{2G}$) necessary to produce government services. Thus the output of the economy is represented as:

(30) $\mathbf{Q} = (\mathbf{e}G^*)^T + \mathbf{Q}_{2G}^* + \mathbf{Q}_{2C}^* + \mathbf{Q}_{2I}^* = (\mathbf{e}G^*)^T + \mathbf{S}^*$

where $\mathbf{Q}_{2G}^*$, $\mathbf{Q}_{2C}^*$, and $\mathbf{Q}_{2I}^*$ are *m x 1*column vectors with the first n row zeros and the last m-n

rows semi-positive for $\mathbf{Q}_{2G}^*$, $\mathbf{Q}_{2C}^*$, and $\mathbf{Q}_{2I}^*$; and

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[17] In terms of empirical evidence, neither of the variables appear very important by themselves in the investment decision-making process. In an uncertain, transmutable world, these variables are overwhelm in importance by other variables—for example, see Andrews and Brunner (1951), Barna (1962), Mackintosh (1963), Petty (1975), Bromiley (1986), and Scheibl and Wood (2005). Moreover, the unimportance of the rate of interest is due to its state money foundation and the absence of the 'productivity' of fixed investment goods—see Nell (2003). Finally, the use of historical costs, state-mandated rates of depreciation, and cost accounting difficulties of measuring the value of fixed investment goods, makes any measurement of the rate of profit for a enterprise-specific product line highly dubious and most certainly quite different from the 'rate of profit' used in heterodox (and mainstream) theory.

[18] Households can be differentiated by other characteristics as well, but household income is the primary factor that differentiates consumption patterns. The fact that households have different consumption patterns that involve purchasing different goods and services (as opposed to greater or lesser amounts of the same goods while keeping the proportions constant) means that households are truly different.

$\mathbf{S}^*$ is *m x 1* column vectors with the first n row zeros and the last m-n rows strictly positive.

Letting $Q_d^{-1}G^* = \begin{bmatrix} Q_{d1}^{-1}G_{11} & 0 \\ Q_{d2}^{-1}G_{21} & 0 \end{bmatrix} = A^* = \begin{bmatrix} A_{11} & 0 \\ A_{21} & 0 \end{bmatrix}$ be a $m \times m$ augmented matrix of material

production coefficients that vary with output and $Q_d^{-1}L = \begin{bmatrix} Q_{d1}^{-1}L_{11} \\ Q_{d2}^{-1}L_{21} \end{bmatrix} = l$ be a $m \times z$ matrix of

labor production coefficients that vary with output, the *output-employment model of the economy*

is:

(31) $\mathbf{Q} = A^{*T}\mathbf{Q} + \mathbf{S}^*$
       $\mathbf{L}^* = \mathbf{L} + \mathbf{L_{31}}^T = l^T\mathbf{Q} + \mathbf{L_{31}}^T$

where $\mathbf{L}^*$ is a *z x 1* column vector of total labor power skills employed in the economy;

   $\mathbf{L}$ is a *z x 1* column vector of total labor power skills employed in the private sector; and

   $\mathbf{L_{31}}^T$ represents the total government employees.

Thus, given the ruling class decisions regarding the amount of the social surplus to be produced,

total social product, total labor employed in the private sector and their composition are

structurally determined while agency by the state determines total number of government

employees and their composition:

(32) $\mathbf{Q} = [I - A^{*T}]^{-1}\mathbf{S}^*$
       $\mathbf{L}^* = l^T[I - A^{*T}]^{-1}\mathbf{S}^* + \mathbf{L_{31}}^T$

or in a disaggregated form:

(33) Output-Basic Goods Sector $\mathbf{Q_1} = [I - A_{11}^T]^{-1}A_{21}^T\mathbf{S}$
       Output-Surplus Goods Sector $\mathbf{S} = \mathbf{Q_2} = \mathbf{Q_{2G}} + \mathbf{Q_{2C}} + \mathbf{Q_{2I}}$
       Total Employment $\mathbf{L}^* = l^T_1[I - A_{11}^T]^{-1}A_{21}^T\mathbf{S} + l^T_2\mathbf{S} + \mathbf{L_{31}}^T$

   The *structural properties* of the output-employment model are also well established and

hence can be briefly stated:

(i) A_{11} is at least semi-positive, indecomposable, and has a maximum eigenvalue (λ_{m11}) less

than one and greater than zero since A_{21} is semi-positive;

(ii) $[I - A_{11}{}^T]^{-1} > 0$ is the Leontief inverse matrix which is finite and strictly positive since $0 <$

$\lambda_{m11} < 1$;

(iii) $[I - A_{11}{}^T]^{-1}A_{21}{}^T > 0$ is a strictly positive *n x m-n matrix* and is the output-employment

multiplier;

(iv)   given any values for **S, L,** and **L$_{31}$,** total social product **Q**, total intermediate inputs **Q$_1$,**

and total employment **L*** are strictly positive;

(v)   any change in **S** (Δ**S** = **S$_1$** − **S$_0$**) where all elements are zero except one which is either a

plus or minus one will produce same direction changes in **Q$_1$** and **L***; and

(vi)   any change in any element of **S** is independent of any other element of **S**, which means

Δ**Q$_{2G}$**, Δ**Q$_{2C}$**, and Δ**Q$_{2I}$** are independent of each other.

