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**Income Inequality and Income Sources:
Towards a SAM Based Analysis of Income Distribution**

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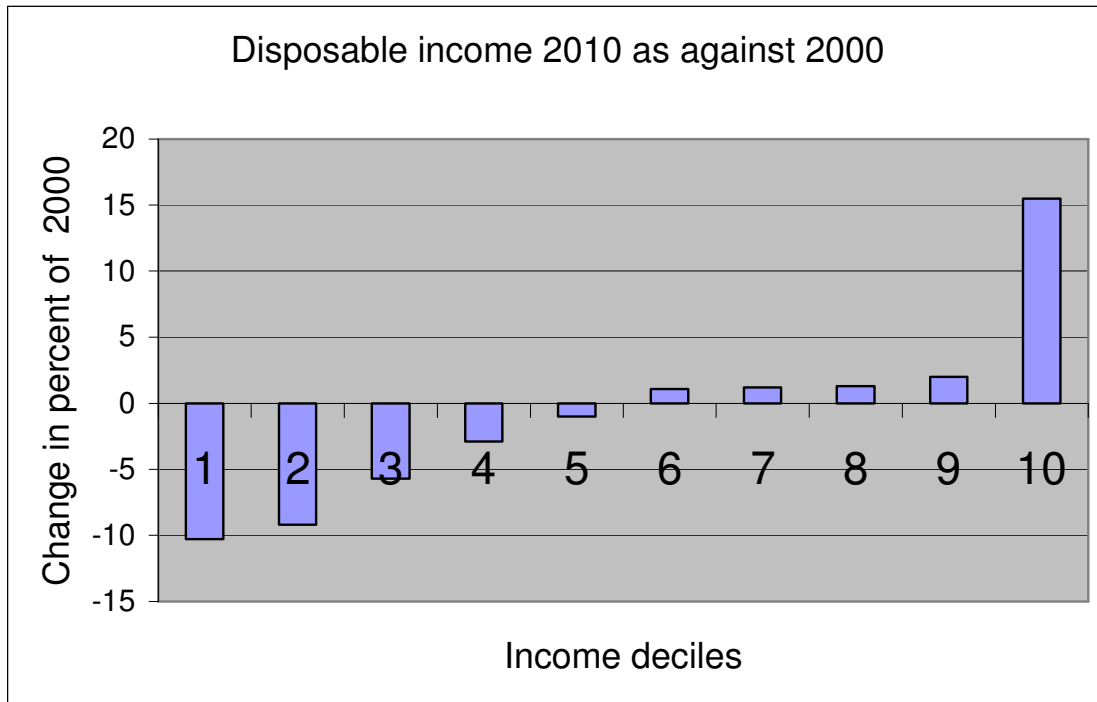
Abstract

Modern income studies are firmly rooted in, and restricted to, the micro-approach. Following the microeconomic theory of the household they begin by defining a concept of “personal income” observable in household surveys, and end by correlating its distribution over households to other variables of the same households. Households are thus the one and only object of investigation. While such focussing of attention may be necessary for certain purposes it also has its short-comings. It seems that the current trend of social income distribution towards income polarisation cannot be explained by looking at households alone, and that other institutional units, by their participation in the distribution process, also determine, or exert an influence on it. As a consequence it is necessary to enlarge the scope of distributional research, and to consider all institutional units of an economy, thus adding a macro-economic perspective to the micro approach. The means for carrying out such project can be found in social accounting matrices (SAMs), which describe every income by type and by source in its flow through the whole circuit of the economy. The paper makes a first experimental step in the direction, using a SAM of Portugal for year 2000.

