

# Modeling the Economic Surplus in a SAM

## Framework\*

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## 1 Introduction

The concept of an economic surplus is something that Marxian and Sraffian economics share in common. Both theories recognize the importance of an economic surplus that is produced and subsequently utilized for various purposes, but they each define this surplus in very different ways. The surplus of Sraffian theory is the net product of the economy as defined in conventional national accounts. The surplus in Marxian theory is defined through its class theory.

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From the Marxist perspective the surplus created by production provides the resources that support the array of nonproduction activities associated with the capitalist enterprise as well as for many activities and individuals that may be quite distant. Shareholders of a corporation, for example, receive an income derived from the surplus created in production, but this is simply one of many potential uses. Identifying the connection between the surplus created in production and the subsequent recipients is the task of Marxian class theory, and this provides a means to understand how the surplus created in production plays a role in the reproduction of the economic system itself. This emphasis on a complex class structure that is part of the fabric of the economy is what distinguishes Marxian class theory from the Sraffian one, and it is also what distinguishes their two different theories of surplus.

These two theories of surplus are different, but they are not inherently incomparable with one another. This paper focuses on defining the Marxian surplus as it is produced and circulates in the economy as a whole. It will also be shown how this differs from the conventional net product, and thus the Sraffian surplus. The primary technique for doing this is with a social accounting matrix (SAM). The SAM makes it possible to first define the conventional national accounting aggregates and then systematically deduce the Marxian aggregates through a class analysis of these conventional accounts. A SAM is simply a way of organizing the transactions in an economy into a set of social accounting aggregates, and it has the advantage of connecting these aggregates together in a way that maintains mutual consistency among them. It can be cast at any level of detail, from complete aggregation to highly disaggregated, according to the task for which it is intended. This flexibility is especially useful for deriving the Marxian income and product aggregates from the conventional ones because neither complete aggregation nor fine-grained disaggregation are necessary or

useful in this process.

The derivation of the Marxian accounting aggregates presented here draws from two very different literatures. The first is Resnick and Wolff's theory of class and their Marxian analysis of the capitalist enterprise (1987). Their work provides a sophisticated microeconomic analysis of the flows of value within an enterprise, and a basic understanding of the flow of value between enterprises. They do some rudimentary national accounting (180-183), but focus primarily on the microeconomics of the production, appropriation, and distribution of surplus. The second important influence on this work is the previous literature on Marxian interpretations of conventional national accounts and, in particular, the work of Shaikh and Tonak (1994). Some readers may find the juxtaposition of Resnick and Wolff's work with Shaikh and Tonak's curious. But despite important differences on many points, with regard to many of the basic issues involved in this paper they have much in common.

This paper contains two primary sections. Section 2 presents a very simple SAM and uses it to show how it defines the conventional national accounting aggregates. Section 3 then systematically derives the Marxian aggregates from the conventional ones and analyzes some of the important similarities and differences. Section 4 summarizes the basic findings of the paper.

## **2 A SAM**

A SAM is simply an accounting device that registers the flows of value between different economic units. This does not, however, imply that the construction of a SAM is theoretically neutral. There is no taxonomy, classification, or observation without theory, and one of the objectives of this section is to show that the construction of a SAM, and the accounting aggregates that this generates

is always an expression of an underlying theory.

A SAM is like an input-output (IO) transactions table in that it uses single-entry accounting. The rows and columns of the matrix represent accounts for a specific sector in the economy, and every element in the SAM is a revenue when read in the row context and an expenditure in the column context. Each element in the matrix depicts a flow from one accounting unit (establishment, industry, sector, etc.) to another. But a standard IO transactions table is limited to inter-industry transactions, while a SAM includes a more comprehensive set of transactions to encompass the entire circular flow of income and product. In fact a SAM need not include inter-industry transactions at all and can instead be used to describe only transactions between different sectors (e.g. business, households, government, and the rest of the world) rather than within a sector.

## 2.1 A Very Basic SAM

Table 1 is the first SAMs published by Stone and Brown (1962)<sup>1</sup>, which depicts the national accounts for the U.K. in 1960. All of the entries in the matrix are flows per unit time (year) reckoned in money units.

INSERT TABLE 1

Each of the four rows/columns in the Stone and Brown SAM are designed to account for four different types of economic activity:

1. Production
2. Current income/expenditure
3. Capital accumulation and depreciation

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<sup>1</sup>Phillips's (1955) interpretation of Quesnay's *tableau economique* using a transactions table might also be called the first SAM.

#### 4. Transactions with the rest of the world (ROW)

Each of the cells in Table 1 present a national accounting aggregate. Reading along the first row shows that the total revenues from the sale of domestically-produced final goods and services consists of household and government consumption ( $CON_h + GOV = 20,797$ ) in cell (1,2), gross domestic fixed investment and net change in business inventory ( $I^+ = 4,694$ ) (1,3), and sales to ROW ( $EX = 5,102$ ) (1,4). Column one lists the total outlays by business in producing this output: domestic factor payments and indirect taxes net of subsidies ( $F_d + T = 23,038$ ) (2,1), depreciation of fixed assets ( $D = 2,015$ ) (3,1), and imports ( $IM = 5,540$ ) (4,1). Gross domestic product ( $GDP$ ) is easily found in the SAM as  $CON_h + I^+ + GOV + (EX - IM) = GDP$ , and net domestic product ( $NDP$ )  $GDP - D = NDP$ . Similarly, using the income measures, gross domestic ( $GDI$ ) income is  $F_d + T + D = GDI$  and net domestic income ( $NDI$ ) is  $GDI - D = NDI$ . The two fundamental national accounting identities  $GDP \equiv GDI$  and  $NDP \equiv NDI$  are definitionally true, and hence either the product or income aggregates provide equivalent measures of domestic production.

The second row and column of Table 1 describe the current income and expenditures by the two domestic final users, households and government. Current income includes both domestic factor payments and net indirect taxes ( $F_d + T = 23,038$ ) (2,1) plus net factor payments from abroad ( $F_{row} = 179$ ) (2,4). The uses of current income are described by column two: household and government consumption ( $CON_h + G = 20,797$ ) (1,2), saving ( $SAV = 2,334$ ) (3,2), and net current gifts (foreign aid, remittances, etc.) to the rest of the world ( $GIF_{row} = 86$ ) (4,2). One of the unique features of the SAM is that it imposes the same source-use consistency that is familiar from the  $GDP \equiv GDI$  or  $NDP \equiv NDI$  identities on each of the four activities considered in the SAM.

In this case consistency requires that the total current income must be consumed, saved, or gifted abroad. This says simply that the current income in the economy can be described either as income or expenditures.

The third row and column of Table 1 describe capital transactions in the economy. The inflows (sources) of revenues for the capital account consists of depreciation ( $D = 2,015$ ) (3,1), saving ( $SAV = 2,334$ ) (3,2), and net capital gifts from abroad ( $CGA = 1$ ) (3,4); the outflows (uses) are gross domestic fixed investment and net change in business inventory ( $I^+ = 4,694$ ) (1,3), and net foreign lending ( $LEN_{row} = -344$ ) (4,3). Once again, the SAM requires that the income into the account equal the expenditures.

The fourth row and column describe domestic balance of payments.<sup>2</sup> The inflows (sources) of revenue for this account consists of the imported goods ( $IM = 5,540$ ) (4,1), net current gifts to the rest of the world ( $GIF_{row} = 86$ ) (4,2), and net foreign lending ( $LEN_{row} = -344$ ) (4,3). Outflows consist of exports ( $EX = 5,102$ ) (1,4), net factor payments from abroad ( $F_a = 179$ ) (2,4), and net capital gifts from abroad ( $CGA = 1$ ) (3,4).