Its *theoretical properties* are, on the other hand, not so obvious. First, the actual economy, as

represented in the output-employment multiplier, is an emergent going plant that has the

productive potential to produce the surplus—that is, it is the system of production of

intermediate material and labor power inputs as a whole which is productive.[19] Consequently,

the production of any surplus good or service requires the direct and/or indirect utilization of all

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[19] The output-employment multiplier is not the same as the Keynesian multiplier in that the finite
value of the latter is dependent on leakages such as imports or savings, while the finite value of
the former is dependent not on leakages but that the basic technology produces a surplus which
means $0 < \lambda_{m11} < 1$. Still they are similar. The latter is a relationship between nominal
investment and national income mediated by the propensity to save, with prices assumed to be
stabled (Trigg 2006, 2008). This suggests that the 'real' variables of investment goods, output,
and the capacity to produce investment goods lie at its heart. Moreover, since consumption
goods (along with government goods) are part of the social surplus, the multiplier is altered from
'savings' to fertility of production. The outcome is that a demand for an investment (or other
surplus) good will generate a demand for material and labor power inputs that are in addition to
those directly used in its production. So to deny the existence of the Keynesian multiplier (Gnos
and Rochon 2008) is to deny the existence of circular production, or more strongly the structure
of production of any capitalist economy that exists.

intermediate inputs and the labor power skills necessary for their production as well as for the production of the surplus goods and services. This implies that the total social product does not adequately represent the economy and the social surplus is not a residual. A better way to represent the economy is the output-employment multiplier qua a going plant that is directed by the demands of the surplus and the total social product emerges as a necessary by-product. With the economy as a going plant, the physical real cost of producing the social surplus in any quantity and composition is represented by the multiplier, $[I - A_{11}{}^T]^{-1}A_{21}{}^T$ and summarized by the maximum eigenvalue of A_{11} (λ_{m11}); and that the variation in real costs as the social surplus varies is captured by variations in λ_{m11}, which represents its productive fertility.[20] While an increase in the social surplus requires more intermediate material inputs and the possible use of vintage technology which means that the material production coefficients may increase, the overall impact is that a sufficient number of the production coefficients will decline so that λ_{m11} remains relatively stable or declines. This means that the productive fertility of the system as a whole remains the same or has increased.[21] Consequently, the system of production as a whole has the fundamental capacity to produce increasing quantities of the social surplus, somewhat akin to Baran and Sweezy's 'law' of the stable or rising surplus (Baran and Sweezy 1966), This means that limitations on its production is not technological but emanates from decisions of the ruling class.[22]

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[20] This is in slight contrast to the classical-Sraffian view of physical real costs as the amount of Q_1 destroyed or used up in the production of the surplus (Kurz 2006, 2011; Kurz and Salvadori 2005; Roncaglia 2010).

[21] For the theory of production that is the foundation for this claim, see Lee and Jo (2010).

[22] It might be argued that because basic goods are not part of the social surplus, basic goods industries do not produce a surplus and hence are sterile. However, this Physiocratic issue is not relevant because the whole system of production as represented by the output-employment multiplier is responsible for producing the surplus, not any one industry or section of the economy.

A second theoretical property is that the economic activity for the economy as a whole is determined by the decisions to produce consumption, fixed investment, and government goods and services: demand for the surplus generates current production. With the 'input' requirements produced (and reproduced) upon the demand for the surplus goods and services, the coordination of the production of the total social product is effectuated independent of prices. That is, the output-employment multiplier represents the technical coordination of economic activity while the surplus through the multiplier determines the level and composition of the total social product and private sector employment. Hence, although the notion of the 'anarchy of production' is a misleading description of production under capitalism, 'anarchy' of ruling class demands for the social surplus is not. The last theoretical property of the model arises from the productive independence of the goods and services that comprise the surplus and that the demand for the surplus generates its production. In particular, since consumption and fixed investment goods are created from the current production they call forth, the former is not constrained by the latter and the latter is not based on 'savings'. The economic system as a whole, represented by the output-employment multiplier, has the capability of producing varying amounts of Q_{2C} independently of Q_{2I} if below full utilization of capacity and co-operatively with Q_{2I} if additional capacity is needed.[23] It also has the capability of producing varying amounts of class-linked

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[23] Because agency of the ruling class determines how the state and the business enterprise react to changes in capacity utilization and employment, it is not possible to articulate a structural 'accelerator' component of the output-employment multiplier, as for example in the case of the Sraffian supermultiplier. For the Sraffian multiplier, dependent and working class households have no agency with regard to their consumption patterns and enterprises have no agency regarding their capacity-enhancing decisions. Thus, autonomous or agency-based decisions are restricted to capitalist (or ruling class) consumption, non-capacity enhancing investment, and state demand for government goods and services (Bortis 1997, 2003, 2008; Serrano 1995a, 1995b). However, no explanation is given why enterprises do not have agency regarding capacity-enhancing investment decisions or why working class households do not have at least some agency to determine consumption patterns that would enhance their particular lifestyles.

consumption goods without affecting the production of other classed-linked consumption goods.[24] Because workers as households consume currently produced $\mathbf{Q}_{2C}$, this implies there is no 'saved' wage fund that inversely links 'real wages' to employment or that links higher 'real wages' for some to lower 'real wages' for others. Similarly, since $\mathbf{Q}_{2I}$ is also currently produced, private fixed investment is not dependent on 'savings' of any sort. Moreover, because the economic system as a whole also has the capability of producing varying amounts of $\mathbf{Q}_{2G}$ independently of $\mathbf{Q}_{2I}$ and $\mathbf{Q}_{2C}$, increasing $\mathbf{Q}_{2G}$ does not 'crowd out' the production of $\mathbf{Q}_{2C}$ and $\mathbf{Q}_{2I}$.