1. Introduction

A few months ago, the German weekly “Der Spiegel” published the following graph:

Figure 1 Variation of households’ disposable income in Germany



Source: Der Spiegel (15/2012, p.19)

It is a picture that strikingly demonstrates the new drive towards social polarisation. The two lowest income brackets experienced a loss of ten percent of their income, an income which lies at the lowest level mere reproduction anyhow, while the top ten percent had their income grow by fifteen per cent, over the last decade. The middle of the population have stayed more or less at their initial level. Assume the income of the top ten percent is five times that of the lowest group (e.g. 500:100 Euros), - surely a conservative assumption, - the top decile would have gained $0.15 \times 500 = 75$ Euros, the bottom tenth lost $0.10 \times 100 = 10$ Euros. Thus the top ten could have shared 10 Euros of their 15 percent growth with the poorest decile, keeping those incomes constant, and still have retained an increase of 65 Euros. One can sharpen the model by asking has income growth of the top ten been achieved at the expense of the bottom ten or twenty? Have 10 Euros of income growth of the first been financed by an equivalent loss of the second? The correlation is there, but is there causality?

It is at this point, at the latest, where the distributional exercise turns into the political; where it is not enough to deal with statistical probabilities and measures of dispersion or variance, but where the source of a certain income must be questioned and judged. Could an income tax on the rich be an effective remedy to the observed polarisation? It is tempting to call for government intervention where the distribution of private benefits threatens cohesion of society. But all flows of income are part of a complex system of payables and receivables between many different institutional units, and the direct effect of an action on one institution may be counteracted by the indirect effect this action has on other institutions. The interaction between direct and indirect effects of an action within an economic circuit is well

known and well studied in traditional input-output-analysis. But there analysis focusses on economic production and the circulation of products, circulation of income being passed over, more or less. The fourth quadrant where such flows might be recorded is empty in an input-output table. The time has come, it seems, to extend the input-output technique of analysing economic interdependency from production to the social network of income distribution.

The paper ventures in this direction and is structured as follows: A brief review of the origin and development of national accounting serves to recall the perspective of research in income and wealth, social accounting matrices (SAMs) forming the last, - and not yet fully exploited, - stage. SAMs provide the tool for a macro-approach to the economics of distribution. As most distribution research is based on microeconomic theory this must be also be assessed briefly. Having arisen, initially, as a matter of critique to national accounting methods, it is now well established, but it has also brought with it its own deficiencies in dealing with income distribution. The experimental part of the paper follows with a simple, numerical example pointing out the interrelationship of different sources, forms and flows of income, which does not stand behind the flows of products in its variety, complexity and connectedness. The final part of the paper takes an existing SAM for Portugal in year 2000 as an experimental object to demonstrate how such aggregate table may be used for analysing social income distribution within a larger framework than that of mere household samples and panels.

2. Development of national accounts

Income and money forming the substance of social cohesion their study has always represented a focus of social science, in general, and economics, in particular. “National accounts” have been created for recording the “wealth of nations”, and its distribution between classes of society. Some truths have been discovered as a result and are now well established. All national income, so the accounts say, derives from production. A modern economy, being based on division of labour, and creation of money as a means of measuring and transacting economic value, generates national income as a claim to its national product both of which aggregates must then be equal in size, by definition.

The “institutional sector accounts” were the first to be developed in full statistical complexity. They deal with income as a reward to factor inputs. The wage share – as opposed to the profit share – serves as an important indicator in assessing the value of labour input in national product, as opposed to the value contributed by capital. As a result it has been a long-standing goal of organised labour to follow a productivity-oriented policy of wage determination, which means that an increase in total factor productivity be shared equally between the two factors, keeping the factor shares more or less constant over time.

The institutional sector accounts – now often called the “core” of the system of national accounts – establish a distinction between “primary” and “secondary” income. Primary income transactions are made to the participants in the process of production, either directly as producers, or indirectly, as owners of capital. A term “mixed income” has been created to cover the case where both qualifications are held by one and the same person (“self-employed”). “Secondary” income comprises all other income transactions, such as social benefits accorded by government, or by private organisations of social security. The idea behind this distinction is that secondary income has no original basis, but is conditioned on the existence of primary income, which, itself, is derived from production.