In the Stone and Brown SAM all of the transactions within a particular account are suppressed (i.e. the principal diagonal of the matrix contains all zeros). This assumption means that inter-industry transactions, transfers of current income among households and government, and flow-of-funds transactions are all omitted.

## 2.2 Disaggregation and Intrasectoral Flows

The SAM in Table 1 provides a useful way of integrating and ensuring consistency in economic data, but it just gives the basic outline of a SAM. To develop

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<sup>2</sup>The convention adopted by Stone and Brown shows the balance of payments from the perspective of the rest of the world.

its analytic properties the assumptions of complete aggregation and omission of all intra-account transactions need to be dropped.

Table 2 presents another simple SAM that distinguishes between businesses and households and includes inter-industry transactions. Government and the ROW are omitted here, and throughout the remainder of the paper, to simplify exposition. Excluding the ROW from the SAM reduces the types of economic activities from the four in the Stone and Brown SAM to three: production, receipt/expenditure of current income, and capital accumulation/depreciation. Table 2 is therefore not a comprehensive depiction of flows in the economy, but it is perhaps the simplest possible one that still has enough detail to be useful for the purposes of this paper.

INSERT TABLE 2

Table 2 defines the standard national accounting aggregates for this simplified economy using the conventions common to both the US National Income and Product Accounts (NIPA) (BEA, 2009) and the US Input-Output (IO) Accounts (Horowitz and Planting, 2006). Since these different accounts are designed to be mutually consistent, these are referred to in this paper as the "IO-NIPA" conventions.

Including inter-industry transactions ( $M$ ) makes it possible to define the familiar IO aggregates total product ( $TP$ ),  $GDP + M \equiv TP$ , and total outlay ( $TO$ ),  $GDI + M \equiv TO$ . These represent the sum of the first row and column of the matrix, respectively, and are equal by definition:

$$\underbrace{M + CON_h + I^+}_{TP} \equiv \underbrace{M + NOS + W + D}_{TO} \quad (1)$$

In (1) the domestic factor payments have been disaggregated into wage income ( $W$ ) and net operating surplus ( $NOS$ ), which is the IO-NIPA measure of "profit-

type income" before it is either distributed to households as interest, dividends, and rent payments (*IDR*) or retained as undistributed profits (BEA 2009, 2-9, 2-25, 2-26, 2-28).

Row and column two show the total profit income in the economy *NOS* as either distributed to households as *IDR* payments or retained by the enterprises to fund capital accumulation:

$$NOS \equiv IDR + SAV_b$$

Row and column three describe the revenues and expenditures of the households. Household income consists of *W* and *IDR* payments from business, and households use this to fund either consumption or saving:

$$W + IDR \equiv CON_h + SAV_h$$

Finally, row and column four show an identity between savings (gross of depreciation) and gross investment:

$$D + SAV_b + SAV_h \equiv I^+$$

At this level of abstraction, where all business establishments are assumed to be engaged in production, the mapping between the IO-NIPA aggregates and the Marxian aggregates for constant capital ( $C^*$ ), variable capital ( $V^*$ ), and surplus value ( $S^*$ ) is one-to-one (Shaikh and Tonak 1994, 44-45).<sup>3</sup> The IO-NIPA aggregate *TO* is equal to its Marxian analog total value ( $TV^*$ ), as are

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<sup>3</sup>Variables in the Marxian accounting system are distinguished with an asterisk. Variables that exist only in the IO-NIPA accounts, or are common to both sets of accounts, have no asterisk.



the individual components of these aggregates:

$$TO = TV^* = \underbrace{M + D}_{C^*} + \underbrace{W}_{V^*} + \underbrace{NOS}_{S^*} \quad (2)$$

$TP$  consists of production inputs ( $M + D$ ) plus net final product ( $FP$ ). Again, when all establishments are understood to be engaged in production, the Marxian total product aggregate ( $TP^*$ ) is also identical to the IO-NIPA  $TP$ , and all of the individual components are also. But an additional distinction can be made in the Marxian aggregates, which is that  $FP$  can be divided into its *necessary* and *surplus* portions. This requires that investment be treated on a net rather than a gross basis ( $I^+ - D = I$ ), and that total consumption  $CON_h$  be disaggregated into consumption out of wage income ( $CON_h^w$ ) and consumption out of profit-type income ( $CON_h^p$ ):

$$TP = TP^* = \underbrace{M + D}_{\text{inputs}} + \underbrace{CON_h^w}_{\text{necessary}} + \underbrace{CON_h^p + I}_{\text{surplus}} \quad (3)$$

Since  $TO = TV^*$  and  $TP = TP^*$ , then the fundamental accounting identity (1) also holds for the Marxian aggregates,

$$\underbrace{M + D}_{C^*} + \underbrace{W}_{V^*} + \underbrace{NOS}_{S^*} \equiv \underbrace{M + D}_{\text{inputs}} + \underbrace{CON_h^w}_{\text{necessary}} + \underbrace{CON_h^p + I}_{\text{surplus}} \quad (4)$$

It is worth noting that in the IO-NIPA conventions assumed in Table 2 businesses are categorically excluded from consuming any portion of the final income/product. By assumption all expenditures on goods and services by enterprises, including interest and dividend payments between enterprises but exclusive of labor services from households, are treated as intermediate inputs and counted among  $M$ . Furthermore, all of the payments to employees of the enterprise are excluded from  $NOS$ . These two assumptions express a more

basic premise that underlies the IO-NIPA national accounting conventions: *all* the activities of business are production. This perspective excludes a possibility, which was commonly-accepted in classical political economy and by Marx, that some of the activities of business, and hence the establishments and employees that carry them out, are final uses that consume resources without creating new goods or services. These are the nonproduction activities of business.

Marx, like Ricardo, Smith and others in the classical tradition, used the term "unproductive" to refer to economic activities like this, and they considered them forms of social consumption rather than production. This difference is what distinguishes the Marxian aggregates from the conventional counterparts, and once one introduces this distinction the symmetry between the Marxian and the IO-NIPA aggregates disappears. Marx analyzed some unproductive activities in detail and concluded that these nonproduction activities consume portions of the economic surplus. These nonproduction activities are connected to production by virtue of their reliance on the surplus produced there, and making this connection visible is the central issue involved in the Marxian theory of classes. Marxian social accounting is one way of identifying these connections.

### **3 A Marxian SAM**

This section presents a SAM that embodies the Marxist conception of the economy and its class structure. In a market economy the surplus exists both as a physical quantity of output and as a quantity of value. Marx, writing to Engels in 1867, concluded that one of the "best points" of *Capital* is ". . . the treatment of *surplus-value regardless of its particular* forms as profit, interest, ground rent, etc. (Marx 1987)." His advance over classical political economy, he argues, is that the classical writers failed to consistently identify these various

forms of income as parts of the surplus, and hence lacked a clear understanding of what the surplus is and its role in the economy. The SAM provides a useful way to both identify surplus value in the economy and make clear its connections to the other commodity and value flows that make up the process of economic reproduction.

### **3.1 Previous Literature on Marxian Interpretation of National Accounts**

There is a long tradition of using conventional national accounts to derive estimates of the Marxian accounting aggregates. Shaikh and Tonak (1994, ch. 6) provide a comprehensive survey of this literature, here I simply discuss several works that are especially germane to this paper.

The connection between Marxian value categories and conventional accounting is first developed by Marx in *Capital*. Marx demonstrate a sensitivity to the issues that arise when interpreting conventional accounting statements cast in price terms from the perspective of a labor theory of value (1976a, 220), but he routinely develops his value quantities in units of money, and frequently interprets conventional business accounting statements in terms of his value categories. Likewise Engels referred to the economic data then published by the U.S. census as a source for estimating Marxian value categories empirically (Marx 1976c, 76).