The structural-theoretical properties do not entirely determine the outcome of the output-employment model; *agency* also has a necessary role. It is clear that the agency-decisions of the capitalist class working through the business enterprise and the political elite working through the state determine the actual amount and composition of the total social product and employment. It is also obvious that the decisions are coordinated to some degree, but also uncoordinated to perhaps a greater degree, thus generating a misplaced perception of anarchy of production. Moreover, given the productive output-employment multiplier, the social provisioning process is potentially sustainable and thus has an expected but transmutable hence uncertain future, which means one that is not necessarily a self-replacing, replicating one. So while the actual-current decisions of the ruling class that determine the current production of the social surplus are continuous results in continuous production (implying that market transactions do not clear markets but rather ensure continuous market transactions so that markets are non-clearable), they are at the same time generally altering the level and composition of the total

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[24] This means that the production of $\mathbf{Q}_{2Cw}$, $\mathbf{Q}_{2Cd}$, and $\mathbf{Q}_{2Cr}$ can vary independently of each other. Hence the particular quantities of class-linked consumption goods and services is determined by the ruling class.

social product. Therefore, the actual production of goods and services do not exactly replace what is used up in production so the economy is not reproduced qua replicated; and nor do they necessarily ensure the survival and reproduction of all of the individuals and groups that comprise the ruling, working, and dependent classes. All of this implies that because of agency with its uncertainty and expectations in a transmutable world, there are no long period positions that are centers of attraction for the actual output and employment resulting from the actual decisions made by the ruling elite. Consequently, the heterodox theory of output and employment consists of the output-employment model and multiplier, the structural, theoretical, and agency properties of the model and multiplier, and the accompanying narrative, all of which explains what determines the social surplus, total social product, and employment and how they change in response to decisions made by the ruling class.

The Going Economy and its Theoretical Core

The previous four sections can be linked together to form a model of the going economy as a whole. That is, linking together the SFSA models of the productive, financial, and monetary structures of the social provisioning process (equations 18, 25) with the disaggregated price model of the economy (equations 28), and the disaggregated output-employment model of the economy (equation 33) creates an emergent concatenated heterodox model of the going economy as a whole:

Going Economy as a Whole

SFSA Model of the Productive and Financial Structure of the Social Provisioning Process

(18)

Basic Goods Sector K_{S1}, FA_{S1}, LB_{S1}: $G_{11} \oplus L_{11}$ $\rightarrow \mathbf{Q_1}$

Surplus Goods Sector K_{S2}, FA_{S2}, LB_{S2}: $G_{21} \oplus L_{21}$ $\rightarrow \mathbf{Q_2 = Q_{2G} + Q_{2C} + Q_{2I}}$

State $\mathbf{K_{S3}}$, FA_{S3}, LB_{S3}: $\mathbf{Q^T_{2G}} \oplus \mathbf{L_{41}} \oplus GP_3 \rightarrow GS$, $\mathbf{K_{F3}} \rightarrow \mathbf{K_{S3}}$
$\rightarrow Q_{3L} \rightarrow FA_{S3}, \rightarrow LB_{1,2,4}$

Household FA_{S4}, LB_{S4}: $\mathbf{Q^T_{2C}} \rightarrow HSA$

Enterprise $\mathbf{Q^T_{2I}} \rightarrow K_{F1\text{-}2} \rightarrow K_{S1\text{-}2}$

Financial Structural Balances

National Debt $LB_{S3} = FA_{S1,2,4}$

State Bank Loans: $FA_{S3} = LB_{1,2,3}$

SFSA Model of the Monetary Structure of the Social Provisioning Process

Basic Goods Sector K_{S1}, FA_{S1}, LB_{S1}: $G_{11}\mathbf{p_1} + L_{11}\mathbf{w} + \mathbf{\Pi_1} = Q_{d1}\mathbf{p_1}$

Surplus Goods Sector K_{S2}, FA_{S2}, LB_{S2}: $G_{21}\mathbf{p_1} + L_{21}\mathbf{w} + \mathbf{\Pi_2} = Q_{d2}\mathbf{p_2} \rightarrow \mathbf{Q^T_{2G}p_2} + \mathbf{Q^T_{2C}p_2} + \mathbf{Q^T_{2I}p_2}$

State $\mathbf{K_{S3}}$, FA_{S3}, LB_{S3}: $\mathbf{Q^T_{2G}p_2} + \mathbf{L_{41}}\mathbf{w} + GP_d + GP_{ih} + GP_{ib} \rightarrow GS$, $\mathbf{K_{F3}} \rightarrow \mathbf{K_{S3}}$,
$\rightarrow Q_{3L}(1 + i) \rightarrow FA_{S3}, LB_{S1,2,4}$

(25) Household FA_{S4}, LB_{S4}: $e(L*\mathbf{w}) + GP_d + GP_{ih} + \Pi_d = \mathbf{Q^T_{2C}p_2} + FA_{4RC} + LB_4 \rightarrow HSA, FA_{S4}, LB_{S4}$

Enterprise $\Pi_{re} = \mathbf{Q^T_{2I}p_2} + FA_{BE} + LB_{BE} \rightarrow K_{S1,2}, \rightarrow FA_{S1,2}, LB_{S1,2}$

Financial Structural Balances

National Debt $LB_{S4} = FA_{S1, 2, 4}$

State Bank Loans: $FA_{S3} = LB_{S1,2, 4}$

Current Financial Balances

Government Deficit $GOV_D = GOV_E - (LB_4 + LB_{BE}) = FA_{BE} + FA_{4RC}$

Total Gross Profits $\Pi = \mathbf{Q^T_{2I}p_2} + LB_{BE} + FA_{BE} + FA_{4RC}.$

Price Model of the Going Economy

(28)   Prices-Basic Goods Sector $[R_{d1}][Z_{d1}][M_{11}\mathbf{p_{1t}} + l^*_1\mathbf{w} + \mathbf{d_1}] = \mathbf{p_{1t+1}}$
         Prices-Surplus Goods Sector $[R_{d2}][Z_{d2}][M_{21}\mathbf{p_{1t}} + l^*_2\mathbf{w} + \mathbf{d_2}] = \mathbf{p_{2t+1}}$