The main purpose of the core income accounts, - or rather the purpose for which they have mainly been used, - is to establish a bridge from the output produced in an economy

(production account) to its use (final consumption, capital formation), closing the circuit of the flow of goods and services in this way. The concept of “disposable income” was created, and has formed the fixed point of income analysis ever since.

There is a second approach to national accounting, which has developed side by side with the institutional accounts. Inter-industrial accounts, or – as they became named in a rather crude way – “input-output tables” have been constructed, in order to describe the flows of goods and services through an economy in a more detailed manner than is possible by means of institutional sector accounts. While these latter answer questions such as who (which sector) performs what kind of transactions (what?) input-output tables supply the additional information about the addressee of a transaction (to whom). They can do so because they reduce the scope of their transactions, restricting themselves to transactions in products while disregarding transactions of income. The detail in analysis of production is paid for by negligence in the area of distribution.

This lacuna has been remedied in a third step of development, extending the technique of input-output accounting into the field of income transactions by means of “social accounting matrices” (SAM). Such accounts complement the product flow information assembled in supply and use tables, by information about income flows. The main task which such statistical work must solve is disaggregation of household consumers, in the same detail as input-output tables disaggregate establishment producers. This is not an easy task, and still the main impediment to reliable tables, but it represents a means – and the only one, for that matter, – to relate the benefit of an income to its economic source. Traditional income analysis is insufficient in that it treats income as homogeneous, independent of the source through which it has been gained. Re-establishing this link in theory which exists in reality is a political desideratum, and it is possible in practice by putting statistical resources into the construction of a SAM, as the third (and last) part of a full-fledged and perfect national accounting system.

3. Development of distributional analysis

While national accounting systems became installed, and grew over time as outlined above, strongly favored by politics, statistical offices and economists akin to them, there also developed a strong current against them, rooted in economic theory. The divide has been there from the beginning. When at Vienna, Austria, in year 1926, the first idea of a statistical measure of national income was ventilated within the German Economic Association, all theoreticians spoke out against it, insisting that income was essentially of an individual nature, that a concept of national income was non-sense, and served only as “a means of political agitation” (Diehl, K. 1926). Micro-economic foundation of macroeconomics has been a methodological prescription for theory ever since, and it has also entered the issue of distribution.

As pointed out before, national accounts deal with income distribution mainly as factor rewards. They focus on producing units and supply little information about households and individual welfare. With the advent of computer technology this handicap of the top-down approach came to be remedied. It is now possible to collect and process masses of data on a much larger scale than before, and to establish the bottom-up approach to macrostatistics as a strong competitive technique. As a result, national accounts lost influence in the distributional arena, micro-simulation overtook the journals and is now the ruling method in research on income and wealth.

The new research frontier has furnished new insights into the economic condition of individual households, but it has also brought with it side effects that demand careful attention. Dealing with masses of data creates its own problems, beginning with the design, and organisation of surveys, assurance of representativity of samples, handling of missing data, etc. While these problems of statistical realisation occupy the scientific mind, they leave little room for outside theoretic speculation, for venturing into complex models of causality, searching for hidden abstract variables and social constants. A recent example may illustrate the point.

In their paper “Does size matter? The impact of changes in household structure on income distribution in Germany” A. Peichl, N. Pestl and H. Schneider ask whether the growth of the income gap observed in Germany may be related to a change in household structure, and they find this is “indeed strongly” so. They explicitly warn, however, that “based on the results one cannot state that there is a *causal* relationship between household structure and income inequality” (p. 119), acknowledging, implicitly, the fact that a logical reason for such connection is not really evident. But if this is so the question arises why you would investigate such relationship, at all. The answer, coming up to a critical mind may be, you check the correlation because the data are there. Number of people living in a household is a simple and unailing data to collect in a survey, (as are age and sex) so why not run the available software over it (Krämer 2012)?