Data about manufactures in the U.S. have been collected in some form since at least 1810, and Varga (1928, 1935) used this data to produce some of the earliest estimates of Marxian value aggregates in the US economy. His methodology has been influential. It provides a basis for number of subsequent studies and is still used today. Gillman (1958) used a variant of it to produce estimates of the Marxian aggregates for the U.S. for the period 1849 - 1952. He worked

directly from the price data reported by federal agencies, but also introduced a distinction between productive and unproductive activities not found in Varga's work.

A significant development in the evolution of the use of U.S. national accounts to estimate Marxian value aggregates was Wolff's (1975) use of disaggregated IO data, which allows for a much more detailed analysis than is possible when working from economy-wide aggregates. Wolff uses a methodology developed by Okishio (1959), which estimates the Marxian aggregates using labor values rather than prices, and this requires industry-level rather than aggregate data. In later work Wolff (1987, ch. 3) also introduces a relatively complete taxonomy of productive and unproductive activities in the economy, and the focus of his work changed from estimating labor values to analyzing the impact of unproductive activity on economic performance.

Wolff's decision to use labor values rather than prices was not adopted by later writers. Weisskopf (1979) takes the position that Marx's concepts refer most rigorously to labor values rather than prices, but he also concludes that prices are reliable estimates of the labor values, and then develops his estimates of the Marxian aggregates from price data. Like Wolff's earliest work, Weisskopf does not distinguish between productive and unproductive labor.

By the mid 1980s several people were producing estimates of the Marxian aggregates from conventional accounts. Moseley (1986) identified two important theoretical issues that define the different perspectives of between people working in this field: (i) whether the Marxian aggregates need to be estimated in money or in labor units, and (ii) whether or not there should be a distinction between productive and unproductive labor.

Like Weisskopf, Moseley (1991, section 2.1) takes the position that the Marxian aggregates should be estimated in price terms rather than labor values, but

he does not accept that these are simply proxies for labor values. Instead, taking inspiration from Foley (1982) he argues that Marx defines his value categories in terms of abstract labor time rather than concrete labor times, and that money is the measure of abstract labor time. Hence Marx's value categories refer directly to quantities of money rather than direct labor times, and these money measures are the entries in the income statements and balance sheets of capitalist firms and national accounts.<sup>4</sup> Moseley, like Gillman and Wolff's later work also argues that the concepts of productive and unproductive activities are integral to Marx's value categories, and hence that these must be integrated in any estimate of the Marxian aggregates.

The methodology for estimating the Marxian aggregates from conventional accounts reaches its highest level of sophistication in the work of Shaikh and Tonak (1994). Like Wolff and Weisskopf they take the position that Marx's value categories refer to quantities of embodied labor, but they also find that empirically prices serve as reasonable proxies for labor values, so it is not necessary to transform the price data reported in conventional accounts into labor times. They recognize the deviation of prices from labor values as a theoretical problem, but since empirically these deviations are found to be small (84, 141-44) it is not necessary to transform the price data to labor values in order to estimate the Marxian aggregates. Also, like Gillman, Moseley, and Wolff's later work they distinguish between productive and unproductive labor. In fact, they argue that since the price-value deviations are small, it is precisely this distinction that sets the Marxian aggregates apart from their conventional analogs.

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<sup>4</sup>Mohun (2004) provides a highly useful analysis of the issues involved with this point.

### 3.2 Production and Nonproduction Activities

The most basic distinction in national income accounting is to establish whether a type of economic activity is an act of production, consumption, accumulation, or a transaction with the ROW (Stone and Stone 1962, ch. 2). As shown in Tables 1 and 2, these four activities serve to define all of the basic conventional national accounting aggregates as well as several secondary flows.

Marxian social accounting shares with conventional social accounting the idea that value is created only in production (Marx 1976a, ch. VII, section II), but it draws the production boundary more narrowly than do the conventional accounts. In conventional national accounting almost any activity that receives remuneration is considered production.<sup>5</sup> So, for example, the retail and financial sectors, whose primary activities are trading claims to existing commodities or financial intermediation, are treated symmetrically with manufacturing and service enterprises, which produce goods and services. All of these things are characterized as different forms of production in the conventional accounts, and hence establishments in any of these sectors would enter into the SAM in Table 2 as simply different parts of national business activity.

The Marxian approach is different, and understanding how it is different is perhaps the most fundamental aspect of defining the economic surplus in the Marxian accounts. The basic point is that, unlike the conventional accounts, not all types business activity that receive remuneration are considered production in the Marxian approach, and not all employees that are remunerated add value. Instead, some payments to businesses and employees are shares of the value created in production, which are subsequently distributed to them.

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<sup>5</sup>The exception to this rule is a transfer payment, which is defined as a payment that receives nothing in exchange, i.e. *no quid pro quo*. Both businesses and households can receive transfer payments, but not as compensation for a good or service. Examples include social welfare payments and insurance claims. These are excluded from production in the national accounts.

Marx divides the value added in production into two parts, variable capital and surplus value. Variable capital is relatively straightforward: it is the compensation of production workers. But surplus value plays a much more complicated role in the economy. In Marxian economic theory the surplus accrues initially to the industrial capitalist, and it is subsequently distributed in various forms to others who do not produce, but rather perform nonproduction activities that support the production activities, or, more broadly, provide the conditions of existence for the capitalist.

Marx is reasonably clear in the presentation of this class theory, but he develops it progressively across all three volumes of *Capital*, and hence this class-analytic vision of the economy is often overlooked by readers who focus instead on one or another of the many individual topics in these books—the forest is often overlooked because of the trees, one might say. He notes in volume one, for example,

The capitalist who produces surplus-value — i.e., who extracts unpaid labour directly from the labourers, and fixes it in commodities, is, indeed, the first appropriator, but by no means the ultimate owner, of this surplus-value. He has to share it with capitalists, with landowners, &c., who fulfil other functions in the complex of social production. Surplus-value, therefore, splits up into various parts. Its fragments fall to various categories of persons, and take various forms, independent the one of the other, such as profit, interest, merchants' profit, rent, &c. It is only in Book III. that we can take in hand these modified forms of surplus-value. (Marx 1976a, 564)

This production-appropriation-distribution process is the first stage that surplus value passes through as it circulates from its initial creation in production to its final disposition in consumption or accumulation. The task of Marxian

social accounting is to clearly distinguish the various forms the surplus takes as it passes through the entire process from creation to final disposition. In so doing Marxian social accounting identifies the various forms that surplus value takes, and is a tool for analyzing the roles that the surplus plays in a class structure and in the process of social reproduction.

The distinction between "productive" and "unproductive" labor in Marxian economics distinguishes sources of value from the subsequent distributions. Marx's definition of productive labor involves two criteria. The first is whether the concrete tasks that a laborer performs is production, and the second is whether production is carried out in the service of capital:

That labourer alone is productive, who produces surplus-value for the capitalist, and thus works for the self-expansion of capital. . . . Hence the notion of a productive labourer implies not merely a relation between work and useful effect, between labourer and product of labour, but also a specific, social relation of production, a relation that has sprung up historically and stamps the labourer as the direct means of creating surplus-value. (1976a, 509)

Similarly, Shaikh and Tonak (1994, 30) adopt a two-fold definition and give these two criteria for defining productive labor: (a) it is labor which is first exchanged against capital (i.e. it is capitalistically employed); (b) it is labor which creates or transforms use values (i.e. it is production labor). Resnick and Wolff also define productive labor as "when the direct laborer produces surplus value for a capitalist employer (1987, 133)". According to these definitions unproductive labor can be either nonproduction labor or production not undertaken under capitalist social relations (e.g. production for use rather than sale, etc.).