Output-Employment Model of the Going Economy

(33)   Output-Basic Goods Sector $\mathbf{Q_1} = [I - A_{11}^T]^{-1}A_{21}^T\mathbf{S}$
         Output-Surplus Goods Sector $\mathbf{S} = \mathbf{Q_2} = \mathbf{Q_{2I}} + \mathbf{Q_{2C}} + \mathbf{Q_{2G}}$
         Total Employment $\mathbf{L^*} = l^T_1[I - A_{11}^T]^{-1}A_{21}^T\mathbf{S} + l^T_2\mathbf{S} + \mathbf{L_{31}^T}$

In terms of its productive structure, the economy is a going plant with unused capacity and fixed investment goods and the capability of producing additional capacity through producing fixed investment goods. So as long as household social activities are ongoing and supported by government services, the structure of production ensures the continuous reproduction of the intermediate inputs and fixed investment goods. More specifically, the level of economic activity for the economy as a whole is completely determined by the decision to produce government, consumption, and investment goods and services, that is, by the decisions to produce the surplus. With the input requirements produced and reproducible simultaneously with the goods and services necessary for the household social activities and government services to take place, the social provisioning process is potentially sustainable, and thus has an expected future; and this is what makes the economy a going plant. On the other hand, the financial structure shows that the national debt consists of government bonds that are held by business enterprises and households; thus an increase in the national debt arising from government expenditures exceeding the interest payments of enterprises and households increases private sector and households holding of government bonds and hence their incomes and profits. Enterprises and households also take out state bank loans which simultaneously create financial assets for the state. Hence, government decisions to spend and enterprise and household decisions to take out state loans create, drive, and change the economy's financial structure, an outcome not dissimilar from decisions concerning the production of the surplus driving the productive structure of the economy noted above.

The monetary structure model shows the flows of intermediate inputs into the surplus goods sector, and the flows of the various surplus goods and services into their social accounts of households, enterprises, and the state. At the same time, it mirrors these flow of goods and

services with the flow of wage, profit, and state incomes required to purchase them. In this manner, the monetized social provisioning process acquires the structure of a going concern. With the provisioning process as a going plant, the flow of state money ties together market transactions and non-market activities that ensure the continuation of consumer activities and government services through time. The model further identifies the core decisions that drive the provisioning process: the decisions that determine the social surplus and employment, prices, profits, wages, and interest rates. The impact of the former decisions is shown in the output-employment model; and the impact of pricing decisions is shown in the price model. Because the ruling class (as opposed to the capitalist class by itself) has the productive and administrative capabilities and the legal rights to these decisions, it can direct the provisioning process in their own current and changing future interests. Therefore, the social provisioning process is a socially sustainable process in which each state money transaction is a manifestation and reproduction of the capitalist relationships and hence both sustains and promises a future for the ruling elite and their dependents—in short we have a going economy.

This model of the going economy is unusual in that it consists of four concatenated models each of which is an emergent model with their own potential locations of agency. Thus, it is not possible to reduce the model of the going economy to a single 'homogeneous' system where everything is determined simultaneously. Hence the theoretical core of the going economy consists of different but linked components, each drawing on the four models in different ways: separation of price and output-employment decisions; prices and the going business enterprise; social surplus, the state, and wages and profits; and the social surplus and social provisioning. Together the components delineate the heterodox narrative picture of how the social provisioning process works under capitalism, that is, the heterodox theory of value.

Price and Output-Employment Decisions

The first component of the core is the separation of price and output-employment

decisions which implies that prices and output are not structurally related in terms of a

deterministic functional relationship, such as in the case of demand or supply curves; prices and

output-employment are not determined simultaneously; and output-employment multiplier has

no impact on prices and hence is not the cause of price increases qua inflation. As a result,

prices are relatively stable in face of output-employment variations; and conversely, the

changing of prices is not predicated on output-employment variations. Indicative of this

separation is that the pricing coefficients matrices (M, l^*) are different from the production

coefficients matrices (A, l), so that the structure of the pricing equations differ from their

corresponding structure of production and cost equation. The absence of a dual between the two

set of matrices implies that prices are not profit maximizing prices and that neither prices nor

output and employment converge to Sraffian long period positions, which explicitly depends on

the existence of the dual. The non-simultaneous decisions of prices and output-employment,

combined with non-profit maximizing prices and the absence of long period positions also

results in the dismissal of the concepts of equilibrium and the tendency towards it, cost

minimization, profit maximization, and implicitly market clearing.[25] What this means

methodologically is that the actual variables and magnitudes of prices and output-employment

are theoretical variables and the actual economy is the theoretical economy.[26] What it means

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[25] There are also other arguments that dismiss these concepts. For example, the existence of
vintage technology and uncertainty about technical progress combined with uncertainty about
prices, wage rates, and profit mark ups means that enterprises are unable to select technology
that minimizes costs but rather (hopefully) just reduces costs (Landesmann 1988).
[26] This fundamental methodological point is based on a structure-agency (critical realism)
ontology and implies a rejection of the theoretical narrative utilized by most heterodox (and
mainstream) economists. In particular, the concepts of exogenous and 'induced' are replaced by

theoretically is that neither the distribution of the social product so that production can take place again nor the coordination of economic activity is possible via prices (and interest rates and profit rates).[27]

Prices and the Going Business Enterprise

Since prices neither coordinate nor make economic activity happen (that is done by the decisions to produce the surplus), their theoretical role in a going economy has to be located elsewhere. In a capitalist going economy, it is necessary that enterprises generate sufficient revenue through the prices they set to cover their costs and generate profits. Thus, prices of goods and services are the primary mechanism through which business enterprises obtain their revenue to continue as a going enterprise. So the second theoretical component of the going economy is that prices, as abstract indexes of credit qua debt obligations, are 'going enterprise' prices. In particular, as credit-debt indexes, prices are not grounded intrinsically in commodities and hence are not 'reproduction prices,' that is prices that only permit the 'commodity' replication of the enterprises and the economy. They are more since the settling of debts enables enterprises to acquire new debts, but not necessarily debts that will replicate it on a constant or expanding basis. This has the obvious implication that even with a state banking system and the absence of private financial enterprises, Minsky's financial instability hypothesis is still relevant. Moreover, because they are credit-debt indexes, price increases (inflation) occur because price declines make it more difficult for enterprises to meet their debt obligations. Finally, going enterprise prices permit the location of agency to be in the business enterprise; and it is this

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structure and the concepts of endogenous and autonomous are replaced by causal mechanisms and agency.