At a higher level of generality the suspicion exists, that distributional research is governed by the suitability of concepts for mass scale surveys rather than by speculation about hidden causal, and perhaps more difficult to observe, relationships. The scientific effort required simply to run, control and continue mass scale surveys, samples and panels and to assure their legitimacy seems to demand so much intellectual attention that little capacity is left for speculating about meaning and consequences of distributional concepts or phenomena.

Take the very concept of income! Whatever its specific operational definition for the purpose of a survey, it is always treated as homogeneous. Not only does one abstract from its source which may be legitimate, if one takes it simply as a means to acquire goods and services, but even in terms of welfare, the central microeconomic variable, it is deficient. There are three main types of income, basically, labour income, capital income and transfer income. While being homogeneous in terms of the amount of products each income can buy, they are not equal and not directly comparable in terms of welfare. It clearly makes a difference to a person whether a certain income has been gained from property, from a forty hours' week of work, or as an un-employment benefit. And the preferences individual households might express vis-a-vis these three forms of a certain income if they had the choice are so obvious that they have never even been asked in a survey. You can predict the outcome. And yet, such evident inhomogeneity in welfare content is not taken note of in traditional income analysis, in spite of the microeconomic perspective, a deficit which it shares with its underlying economic theory of households as a mere consumer behavior study.

It is at this point, therefore, where the macroeconomic approach comes back into play. This does not mean that you simply return to the top-down approach trying to disaggregate macroeconomic figures into variables that you consider more meaningful from an individualistic point of view. It means that you construct a relationship between factor shares as brought out in the national accounts and personal income distribution as surveyed under the micro-economic approach. Atkinson (in 1983 already) made this plea the “main concern” of his book (p. 220), and it serves as a good starting point, still today. We must acknowledge that there is what we may call a “social value” to each form of income which may differ between

them even if in terms of economic value they are the same. And if we accept the interpretation of income as a means of social cohesion then this social value must be taken into account in an analysis of inclusion or general welfare.

“In order to relate the distribution of factor shares to that by persons we have, therefore, to trace through these links and to take account of classes of income, such as government transfers, that did not appear in our earlier discussion (about factor shares, UPR).” (Atkinson 1983, p. 222) How much, we then ask, is quantitative inequality in personal income not only related to, but caused by, inequality in the kinds of income? The welfare content of a certain income is given by the economic source from which it stems, and the forces that distribute it within the overall economic circuit. The question is: Where does the money go? Where does value added generated in a certain production end up, finally, after all processes of primary and secondary distribution have been completed, and before it is being spent on products? Or, putting the question the other way around: Where does disposable income of a certain person originate? Through which processes of distribution and redistribution did it go? Such process that may circular in that, for example, a household may receive an interest on government bonds (primary income) that is being paid out of taxes (secondary income) levied on wages (primary income). The paper is a pledge to broaden our view of this process, and rather than trying (in vain) to explain income distribution of households merely by characteristics of these same households, to accept the fact that they are all members of a comprehensive economic process where products and income circulate in a regulated way and determine one another.

4. Statistical tool: the social accounting matrix (SAM)

A network of relationships may be formally represented by a square matrix table in which a cell describes a directed relation between two knots of the network. In an input-output table such a cell pictures the flow of products from one industry to another. A social accounting matrix extends the input-output format in two ways. It allows for a combination of different classifications within one table (e.g. industries and institutional units), and - more important in our context, - it disaggregates the household sector into different groups or classes. The accounting matrix is called “social” because distribution of income among households on which it focusses is a social rather than an economic process. SAMs have initially been constructed for development planning (Pyatt and Round 1977), and this is still their main field of application. We argue, however, that with problems of income distribution increasing the time has come to prepare SAMs for OECD countries as well. Before introducing such an actual SAM here it is convenient to work with a simple blackboard model in order to explain the analytical use to which the actual table of Portugal will then be put.