In order to simplify the analysis in this paper I assume a purely capitalist economy. Therefore the question of distinguishing productive from unproduc-



tive labor reduces to simply whether or not it is labor engaged in production or nonproduction activity.

There are many things that are classified in conventional accounts as forms of production that are nonproduction from the Marxist perspective. Moseley (1988) broadly categorizes nonproduction labor in a capitalist economy as either circulation or supervisory labor. At a very general level we can say that circulation labor is associated with trading and financial activities, while supervisory labor is required for the management of capitalist enterprises, as well as the supervision and disciplining of workers.<sup>6</sup> Nonproduction activity may occur alongside production processes within an enterprise, or, as with trading or financial firms, nonproduction activities may be the enterprise's sole activity. Marx recognized this possibility, and indeed goes to some lengths to explain that if an industrial capitalist chooses to contract for a nonproduction activity rather than performing it himself, this does not change it into production activity (1976b, 131). In other words, nonproduction activity does not become production simply because it becomes the exclusive occupation of, say, a merchant enterprise rather than an incidental occupation of an industrial (productive) capitalist enterprise. This is what makes it possible for there to be capitalist enterprises that do not engage in production at all. These firms employ workers, earn profits, and behave in ways that are entirely similar to productive capitalist enterprises, but they do not engage in production. Understanding how this can occur is best done by looking at specific industries in the context of developing the Marxian aggregates from the IO-NIPA accounts.

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<sup>6</sup>This is by no means an extensive description of these categories, which would require a book-length treatment. Indeed a large part of the literature on estimating the Marxian aggregates from published accounts is taken up with just this issue.

### 3.3 Nonproduction Activities and the Marxian Aggregates

Distinguishing production from nonproduction activities within the SAM makes it possible to derive the Marxian aggregates as distinct from the conventional aggregates discussed in section two. In the following sections three different types of nonproduction activity are introduced: trading activities (wholesale and retail trade), finance, and management and supervision. This requires that the single aggregate national business accounts shown in Table 2 be further disaggregated.

This disaggregation generally follows the conventions of the U.S. IO accounts with some notable exceptions. First, the disaggregation assumed here is simply into three sectors—production, trade, and finance. While not comprehensive it is sufficient to illustrate the basic similarities and differences between the Marxian and conventional aggregates. Second, since the late 1960s the U.S. BEA publishes rectangular "Make" and "Use" tables rather than the more analytically useful symmetric inter-industry tables. But these Make and Use tables can readily be converted into an inter-industry table, and the following discussion assumes that the primary IO table is an inter-industry table.

#### 3.3.1 Trading activities

Trading activities, the buying and selling of commodities or "merchanting", are considered circulation activity in Marxian theory, not production. They consume labor and nonlabor inputs, but produce neither new commodities or value. Marx refers to these activities as among of the "*faux frais*" (false costs) of capitalist production (1976b 131).

This cost is paid by the distribution of surplus value either within an enterprise, if the enterprise handles the merchanting of its output itself, or a distribution from one capitalist enterprise to another if merchanting becomes the

primary occupation of separate enterprise (Marx 1976b, 126-135; 1976c, chs. 16-17; Resnick and Wolff 1987, 125-127). Since merchanting may be the primary occupation of a particular type of capitalist enterprise, Marx introduces two different terms to distinguish different types of capitalist enterprises. He refers to "industrial capitalists", who use their capital for production, and "merchant capitalists", who use their capital simply to buy and sell produced commodities. Both of these types of firms are capitalist in that they seek to expand their capital through their activities, but they are distinguished by whether their primary activity is production or trading.

Since merchants do not produce, the value they realize in trade must circulate to them from production. This typically occurs through an unequal exchange between a producing establishment and a trading firm. The industrial capitalist sells the commodity to the merchant capitalist below its value, and in so doing allows the merchant to realize a portion of the surplus value created in the production process (Shaikh and Tonak 1994, 45 - 51; Resnick and Wolff 1987, 127; Marx 1967b, ch. 6; Marx 1967c, ch's 16-17). This is the familiar difference between the 'wholesale' and the 'retail' price of a commodity, though it should be noted there may be several sales and purchases between the producer and the final consumer. For example, a producer may sell to a wholesale trader at one price (the producer's price) which realizes a portion of the value of the commodity for the producer; the wholesale trader sells to a retail trader at an even higher price and thereby realizes another portion of the total value of the commodity; and finally the retailer sells the commodity to a consumer for still another higher price, and thus realizes another portion of the value of the commodity. In this series of transactions the value of the produced commodity is shared-out among both the producing and the trading sectors. This series of transactions between the producing and the trading sector, and between the

wholesale and retail sector, is the method through which this distribution of surplus value occurs. This distribution of surplus value from the production sector to the trading sectors is what makes it possible for *merchant capital* to exist as something distinct from *industrial capital*.

In IO-NIPA conventions the price paid by the final consumer of a commodity sold in the market (the purchaser's price) is decomposed into four parts, the producer's price, the transportation costs, and the trade margins (wholesale and retail). The IO-NIPA accounts then show these components of the value of a commodity as four separate purchases by the user of the commodity: one from the industry that produced the commodity, one from the transport sector, one each from the wholesale and retail trade sectors (Streitwieser 2009, 42). This is known as "unbundling" and "forward shifting" the various components of market value of the commodity as it is realized by the different sectors (Horowitz and Planting 2006, 5-4). Since the trading industries are treated just like any other industry in IO-NIPA conventions, the producer's price, the transport cost, and the trade margins are all treated symmetrically and hence all register as measures of production. The producer's price measures the contribution of the producing sector; the transport costs measures the contribution of the transport sector; and the trade margins represents the contribution of the wholesale and retail trade sectors.

From the Marxist perspective counting the trade margin as a measure of production is incorrect and should be corrected. To do this the wholesale and retail trade sectors can be grouped together into one combined Trade sector and all production industries into one Production sector. In the IO-NIPA conventions this Trade sector produces a product that it sells to the Production sector as an intermediate input  $M_{tp}$ , to the Trade sector itself as an intermediate input  $M_{tt}$ , to households as a final consumption good  $CON_{th}$ , and to businesses

as a final investment good  $I_t^+$ . The sum of these sales is the total product of the Trade sector  $TP_t$ .

$$TP_t \equiv M_{tp} + M_{tt} + CON_{th} + I_t^+$$

To produce this product the Trade sector is understood to purchase intermediate inputs from the Production sector  $M_{pt}$  and from itself  $M_{tt}$  (the trade mark-up on  $M_{pt}$ ), labor power from households  $W_t$ , and incur depreciation of fixed capital  $D_t$ . The profit-type income of this sector is its net operating surplus  $NOS_t$ . The sum of these outlays is the income measure of the total product of this sector, the total output  $TO_t$  of the Trade sector:

$$TO_t \equiv M_{pt} + M_{tt} + D_t + W_t + NOS_t$$

The Marxian accounting for this set of transactions is significantly different. The producer's price and transport cost do measure the value of production activity. The trade margins, on the other hand, represent the distribution of surplus value from the Production sector to the Trade sectors as described above.

Since trading activities involve no production the Trade sector produces no output<sup>7</sup>, so  $TO_t$  and  $TP_t$  simply record the portion of the income and product created in the Production sector that passes to the Trade sector through unequal exchange and is realized by that sector. The "unbundling" done in the IO-NIPA accounts, which splits the purchaser's price of a commodity into the various components falling to the different sectors, make it possible to identify

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<sup>7</sup>Even in the IO-NIPA conventions the trade sectors are defined as simply buying and reselling merchandise without providing any additional fabrication (Horowitz and Planting, 2006, 5-4). Despite this the trade margin is interpreted as a measure of "production".

the portion of surplus value that passes from Production to Trade sectors.