[27] This core component and some of its implications are accepted by Sraffians, but others are not—see Bortis (1997, 2003, 2011), Kurz (2006), Lee and Jo (2010), and Roncaglia (1996, 2009, 2010).

agency qua business enterprise working through the output-employment multiplier that (along with state expenditures) drives, coordinates, and changes economic activity of the going economy.[28]

Social Surplus, the State, and Wages and Profits

The third component deals with the origins of the social surplus, the analytical categories of profits and wages, and the relationship between the social surplus and wages, profits, and state expenditures. Since the economy, as represented by the output-employment multiplier, has the productive potential to produce the social surplus (and hence the total social product and employment), the origin of the social surplus under capitalism is found in the agency of the ruling class and the correlative existence of the working class, whose members are compelled to work for capitalists and the state to get state money so to have access to the social provisioning process—unlike the ruling class, the working (and dependent) class has no fundamental-structural control over their access to social provisioning because they have no access to the means of production or the productive capabilities of the economy. Utilizing this class and state imposed dependency on state money, the ruling class's desire to acquire particular surplus goods and services results in their commanding state moneyless unemployed labor power to produce it, with the unintended by-product of also having to produce, as part of the surplus, consumption goods for the working (and dependent) classes.[29] In short, with the economy as a going plant,

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[28] An implication of going enterprise prices is that prices are not sector, industry, or market related in that they are creatures of them, that is, of structures and institutions outside of agency.
[29] This suggests that workers are exploited in a Marxian sense, but without being articulated through the labor theory of value. [Mongiovi 2010]

the origin of the social surplus (and hence the total social product) is found in agency-demanded class and state-linked goods and services.[30]

The most significant implication that flows from agency-driven surplus is that it generates the analytical categories of wages, profits, and state expenditures and the corresponding, the surplus-acquiring, provisioning-accessing variables of wage rates, profit mark ups, and state money.[31] That is, the decision by business enterprises to demand and purchase fixed investment goods requires them to also have an income variable, the profit mark up, by which to acquire them. Similarly, the decision by the state to demand and purchase government goods and services requires it to also have an income variable, state money, by which to acquire them and the business enterprise to have a profit mark up to capture the state expenditures as profits. Finally, the decision to produce consumption goods and services requires the existence of income variables, the wage rate and government payment for households to purchase them. Thus, the production of the social surplus requires the simultaneous 'production' of income variables (and prices)—wage rates, profit mark ups, government payments, and state money--in

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[30] Because state money is created through government expenditures and enterprises and the state control the access to state money, it is not neutral to the operation of the economy.

[31] This implication is found in classical political economy and was clearly established by Sraffa (1960: 6). Its significance is that the existence of the profit mark up is a non-price phenomenon and hence is not dependent on whether markets are competitive or not (Pasinetti 2007: 198; Bortis 2003). So, in contrast to various Kaleckian statements, imperfect competition is not the basis for the existence of the profit mark up. Moreover, profit mark ups are not profit rates or rates of return. These latter concepts are synthetic concepts constructed by enterprises to help in making strategic business decisions with regard to discretionary expenditures, such as fixed investment goods and research and development. Hence, they are not fundamental 'properties' of capitalism. Rather, it can be plausibly argued that profits rates are not dominant in these decision making processes, but rather are one of many other important variables, such as internal rate of return based on an administratively determined 'interest rate', pay-off period, net present value, discounted cash flow, nature of the investment project (growing markets, replacement investment, product change, or new technology to reduce production costs), the level of management that proposed the investment project, type of funding for the investment project (internal vs. external), and management judgment which may be reflective or in the form of animal spirits.

order for the state, business enterprises, and households to gain access to the social provisioning process.[32] In fact, it is not just that the income variables are produced simultaneously with the production of the surplus, the production of the social surplus also generates the incomes by which they are purchased. Since government expenditures have the tripartite role of directly and/or indirectly purchasing goods and services, of becoming part of business enterprise profits, and of ending up as financial assets purchased by households and enterprises, the value of the surplus plus the purchase of government bonds equals private sector wages, net profits, depreciation, and the net government income qua expenditures (GOV_{NE}), which is equal to the deficit:

$$(34) \quad e(Lw) + \Pi_N + D_E + GOV_{NE} = Q^T_{2G}p_2 + Q^T_{2C}p_2 + Q^T_{2I}p_2 + FA_{BE} + FA_{4RC}.$$

Subtracting out the equivalent of government expenditures qua deficit from both sides, we have the value of the surplus equaling private sector wages plus net profits and depreciation plus a residual of state financial assets and liabilities (due to $p_{1t} \neq p_{1t+1}$). So if the ruling class decides to produce more social surplus goods and services, then the result will be an increase in private sector wages and profits, and at the same time 'produce' private financial assets in the form of government bonds purchased by the ruling class.[33] In short, being producible means that agency qua demands for the social surplus creates the income variables that give access to the social surplus and the provisioning process and the incomes to purchase it: demand creates the surplus *and* income to purchase the surplus or 'demand creates it own supply'.