Table 1 models a social accounting matrix between three institutional sectors, non-financial corporations (NFC), financial corporations (FC), general government (GG) and two classes of households, wage earners (HH1), and profit earners (HH2). The last column shows the use of products (C) to which the disposable income (DI) of households and general government, entered in the last row, is being put.

Table 1 Blackboard example of a social accounting matrix

	NF	FC	GG	VA	HH1	HH2	GG	C
NFC	81	21	41					60
FC	22	12	12					10
GG	60	3	0					30
VA	40	20	40					
HH1				35			18	
HH2				50				
GG				15		28		
Disp. Inc.					53	22	25	
Total	20	56	93	100	53	50	43	100

The upper left corner of the table represents the flow of goods and services between three institutional sectors the production of which yields a value added (VA) of 40, 20, 40, respectively in these sectors. This value added is acquired by households HH1 in the form of labor income (35), by households HH2 in the form of capital income (50), and by general government GG in the form of taxes on production (15). The lower right hand corner pictures the circuit of income transactions which looks very simple in this case: HH2 pay taxes on income of 28 to GG, which itself transfers income of 18 to HH1 (social benefit), retaining 25 as disposable come for public expenditure. One can see how a social accounting matrix extends the observation boundary beyond the realm of production covered in ordinary input-output tables into the realm of distribution.

A social accounting matrix combines the comprehensiveness of institutional sector accounts with the accounting technique developed for input-output tables. Thus it is natural to treat the extended matrix in table 1 like an ordinary input-output table, form a Leontief inverse, and calculate multipliers for each component of final demand which then include distributive transactions shown in the table. The result, however, would not be very meaningful. The row corresponding to the column of final use is disposable income of households and general government. Connecting it to the multipliers shows how much of households or government's income is contained in a unit of final product, or, if you apply the linear production model, by how much each households' and government's income would rise if one more unit of a certain product were being produced. This is not a very meaningful figure.

We propose, instead, to take one more step away from traditional input-output analysis, and to reconsider, which knot of the network to define as exogenous, as opposed to all others who are then endogenous in applying the multiplier technique. The traditional definition of exogeneity is justified by the national accounts the structure of which is again based on macroeconomic (Keynesian) theory. Formally, however, this structure is not the only one possible, other definition also may make sense. All in all, the mathematical base on which

input-output techniques reside is a homogeneous system of linear equations which does not require specifying a particular variable as exogenous in order to be solved. Thus one could make the household sector endogenous and to look at the economy from the perspective of a certain industry, the car industry, for example. Putting it in the exogenous position and applying the corresponding Leontief inverse tells you then what sales revenue from which sector may be generated for the car industry by the initial purchase of a certain input (product or labour). All sectors of the economy buy cars, and in the linear model expenditure is directly related to income so that an increase in the latter engenders an equal increase in the first all through the system.

It is in the spirit of neutrality of the underlying mathematical model that we propose to deviate from the normal definition of exogeneous sectors in national accounts and input-output tables, in this paper, and to introduce another definition, more apt to analyse the circuit of income flows. “Rearranging a system of accounts does not change it in any fundamental respect, it simply encourages a different way of looking at it.” (Stone 1977, p. xx) Table 2 shows the proposal. The accounts are the same as before, but the boundary of exogeneity has been moved. The row/column of value added (VA) has been shifted from the inside to the outside of the flow table.

Table 2 Reorganising the social accounting matrix for the purpose of income analysis.

	NF	FC	GG	HH	HH	GG	VA	DI/
NFC	81	21	41					60
FC	22	12	12					10
GG	60	3	0					30
HH1(wages)				18			35	
HH2							50	
GG				28			15	
VA	40	20	40					
Disp. Inc.				53	22	25		
Total	203	56	93	53	50	43	100	100

The reason is the following. It has already been pointed out that applying the Leontief inverse to a row of disposable income is not very meaningful for analytical purposes. The account (row/column) of value added (VA) is ordinarily endogenised in a social accounting matrix because in the tradition of input-output analysis one is interested in the flow of products through the system. It is put in an exogenous position here, because the Leontief multiplier

may then lead to meaningful results for the purpose of analysing the distribution of income through the economy.