Therefore, in an economy with only Production and Trade sectors the IO-NIPA product measure  $TP$  and the Marxian analog  $TP^*$  are equal, but  $TP^*$  is understood to be entirely output of the Production sector, even if some portion of it is realized by the Trade sector. For this reason Shaikh and Tonak (1994, 39) refer to Production and Trade as the "primary" sectors. It is through their combined operation that the product of the economy is produced and realized.

Since trading activities are not production they have no production inputs; instead the Trade sector's commodity purchases,  $M_{pt}$  and  $M_{tt}$ , represent the consumption of final goods and services by the trading activities. This creates a new category of final consumption in the Marxian aggregates that does not exist in the IO-NIPA aggregates: consumption by business ( $CON_b^*$ ).

Shifting  $M_{pt}$  and  $M_{tt}$  from  $M$  to  $CON_b^*$  is the first discrete operation performed on the IO-NIPA aggregates in order to derive the Marxian aggregates. In order to clearly identify this and subsequent operations performed to derive the Marxian aggregates they are listed individually. Together these operations represent the algorithm for deriving the Marxian aggregates from the IO-NIPA accounts in this simplified three sector economy.

**T.1** Trade sector purchases from the Production sector  $M_{pt}$ , and the trade mark-up on these purchases  $M_{tt}$ , are classified as Current consumption of business  $CON_b^*$ .

Distinguishing trading activities from production activities requires a similar change to the outlay (value) side of the accounts. In the IO-NIPA accounts the Trade sector purchases labor and nonlabor inputs  $W_t$ , and  $M_{pt} + M_{tt}$ , incurs depreciation of fixed capital  $D_t$ , and has a net operating surplus  $NOS_t$ . The sum of these items constitutes the total output of the trade sector  $TO_t$ . Since

in the Marxian accounts the revenues of the Trade sector simply realize the portion of the surplus value distributed to them from the Production sector through unequal exchange,  $TO_t$  is classified as part of aggregates surplus value.

**T.2** All of the components of the total output of the trading sector ( $TO_t = M_{pt} + M_{tt} + NOS_t + W_t + D_t$ ) are classified as parts of aggregate surplus value.

**Remark 1** *Operations T.1 and T.2 leave the equalities  $TO = TV^*$  and  $TP = TP^*$  intact, but increase the Marxian measures of gross value added ( $GVA^*$ ) and gross final product ( $GFP^*$ ) relative to the IO-NIPA analogs ( $GVA^* > GVA$  and  $GFP^* > GFP$ ).*

**Proof.** Remark one follows immediately from the descriptions of T.1 and T.2. T.1 annexes Trade sector purchases  $M_{pt} + M_{tt}$  from  $M$  to  $CON_b^*$ , which is a type of final consumption. Marxian gross final product is therefore  $GFP^* = CON_b^* + CON_h + I^+$ , which is strictly greater than the IO-NIPA  $GFP = CON_h + I^+$ . T.2 shifts  $M_{pt} + M_{tt}$  from intermediate use  $M$  to the  $S^*$  portion of value added. The Marxian measure of gross value added  $GVA^* = S^* + V^* + D$  is thus strictly greater than the IO-NIPA  $GVA = NOS + W + D$ . Therefore operations T.1 and T.2 increase  $GFP^*$  and  $GVA^*$  relative to  $GFP$  and  $GVA$ , and reduce  $M$  by an equivalent amount, but leave the  $TV^* = TV$  and  $TP^* = TP$  unchanged. ■

### 3.3.2 Finance

The Finance sector consists of financial establishments that receive deposits and make loans.<sup>8</sup> Their primary income source is the interest rate spread between

<sup>8</sup>The benchmark U.S. Input-Output accounts group Finance, Insurance, Real Estate, Rental and Leasing together into one sector. This paper considers only financial estab-

deposits and loans.

As with the Trade sector, the Finance sector is treated just like any other in the IO-NIPA accounts. It is understood to produce a product-financial intermediation—that it sells to other sectors and to households. Interest payments from the Production and Trade sectors to the Finance sector are treated as purchases of intermediate inputs by these sectors ( $M_{fp}$  and  $M_{ft}$  respectively), and interest payments from households to the Finance sector  $CON_{h,f}$  are treated as the purchase of a final commodity. Finance sector purchases from the Production sector  $M_{pf}$ , and the Trade mark-up on these purchases  $M_{tf}$ , are treated as the intermediate inputs of the Financial sector. The gross "value added" of this sector ( $GVA_f$ ) consists of compensation paid to employees ( $W_f$ ), net operating surplus ( $NOS_f$ ), and depreciation ( $D_f$ ).

Again, from the Marxian perspective this sector and its place in the aggregates is quite different. Financial enterprises do not engage in production, and they produce neither value nor product. Shaikh and Tonak characterize the Finance sector as a "secondary" sector along with real estate, government and several others, and characterize them as,

. . . defined by the fact that they derive their revenues from the recirculation of the money flows generated by the primary sectors (Production and Trade), or from the circulation of socially validated claims upon portions of these primary flows, or both. (1994, 52)

Shaikh and Tonak refer to the interest paid by the Production and Trade sectors to Finance as a "business royalty payment". Royalty payments are understood to be paid out of value added, and adopting this nomenclature in the Marxian accounts signals that this is a distribution of the surplus realized by financial institutions, specifically bank or bank-like institutions that take deposits and lend money at interest. This corresponds with industry 52A0 "Monetary authorities, credit intermediation and related activities" in the summary IO table. The analysis here can, however, be generalized for other similar industries.



by the primary sectors. Similarly Resnick and Wolff (1987, 219-226) characterize interest payments from productive capitalist enterprises to financiers as a distribution of the surplus value created in production and subsequently distributed to this sector in order to gain access to capital. Interest payments and fees from households, on the other hand, are interpreted as expenditures of household revenue. These exchanges between Finance and the nonfinancial sectors, or between Finance and households takes place outside of the production sphere of the economy, and hence outside of the Production account in the SAM. These transactions are simply the circulation of current income, and register entirely in the Current account of the SAM.

The key point of this analysis for the Marxian aggregates is that the Finance sector produces no product and adds no value. Instead, the interest payments  $M_{fp}$  and  $M_{ft}$  are portions of the surplus realized by the Production or Trade sectors, and distributed as business royalty payments to the Finance sector. To derive the Marxian aggregates these payments must be reclassified both as an outlay of the primary sectors and as an income of the Finance sector.  $M_{ff}$ , interest payments which circulate revenue within the Finance sector, must likewise be shifted out of  $M$ .

**F.1** Intermediate inputs are reduced by  $M_{fp}$ ,  $M_{ft}$ , and  $M_{ff}$ . These transactions are reclassified in the Marxian aggregates as business royalty payments  $RY_b^*$  and surplus value  $S$  is increased by  $M_{fp} + M_{ft}$ .

Also, since the Finance sector does not engage in production, its purchases of goods and services from the primary sectors ( $M_{pf}$  and  $M_{tf}$ ) are a part of final demand in the Marxian aggregates rather than an intermediate input. These purchases are a part of  $CON_b^*$  rather than intermediate transactions, and this reduces intermediate output and increases final output by an equivalent amount.

**F.2** Purchases by the Finance sector from Production and Trade  $M_{pf}$  and  $M_{tf}$  are shifted from  $M$  to  $CON_b^*$ .