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[32] The production of the surplus qua profits is in contrast to the Marxian argument that profits emerge via the exploitation of labor. The difference between the two accounts arises from whether the total social product is driven by agency decisions concerning the surplus or whether it is given and profits appear as a residual.

[33] This implies that the greater the government expenditures are, the greater amount of financial assets in existence. Thus the question of financialization of the economy arises. However, the assumption of a state banking system essentially sterilizes this concern.

Two subsidiary implications follow from 'demand creates its own supply'. The first is that saving behavior has no theoretical role in explaining incomes specifically profits; and the second is that underconsumption and overproduction do not exist—rather only Keynesian unemployment exists. This well-known relationship of demand creates its own supply is a result of a agency-structure relationship deeply embedded through the output-employment multiplier in the productive-monetary structure of the social provision process; and it is an outcome that is independent of the competitive nature of the markets (Pasinetti 1997, 2001).[34] But even more significantly, this relationship, in the context of a state money economy, creates state financial assets for the ruling class (and simultaneously state liabilities) that extend into the future. Hence, the ruling class not only directly determines the current social provisioning process, it can, through its accumulation of financial assets, also determine its future.[35] Therefore, the state can never be a neutral arbitrator in a class-based economy; rather it must always work in the interests of the ruling class—those who control the future also control the present.

A second implication is that the classical-Marxian distinction between productive and unproductive labor power is not relevant. That is, from equations 15 and 31 it is evident that all the labor employed is necessary to produce, on an ongoing basis, the surplus goods and services for the state to carry out its government services and households to engage in their consumer

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[34] Implied in this is that the mantra of competition is a veil that obscures the fundamental workings of the social provisioning process in a capitalist economy.

[35] It is this context that the concern about wage-based price increases or inflation emerges. As noted in Appendices I and II, increases in wage rates does not affect the structure of the economy or class incomes very much while having some impact on household incomes and hence households access to social provisioning if the increases are not uniform. But what it does have a significant impact on are the values of the financial assets held by the ruling class. Thus, to maintain the value of their financial assets, the ruling class promotes the myth that wage-based price increases have a negative impact on the social provisioning capability of the economy. On the other hand, profit mark up-based price increases are not portrayed in the same negative light. [Nell 2003]

social activities. Moreover, the employment pattern of the labor power among the various economic and social activities does not intrinsically limit the production of the surplus, limit the creation of profits, hence potentially generate a lower rate of accumulation. If there is a problem with the size, growth, and composition of the social surplus, its solution lies with the agency of the ruling class and not with the pattern of employment. The solution, however, is a ruling class solution which may mean higher employment for the working class and worsening living standards for working and dependent households.

Social Surplus and Social Provisioning

The final theoretical component of the going economy is the social surplus itself and the implications for differential access to the social provisioning process. As noted above, the output-employment multiplier represents the physical real cost of producing the social surplus and that this real costs declines (or at least remains constant) as the amount of the surplus produced increases. So instead of a technological barrier to increasing the surplus, there is an agency barrier in terms of the decisions made by the ruling class. In particular, as long as the ruling class makes the decisions needed to sustain (but not necessarily replicate) the technological capabilities of the multiplier, the production of the social surplus remains unimpeded. Thus, much of the surplus is discretionary in that its quantities and composition between and within consumption, fixed investment, and government goods and services is not dictated by the multiplier but by the discretionary decisions of the ruling class.

This gives rise to two significant implications. Since the production of fixed investment goods is independent of the production of consumption goods, variations in the ratio of the value of fixed investment goods to consumption goods has little economic relevance, either to the issue of the distribution of income or to understanding economic growth. As noted above, the

production of the surplus simultaneously creates the income variables that give access to it. However, the 'discretionary' decisions by the ruling class generate a differentiated composition of the surplus, and particularly of fixed investment and consumption goods. And this in turn generates a hierarchical array of profit mark ups and household incomes. So the second implication is that the distribution of consumption goods between the working, dependent, and ruling classes is varied in that enterprises produce specific kinds of goods and services for each of the social classes, with each array of goods priced so that they equal the particular incomes of the three classes. Thus, capitalist production decisions create a structure of household incomes and within them a structure of wage rates and government payments.[36] It also creates a structure of household incomes within the working and dependent classes and within the ruling class, but there is no necessity that all household incomes of the former provide at least a minimal subsistence access to social provisioning.[37] The same can be said for profit mark ups, in that the production of differentiated fixed investment goods with different prices associated with different kinds of technology and enterprise organization creates the basis for differentiated profit mark ups and differential business incomes.[38] Hence the distribution of household and business enterprise income is determined by the ruling class outside the market and prior to the determination of the various income variables and prices; and the income variables and prices

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[36] Although not possible to fully deal with it at this juncture, uneven distribution does not per se generate unemployment and nor is there a direct relationship between the two.

[37] A subsistence household income is not a social right under capitalism but a political concession obtained from the ruling class.

[38] Because profit mark ups are not rates of profit, there is no reason for them to be uniform. Moreover, it is not clear what a competitive vs. non-competitive profit mark up is since competition does not have a fundamental role in the economy. Finally, very little empirical work has been done on the determination of the profit mark up, so there is little that can be said about it. In particular, there is no evidence that enterprises are influenced by interest rates when determining/setting their profit mark ups.

simply 'adjust'.[39] In short, production decisions by the ruling class concerning the surplus drives distribution; and this clearly makes the differential access to social provisioning a social-political issue.