The transactions between the Finance sector and households must similarly be modified in the Marxian aggregates. Interest payments from households to the Finance sector  $CON_{fh}$  are classified as royalty payments from the household  $RY_h^*$  to the Finance sector in the Marxian accounts. This reduces final consumption but increases the current income of business by an equivalent amount.

**F.3** Household consumption is reduced by the amount  $CON_{fh}$  and household royalty payments  $RY_h^* = CON_{fh}$  are added at the intersection of the Current row of Business and the Current column of the Household division.

Finally, the IO-NIPA gross value added for the Finance sector ( $W_f + NOS_f + D_f = GVA_f$ ) must be deducted from the Marxian measure of gross value added. This is because the Finance sector does not engage in production and hence it adds no value. These outgoings from the Finance sector do not disappear from the aggregates entirely, but rather are treated only when they are paid-out as Current expenditures by this sector. In the Marxian accounts the Finance sector has revenues  $RY_b^* + RY_h^* \equiv M_{fp} + M_{ft} + CON_{fh}$  and expenditures  $W_f + IDR_f + SAV_f + D_f \equiv W_f + NOS_f + D_f$ . But what is treated as production revenues and outlays in the IO-NIPA accounts is simply secondary circulations of value in the Marxian accounts and must be treated accordingly.

**F.4** Gross value added is reduced by the amount  $GVA_f \equiv D_f + NOS_f + W_f$ .

**Remark 2** Operations F.3 and F.4 eliminate the equality between  $TV^*$  and  $TO$  and the equality between  $TP^*$  and  $TP$ .

These conclusions follow immediately from the description of the operations, which provide adequate proof of this Remark. F.3 reduces the size of the Marxian product measure  $TP^*$  relative to  $TP$  by the amount  $CON_{fh} \equiv RY_h$ , and F.4 and reduces the Marxian income measure  $TV^*$  relative to  $TO$  by the amount  $GVA_f$ . Since none of the other operations offset these changes, then  $TP^* \neq TP$  and  $TV^* \neq TO$  when secondary sectors, and their associated secondary flows, are included in the economy.

**Remark 3** *The net effect of operations F.1 - F.4 on GVA and GFP may be greater than, less than or equal to zero, but the size of these effects will be the same on both, and therefore these operations maintain the identity  $GVA^* \equiv GFP^*$  in the Marxian aggregates.*

**Proof.** The following outlay/income identity must hold for the Finance sector:

$$M_{pf} + M_{tf} + M_{ff} + GVA_f \equiv M_{fp} + M_{ft} + M_{ff} + CON_{fh} \quad (5)$$

The right-hand side of (5) is the IO-NIPA definition of the total product of Finance sector  $TP_f$ , the left-hand side is the IO-NIPA definition of total outlays of the Finance sector  $TO_f$ . Simple manipulation of (5) yields,

$$M_{fp} + M_{ft} - GVA_f = M_{pf} + M_{tf} - CON_{hf} \quad (6)$$

Operation F.1 increases  $GVA^*$  relative to  $GVA$  by  $M_{fp} + M_{ft}$  and F.4 reduces it by  $GVA_f$ . F.2 increases  $GFP^*$  relative to  $GFP$  by  $M_{pf} + M_{tf}$  and F.3 reduces it by  $CON_{hf}$ . According to (6) these net changes will always be equal to one another, and therefore operations F.1 - F.4 maintain the identity  $GVA^* \equiv GFP^*$  in the Marxian aggregates. ■

**Remark 4** *Operations F.1 - F.4 do not affect the total income or outlay from the Finance sector, they simply re-classify these transactions.*

**Proof.** According to F.1 - F.3 the revenues of the Finance sector,  $M_{fp}$ ,  $M_{ft}$ ,  $M_{ff}$  and  $CON_{hf}$  are classified as  $R Y_b^*$  and  $R Y_h^*$ , and the outlays  $M_{pf}$ ,  $M_{tf}$ ,  $M_{ff}$  register as portions of  $CON_b^*$  and  $R Y_b^*$ . According to F.4 (and the associated discussion) all of the outlays associated with  $GVA_f$  continue to appear in SAM, though only as parts of the current expenditure of business rather than flows associated with production. ■

The effect of the operations on the Finance sector is to show its revenues and outlays as secondary circulations of current income entirely within the Current account of the SAM. This sector receives business royalty payments from businesses and households, and uses this revenue to consume final commodities, compensate employees, make interest, dividend and rent payments, etc. It does all of this without engaging in production. This illustrates the case of a nonproduction capitalists business sector.

### 3.3.3 Management and Supervision

The third type of nonproduction activity considered here is the management of enterprises, including the supervision of labor, within the Production establishments. No such production/nonproduction distinction was necessary or possible within the Trade or Finance sectors because, as nonproduction sectors, *all* of the labor performed there is nonproduction labor. But the Production sector is different. Only some of the employees in this sector engage in production, while others engage in associated nonproduction activities such as corporate management and the supervision and disciplining of production workers.

Resnick and Wolff (1987, 174-176) present a concise Marxian analysis of the class position of managers and supervisors within the firm. They note that since they engage in nonproduction activities rather than production their compensation consists of shares of the surplus value produced by the productive laborers in that enterprise. Similarly Shaikh and Tonak (1994, appendix F) classify nonproduction workers as unproductive laborers whose compensation is paid out of the surplus value of the firm.

There are quite a few theoretical issues that arise when trying to estimate the size of managerial and supervisory labor from published accounts. Wolff (1987), Moseley (1991), and Shaikh and Tonak (1994) take slightly different approaches to this, but all ultimately rely on the occupational distinctions made in the Bureau of Labor Statistics Standard Occupational Classification (SOC) system. Since the SOC distinguishes management and supervisory occupations from production occupations ("persons engaged in production") it is possible to use them to estimate the Marxian equivalent of production and nonproduction employees, as well as to estimate the compensation of these employees.<sup>9</sup>

Using this approach the total wage and salary income in the SAM can be divided into the portion paid to production workers in the Production sector ( $(W_p)^p$ ) and the portion paid to nonproduction workers in that sector ( $(W_p)^u$ ). The key idea here for the purposes of the Marxian aggregates is that  $(W_p)^p$  is constant capital, while  $(W_p)^u$  is paid out of surplus value. In order to identify the surplus in the Marxian aggregates  $(W_p)^u$  must be deducted from the labor cost portion of production inputs  $W_p$  and added to the surplus.

**M.1**  $W_p$  is split into  $(W_p)^p$  and  $(W_p)^u$ , and  $(W_p)^u$  is annexed to  $S^*$ .

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<sup>9</sup>Mohun (2005) provides a detailed discussion of this methodology.

**Remark 5** *M.1 shifts a portion of  $GVA^*$  from  $V^*$  to  $S^*$ . This does not change  $TV^*$  or  $TP^*$ , affect the relation between  $TV^*$  and  $TV$ ,  $TP^*$  and  $TP$ ,  $GVA^*$  and  $GVA$ , or  $GFP^*$  and  $GFP$ .*

**Remark 6** *Total household income remains unchanged, but  $(W_p)^u$  now registers in the aggregates as a distribution of surplus from the Production sector rather than as cost of production.*

### 3.3.4 Summary Accounting

The SAM in Table 3 shows a Marxian SAM for this three-sector economy. It is derived by applying the discrete operations specified above to the basic IO-NIPA SAM in Table 2. Several important conclusions about the Marxian aggregates and their relation to the conventional equivalents can be deduced from this.

INSERT TABLE 3

**Remark 7** *The Marxian aggregates maintain the necessary identity  $TP^* \equiv TV^*$ .*

**Proof.** Remark 1 establishes that T.1 and T.2 preserve the identity  $TP^* \equiv TV^*$ , and remark five notes that M.1 has no effect on either  $TP^*$  and  $TV^*$ . Therefore, it only remains to be proven that F.1 - F.4 preserve the identity  $TP^* \equiv TV^*$ . To prove this observe that  $TV^* \equiv GVA^* + M^*$  and  $TP^* \equiv GFP^* + M^*$ . Since Remark 3 proves that F.1 - F.4 maintain the identity between  $GVA^* \equiv GFP^*$ , then the identity  $TP^* \equiv TV^*$  is also maintained in the Marxian aggregates. ■

**Remark 8** *The Marxian measures  $TP^*$  and  $TV^*$  are strictly less than their IO-NIPA analogs  $TP$  and  $TO$ .*

**Proof.** This property of the Marxian aggregates can easily be shown from Table 3.  $TP^*$  is defined in the first row of Table 3:

$$TP^* \equiv M_{pp} + M_{tp} + M_{pt} + M_{tt} + CON_{hp} + CON_{ht} + I_p^+ + I_t^+$$

This defines  $TP^*$  as the sum of the IO-NIPA measures of the gross product of production sector  $TP_p$  and the trade mark-up on that product  $TP_t$ . This is strictly less than the economy-wide  $TP$  for this model economy, which has Production, Trade and Finance sectors:

$$TP^* \equiv TP_p + TP_t < TP_p + TP_t + TP_f \equiv TP \quad (7)$$

$TV^*$ , which is also decomposable into the Marxian value categories for constant capital  $C^*$ , variable capital  $V^*$ , and surplus value  $S^*$ , is defined by the production column of Table 3:

$$TV^* \equiv \underbrace{M_{pp} + M_{tp} + D_p}_{C^* = C_m^* + C_d^*} + \underbrace{(W_p)^p}_{V^*} + \underbrace{NOS_p + TO_t + M_{fp} + (W_p)^u}_{S^*}$$

This defines  $TV^*$  as the sum of the IO-NIPA measures  $TO_p$  and  $TO_t$ . This is strictly less than the economy-wide  $TO$  for this model economy, which has Production, Trade and Finance sectors:

$$TV^* \equiv TO_p + TO_t < TO_p + TO_t + TO_f \equiv TO \quad (8)$$

Therefore, according to (7)  $TP^* < TP$  and (8)  $TV^* < TO$ . ■

**Remark 9** *The Marxian economy-wide measures  $GVA^*$  and  $GFP^*$  may be greater than, less than or equal to the IO-NIPA measures  $GVA$  and  $GFP$ .*

Remark 9 is a corollary of Remarks 1, 3 and 5. Each of these deals with the effect that the operations used to derive the Marxian aggregates from the IO-NIPA ones has on gross value added and gross final product. Remark 1 proves that T.1 and T.2 result in  $GVA^* > GVA$  and  $GFP^* > GFP$ , and Remark 5 notes that M.1 has no effect on the size of  $GVA^*$  or  $GFP^*$  relative to  $GVA$  and  $GFP$ . But Remark 3 proves that the effect of F.1 - F.4 on the size of  $GVA^*$  and  $GFP^*$  relative to  $GVA$  and  $GFP$  is ambiguous. Since the effect of F.1 - F.4 may reinforce or counteract that associated with T.1 and T.2, the cumulative effect of these operations on  $GVA^*$  and  $GFP^*$  relative to  $GVA$  and  $GFP$  is likewise ambiguous.

**Remark 10** *The Marxian measure of surplus value  $S^*$  may be greater than, less than or equal to the IO-NIPA measure  $NOS$ .*

**Proof.** According to the IO-NIPA conventions  $NOS$ , the conventional measure of profit-type income, is the sole current income of business. This income is exhausted by the current expenditures of this sector:

$$NOS \equiv IDR + SAV_b \quad (9)$$

In contrast, the current income of business in the Marxian accounts is  $S^* + RY_b^* + RY_h^*$ , and this is used to satisfy several different end uses:

$$S^* + RY_b^* + RY_h^* \equiv CON_b^* + RY_b^* + IDR + WU^* + SAV_b \quad (10)$$



Solving (10) for  $S^*$  and then equating this with the IO-NIPA definition of current expenditures (the right-hand side of 9) gives:

$$CON_b + IDR + WU^* + SAV_b - RY_h = IDR + SAV_b$$

This is solved for the necessary condition for the equality  $S^* = NOS^*$ :

$$RY_h^* = CON_b^* + WU^* \quad (11)$$

But  $RY_h^*$  and  $CON_b^* + WU^*$  have no necessary relation to one another.  $CON_b^*$  and  $WU^*$  are competing demands for surplus value, and hence may be expected to be inversely related, but  $RY_h^*$  is a type of expenditure of household revenue and will vary independently of  $CON_b^*$  and  $WU^*$ . Condition (11) will be satisfied only by coincidence, and therefore,  $S^*$  may be greater than, less than or equal to  $NOS$ . ■

**Remark 11** *The ratio  $\frac{NOS}{W}$  may be greater than, less than or equal to the Marxian rate of surplus value  $\frac{S^*}{V^*}$ .*

**Proof.**  $V^* = (W_p)^p$  is strictly less than  $W = (W_p)^p + (W_p)^u + W_t + W_f$ , but Remark 10 proves that  $S^* \geq NOS$ . Therefore  $\frac{S^*}{V^*} \geq \frac{NOS}{W}$ . ■

**Remark 12** *The Marxian measure of surplus value  $S^*$  may be greater than, less than or equal to the IO-NIPA measure of net final product  $NDP$ .*

**Proof.** The IO-NIPA definition of  $NDP$  for this three-sector economy is:

$$NDP \equiv CON_{hp} + CON_{ht} + CON_{hf} + I \quad (12)$$

Here  $I$  is net rather than gross investment. To relate  $NDP$  to  $S^*$  note that  $S^*$  can be defined in terms of the equality between Marxian net value added and Marxian net final product:

$$S^* + V^* \equiv CON_b + CON_{hp} + CON_{ht} + I \quad (13)$$

Definition (13) shows  $S^*$  as the Marxian net final product minus  $V^*$ . Equating this with the IO-NIPA definition of  $NDP$  from (12) and simplifying gives the following condition for equality between  $S^*$  and  $NDP$ :

$$CON_b - V^* = CON_{hf} \quad (14)$$

Since  $CON_b$ ,  $V^*$  and  $CON_{hf}(= RY_h^*)$  are all free to vary independently of one another, then this condition will be satisfied only by coincidence and  $S^* \not\equiv NDP$ . ■

## 4 Conclusion

The Marxian surplus  $S^*$  has no necessary relation to either the IO-NIPA  $NOS$  or  $NDP$ . Neither of these conventional aggregates serve as useful proxies for the Marxian one, and it is an empirical question which will be larger. But even though they are conceptually distinct, the mapping between these quantities is well-defined.

The Marxian aggregates are based on a theory that is different in important ways from the one that underlies the IO-NIPA accounts and the Sraffian concept of surplus. The primary difference between them is Marxian class theory. The distinction between production and nonproduction activity makes it possible to distinguish the producers from the subsequent receivers of surplus, and thus

to classify positions in the economic system according to their relation to the surplus created by workers engaged in production activities. In a capitalist economy the surplus is appropriated by employers who then use it to maintain and develop the enterprise. This gives rise to a class structure established by this network of relations involved with the production, appropriation, and distribution of surplus. It is through this that Marxian theory demonstrates how the exploitation of workers in production provides the means for the system of class relations to be reproduced. Rather than a question of simply maintaining an enterprise as a "going concern", the Marxian theory of surplus enables us to understand how a capitalist class structure is maintained.