Theory of Value and Heterodox Economics

The heterodox theory of value emerges from the model of the going economy and its theoretical core, which means it is much more than simply a theory of prices. Its narrative is linked with a quantitative analysis (usually a model or a concatenated set of models) that succinctly explains why and how the particular goods and services that constitute the social provisioning process get produced and the households, business enterprises, and the state get access to them. Consequently, the particulars of the explanation include the origins of the income variables (wage rates and profit mark ups) that give access to the surplus and hence to the provisioning process; the determination of prices and their role in affecting economic activity; the determination of the social surplus, total social product, and employment; the 'real costs' of producing the social surplus; the distribution of the consumption goods between and within the three social classes; and the distribution of fixed investment goods and state financial assets among business enterprises and the ruling class (Dobb 1945). The explanation also includes an examination of the state as the political unit in which the provisioning process is located and its role in affecting and directing economic activity. The narrative of heterodox value theory starts with the observation that the material basis of the social provisioning process is determined by the ruling class—the capitalist class and the political elite of the dependent capitalist state—for society as a whole. That is, since the composition and amount of the total social surplus is determined by the ruling class, they have the dominant influence qua control

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[39] See Appendix II for further discussion.

over the economy and society; and since the capitalist class via the business enterprise administratively set going enterprise prices, profit mark ups, and wages while the state sets wages, employs people, and makes government and interest payments, the ruling class determines through non-market decisions both the general access and the differential access to social provisioning. Underpinning the narrative is the theoretical core which delineates the structures and agency that gives it its form and character. In particular, the quantity of the surplus is not technically constrained, and the distribution of consumption goods among households is not technically determined by their productivity or the market value of what they produce. Rather, the creation and distribution of the surplus is effectuated through the social relationships that sustain the ruling class, while the trappings of market forces and the ideology of individualism are veils that obscures them. The heterodox theory of value through its model of the going economy pierces these veils and reveals what is hidden or obscured.

It is evident that the heterodox theory of value is quite different from its neoclassical counterpart which is restricted to a theory of prices and a narrative of market interaction of non-social individuals all located independently of the social realm. It also differs (but much less so) from the classical and Marxian theories of value because of its emphasis on agency and structures, as opposed to just structures, in the determination of the social surplus, total social product, prices, and profit mark ups. Thus, the heterodox theory of value and its model of the going economy as a whole is distinctive. But it is more than that—it is also an integrating force (or 'center of gravity') for all of heterodox economics. For the last quarter century and more, efforts have been made to create a heterodox synthesis. The arguments in this paper and the resulting model of the going economy and theory of value are part of these efforts. Whether dealing with the structure of production, classes, money, prices, or social provisioning, many of

the ideas, arguments, and even conclusions are drawn from Marxian-radical, Post Keynesian-Sraffian, Institutional, social, and feminist economics. There are also novel arguments whose introduction facilitates bringing them together, most notably being critical realism with its emphasis on structures, agency, and causal mechanisms that provide a common methodological foundation and situates economics in actual historical time, whether it be past or present. Finally, there are hybrid novel arguments that consist of using accepted ideas and arguments from different approaches in unexpected ways: the application of agency to the creation of the surplus, of circular production and non-basics to separate and unconstrained production of the different components of the surplus, and of the separation of price and quantity decisions and the non-dual between pricing and production coefficient matrices. Overall, the model of the going economy with its theoretical core and accompanying theory of value constitutes a comprehensive, coherent theoretical foundation for heterodox economics—one that does not privilege macro over micro, money over real, or structure over agency. Can it be further developed—of course. But for the present, it is a good point of departure for further integrative work in heterodox economics.

Appendix I

Starting with equation (29) and assuming that $\mathbf{d}_1$ and $\mathbf{d}_2$ are null column vectors, we have

(29a) $\mathbf{p_1} = [I - R_{d1}Z_{d1}M_{11}]^{-1}R_{d1}Z_{d1}[l*_1\mathbf{w}]\psi$
   $\mathbf{p_2} = [R_{d2}Z_{d2}M_{21}] \, [I - R_{d1}Z_{d1}M_{11}]^{-1}R_{d1}Z_{d1}[l*_1\mathbf{w}] \, \psi + R_{d2}Z_{d2}[l*_2\mathbf{w}]\psi$

where δ is a scaler and a percentage increase in all wage rates; and

   $\psi = (1 + \delta)$.

Since all the components of the price equations are given, the two price equations reduce to:

(29b) $\mathbf{p_1} = V_1[l*_1\mathbf{w}]\psi$
   $\mathbf{p_2} = V_2[l*_1\mathbf{w}] \, \psi + V_3[l*_2\mathbf{w}]\psi$

where $V_1 = [I - R_{d1}Z_{d1}M_{11}]^{-1}R_{d1}Z_{d1}$;
   $V_2 = [R_{d2}Z_{d2}M_{21}] \, [I - R_{d1}Z_{d1}M_{11}]^{-1}R_{d1}Z_{d1}$; and
   $V_3 = R_{d2}Z_{d2}$.

Thus an increase in δ for all wage rates will result in the increase in all prices by the same

percentage amount; hence p_i/w_{iz} will not change. However, if $\mathbf{d}_1$ and $\mathbf{d}_2$ are semi- or strictly

positive, then we have

(29c) $\mathbf{p_1} = V_1[l*_1\mathbf{w}\psi] + V_1\mathbf{d}_1$
   $\mathbf{p_2} = V_2[l*_1\mathbf{w}\psi] + V_3[l*_2\mathbf{w}\psi] + V_2\mathbf{d}_1 + V_3\mathbf{d}_2$

Thus each price change will increase by less than δ; and as δ increases, the percentage change in

prices will approach δ. Since the price-mark up ratio is embedded in V_1, V_2, and V_3, any change

in $\mathbf{w}$ will be passed through without affecting it. In short prices are correlated with state money

wage rates.