These relation can be observed in the transactions that participants engage in and these transactions form the basis for both the IO-NIPA aggregates illustrated in Tables 1 and 2, and also the Marxian aggregates illustrated in Table 3. Each of these aggregates groups these transactions according to an underlying theory of the social and economic relations involved. They are not pre-theoretic or theoretically neutral. But since the basis for both accounts is the same universe of transactions, there should be a consistent mapping from one to the other. This is done here by the set of discrete operations outlined in the paper. This class analysis of the national accounts provides the method to derive one set of aggregates from the other, and shows that the Marxian aggregates are both comprehensive and consistent. The method presented here is limited to an economy with only three sectors (Production, Trade, Finance), but it can be extended to include the full array of sectors and activities in a modern capitalist economy and published national accounts.

## References

- [1] U.S. Department of Commerce, Bureau of Economic Analysis. 2009. "Concepts and Methods of the U.S. National Income and Product Accounts" chapters 1 - 5. Available at [www.bea.gov/national/pdf/NIPAhandbookch1-4.pdf](http://www.bea.gov/national/pdf/NIPAhandbookch1-4.pdf). Accessed January 15, 2010.
- [2] Foley, Duncan. 1982. "The Value of Money the Value of Labor Power and the Marxian Transformation Problem", *Review of Radical Political Economics* 14 (2) 37 - 47.
- [3] Gillman, Joseph M. 1958. *The Falling Rate of Profit*. New York: Cameron Associates.
- [4] Horowitz, Karen J. and Mark A. Planting. 2006. "Concepts and Methods of the Input-Output Accounts". Washington D.C.: U.S. Department of Commerce, Bureau of Economic Analysis. Available at: [www.bea.gov/papers/pdf/IOmanual\\_092906.pdf](http://www.bea.gov/papers/pdf/IOmanual_092906.pdf). Accessed January 10, 2007.
- [5] Marx, Karl. 1967a. *Capital* vol. 1. New York: International Publishers.
- [6] Marx, Karl. 1967b. *Capital* vol. 2. New York: International Publishers.
- [7] Marx, Karl. 1967c. *Capital* vol. 3. New York: International Publishers.
- [8] Marx, Karl. 1987. Letter to Engels dated August 24, 1867, in *Marx and Engels Collected Works* vol. 42, 407. New York: International Publishers.
- [9] Mohun, Simon. 2004. "The Labour Theory of Value as Foundation for Empirical Investigations", *Metroeconomica* 55 (1) 65 - 95.

- [10] Mohun, Simon. 2005. "On measuring the wealth of nations: the US economy, 1964–2001", *Cambridge Journal of Economics* 29 (5), 799–815.
- [11] Moseley, Fred. 1986. "Estimates of the Rate of Surplus-Value in the Postwar United States Economy", *Review of Radical Political Economics*, 18 (1&2) 168-189.
- [12] Moseley, Fred. 1988. "The Increase of Unproductive Labor in the Postwar U.S. Economy", *Review of Radical Political Economics*, 20 (2&3) 100-106.
- [13] Moseley, Fred. 1991. *The Falling Rate of Profit in the Postwar United States Economy*. New York St. Martin's Press.
- [14] Okishio, Nobuo. 1959. "Measurement of the Rate of Surplus Value." *Economic Review*, Hitotsubashi University Institute of Economic Research, 10 1-9.
- [15] Phillips, Almarin. 1955. "The Tableau Economique as a Simple Leontief Model", *The Quarterly Journal of Economics* 69 (1) 137-144.
- [16] Resnick, Stephen A. and Richard D. Wolff. 1987. *Knowledge and Class*. Chicago and London: The University of Chicago Press.
- [17] Shaikh, Anwar M. and E. Ahmet Tonak. 1994. *Measuring the Wealth of Nations*. Cambridge U.K. and New York: Cambridge University Press.
- [18] Stone, Richard and Alan Brown. 1962. *A Programme for Growth: vol. 1 A Computable Model of Economic Growth*. Cambridge, MA: The MIT Press.
- [19] Streitwieser, Mary L. 2009. "A Primer on BEA's Industry Accounts", *Survey of Current Business* 89 (6) 40 - 52.

- [20] Varga, Eugen. 1928. *The Decline of Capitalism: The Economics of the Decline of Capitalism After Stabilization*. London: Communist Party of Great Britain.
- [21] Varga, Eugen. 1935. *The Great Crisis and Its Political Consequences 1928-1934*. London: Modern Books Limited.
- [22] Weisskopf, Thomas E. 1979. "Marxian Crisis Theory and the Rate of Profit in the Postwar U.S.", *Cambridge Journal of Economics* 3 (4) 341-378.
- [23] Wolff, Edward N. 1975. "The Rate of Surplus Value in Puerto Rico", *The Journal of Political Economy*, 83 (5) 935-950.
- [24] Wolff, Edward N. 1987. *Growth, Accumulation and Unproductive Activity*. Cambridge U.K. and New York: Cambridge University Press.

**Table 1: Stone and Brown's Proto SAM for U.K. 1960 (millions of Pounds Sterling)**

	(1) Domestic Product	(2) Income/ Outlay	(3) Capital Transactions	(4) Balance of Payments	Totals
(1) Domestic Product	0	20,797	4,694	5,102	30,593
(2) Income/Outlay	23,038	0	0	179	23,217
(3) Capital Transactions	2,015	2,334	0	1	4,350
(4) Balance of Payments	5,540	86	-344	0	5,282
Totals	30,593	23,217	4,350	5,282	

**Table 2: A basic IO-NIPA SAM**

		<b>PRODUCTION</b> Enterprise	<b>CURRENT</b>		<b>ACCUMULATION</b> Business	$\Sigma$
			Business	Household		
<b>PRODUCTION</b>	Business	Inter-industry Transactions (M)	0	Household Consumption ( $CON_h$ )	Gross Investment ( $I^+$ )	Total Product (TP)
<b>CURRENT</b>	Business	Net operating surplus (NOS)	-	0	0	NOS
	Household	Wages and salaries (W)	Interest, dividends, rent (IDR)	-	0	W + IDR
<b>ACCUMULATION</b>	Business	Depreciation (D)	Undistributed profit ( $SAV_b$ )	Household saving ( $SAV_h$ )	-	$D + SAV_b + SAV_h$
$\Sigma$		Total Outlay (TO)	$IDR + SAV_b$	$CON_h + SAV_h$	$I^+$	



**Table 3: A Marxian SAM**

		<b>PRODUCTION</b> Business	<b>CURRENT</b> Business                      Household		<b>ACCUMULATION</b> Business	$\Sigma$
<b>PRODUCTION</b>	Business	$C_m^* = M_{pp} + M_{tp}$	$CON_b^* = M_{pt} + M_{tt} + M_{pf} + M_{tf}$	$CON_h^* = CON_{hp} + CON_{ht}$	$I^+ = I_p^+ + I_t^+$	TP*
<b>CURRENT</b>	Business	$S^* = NOS_p + GO_t + M_{fp} + (W_p)^u$	$RY_b^* = M_{fp} + M_{ft} + M_{ff}$	$RY_h^* = CON_{hf}$	0	$S^* + RY_b^* + RY_h^*$
	Household	$V^* = (W_p)^p$	$IDR + WU^* = IDR + (W_p)^u + W_t + W_f$	-	0	$V^* + IDR + WU^*$
<b>ACCUMULATION</b>	Business	$C_d^* = D_p$	$SAV_b + D_t + D_f$	$SAV_h$	-	$C_d^* + SAV_b + D_t + D_f + SAV_h$
	$\Sigma$	TV*	$CON_b^* + RY_b^* + IDR + WU^* + SAV_b + D_t + D_f$	$CON_h^* + RY_h^* + SAV_h$	$I^+$	