If the profit mark ups increase by δ, then all prices will increase, but not by as much as

the percentage increase in the profit mark up, and both the price-cost margins and price-wage

ration for all prices and wage rates will increase. More significantly the price-mark up ratio for

each price will also increase as well as the price-wage ratio for all prices and wage rates:

(29d) $\mathbf{p_1} = [I - R^{\psi}_{d1}Z_{d1}M_{11}]^{-1}R^{\psi}_{d1}Z_{d1}[l*_1\mathbf{w} + \mathbf{d}_1]$

$$\mathbf{p_2} = [R^\Psi_{d2}Z_{d2}M_{21}] [I - R^\Psi_{d1}Z_{d1}M_{11}]^{-1}R^\Psi_{d1}Z_{d1}[l^*{}_1\mathbf{w} + \mathbf{d_1}] + R^\Psi_{d2}Z_{d2}[l^*{}_2\mathbf{w} + \mathbf{d_2}]$$

where each diagonal element of R^Ψ_{d1} and R^Ψ_{d2} is equal to $\psi = 1 + r_i + \delta\, r_i$.

Since all the components of the price equations are given, they reduce to:

(29e) $\mathbf{p_1} = [I - R^\Psi_{d1}X_1]^{-1}R_{\psi d1}X_2$
        $\mathbf{p_2} = [R^\Psi_{d2}X_3] [I - R^\Psi_{d1}X_1]^{-1}R^\Psi_{d1}X_2 + R^\Psi_{d2}X_4$

where $X_1 = Z_{d1}M_{11}$,
        $X_2 = Z_{d1}[l^*{}_1\mathbf{w} + \mathbf{d_1}]$,
        $X_3 = Z_{d2}M_{21}$, and
        $X_4 = Z_{d2}[l^*{}_2\mathbf{w} + \mathbf{d_2}]$

When ψ increases due to increases in δ, the maximum eigenvalue of $R^\Psi_{d1}X_1$ increases which means that all the elements of $[I - R^\Psi_{d1}X_1]^{-1}$ increase as well as $R_{\psi d1}X_2$, $R^\Psi_{d2}X_3$, and $R^\Psi_{d2}X_4$ will increase. With all components of the price equations increasing when ψ increases, prices will increase. Thus an increase in either the profit mark up or wage rates will increase prices, but the increases are not symmetrical. Changes in wage rates do not alter the price-wage rate ratio and price-mark up ratio whereas changes in the profit mark up alters both which has a differential impact on the access to social provisioning by households whose income is solely wage income and by households and business enterprises who receive profits as part or all of their income. Thus, wage-driven price increases leave the pricing structure and the structure of prices unaffected, while profit mark up-driven price increases changes both in favor of the profit recipients.[40]

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[40] For similar arguments reaching the same general conclusions, see Pivetti (1985, 1988).

Appendix II

The decision to produce consumer goods and services for a particular household income generates the particular income variables to purchase those goods: low price goods for low household incomes and high price goods for high household incomes. As long as the goods are distinct from each other in terms of technical-quality characteristics, their class-income distinction-differentiation are established and maintained through the simultaneous setting of prices and 'matching' income categories. So the decision to produce different goods for different social classes under capitalism creates as a result a structure of high-low incomes and in particular wage rates and government payments, with the direction of causation going from social class distinction to socially-technically differentiated goods to a structure of incomes and wage rates. This argument can also be extended to the differentiation of social goods within a social class. If all households had equal access to consumption goods and therefore to social provisioning, then the consumption goods produced could only be technically differentiated so as to support different but socially equal lifestyles.

Starting with equation (24) and noting that the households of the working and dependent classes do not own state financial assets but do have state liabilities, they spend their entire wage income $[\mathbf{e}(L\mathbf{w_w}) + \mathbf{L}_{31}\mathbf{w_w}]$ and government payments (GP_d) on consumption goods and services and liabilities:

(24a) $\mathbf{e}(L\mathbf{w_w}) + \mathbf{L}_{31}\mathbf{w_w} + GP_d = \mathbf{Q}^T_{2Cw}\, \mathbf{p_2} + \mathbf{Q}^T_{2Cd}\, \mathbf{p_2} + LB_{4wd}$

Similarly the ruling class households spend their salary $[\mathbf{e}(L\mathbf{w_r}) + \mathbf{L}_{31}\mathbf{w_r}]$ and interest payments (GP_{ih}) on consumption goods and services and liabilities, and use their dividend income (Π_d) to purchase government bonds:

(24b) $\mathbf{e}(L\mathbf{w_r}) + \mathbf{L}_{31}\mathbf{w_r} + GP_{ih} = \mathbf{Q}^T_{2Cr}\, \mathbf{p_2} + LB_{4RC}$

(24c) $\Pi_d = FA_{4RC}$

where $\mathbf{e}(L\mathbf{w_w}) + \mathbf{e}(L\mathbf{w_r}) = \mathbf{e}(L\mathbf{w_w})$;

$\mathbf{L}_{31}\mathbf{w_w} + \mathbf{L}_{31}\mathbf{w_r} = \mathbf{L}_{31}\mathbf{w}$; and

$LB_{4wd} + LB_{4RC} = LB_4$.

Together equations (24a), (24b), and (24c) constitute equation (24):

(22) $\mathbf{e}(L\mathbf{w}) + \mathbf{L}_{31}\mathbf{w} + GP_d + GP_{ih} + \Pi_d = \mathbf{Q}^T{}_{2C}\mathbf{p_2} + FA_{4RC} + LB_4$.

Because the ruling and the working-dependent classes purchase different goods and services,

there are no overlapping purchases. However, within the two broad classes, there can be

overlapping purchases so that the distribution of wage rates and government payments is not as

tightly tied to a particular set of goods and services.

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