If A is the matrix of column (input) coefficients of the first quadrant of table 2, and v' is the corresponding row vector of the third quadrant (last row), showing value added and disposable income, the Leontief inverse is given by $Q = (I - A)^{-1}$, and the repartition of income according to the Leontief method is given by the matrix $W = Q'v$. It is recorded in table 3, for the figures of table 2.

Table 3 Incidence of value added generated in institutions and in disposable income of households

$$W' = \hat{v}(I - A)^{-1}$$

		Value added			Disposable income			
		NFC	FC	GG	HH1	HH2	GG	Tot
Final product	NF	49	17	34				100
	FC	25	55	20				100
	GG	25	14	61				100
Income generated	HH1				100			100
	HH2				23	45	32	100
	GG				42		58	100

The upper left hand corner of table 3 repeats ordinary input-output analysis. It shows the proportions of value added of different producers contained in the product of each. A final product of financial corporations (FC), for example, contains 55 percent of its own value added, 25 percent value added from nonfinancial corporations (NFC) and 20 percent from general government (in return for taxes, in this simple scheme). One can read this chain the other way around: Revenue from final sales of the financial corporations sector (FC) fall 23 percent upon nonfinancial corporations (NFC) and 32 percent upon general government.

In the same spirit, the lower right hand corner indicates that 100 percent of the income generated in production by the employee household group is retained there as disposable income, a result that can be directly verified by looking at the income account of the group in table 2. In contrast, income generated in production by the group of employer households falls partially upon other groups, 23 percent go to employee households, 32 percent to general government, and only 44 percent are retained in disposable income of the group itself, a result which can also be made plausible from the original figures in table 2. The distribution process

favours HH1 over HH2, and this fact can be ascertained, and made transparent, without any recourse to further survey variables. The question remains: How is it in reality?

5. The case of Portugal

Social accounting matrices are known in many countries, but they are difficult to construct and not part of the regular reporting activity of statistical offices, demanded by international organisations. Often the work goes only up to the first step, namely, the construction of a “national accounting matrix” (NAM), which means that the institutional national accounts are being presented not as a series of accounts ordering payables and receivables side by side and opposite each other, but as a table where payables of an account form a column and receivables form the corresponding row of a matrix (e.g. Statistisches Bundesamt 2005). Often it is left to private initiative and research, as it is, for example, in Portugal (Santos 2007). In this paper we use a SAM constructed for Portugal in year 2000, received from Susana Santos by private communication. It is a matrix of some hundred rows and columns, difficult to communicate on paper. Headings of the rows and columns are shown below.

Table 4 Organisation of a SAM for the purpose of distributional analysis

Portugal 2000					
1. Products			1		
3. Generation of income	Compensation of employees	Male	Primary/lower secondary	3a-1	
			Upper or post secondary	3a-2	
			Tertiary	3a-3	
		Female	Primary/lower secondary	3a-4	
			Upper or post secondary	3a-5	
			Tertiary	3a-6	
	Mixed income	Male	Primary/lower secondary	3b-1	
			Upper or post secondary	3b-2	
			Tertiary	3b-3	
		Female	Primary/lower secondary	3b-4	
			Upper or post secondary	3b-5	
			Tertiary	3b-6	
		Net operating surplus		3c	
		Other taxes less subsidies on production		3d	
4. Allocation of income	Non-Financial corporations			4a	
	Financial corporations			4b	
	General Government			4c	
		Wages and salaries		4d-1	
	Households classified by main source of income	Mixed income (including property income)		4d-2	
		Income in connection with old age (retirement)		4d-3	
		Other transfer income		4d-4	
	NPISH			4e	
	5. Secondary distribution	Non-Financial corporations			5a
		Financial corporations			5b
General Government			5c		
		Wages and salaries		5d-1	
Households classified by main source of income		Mixed income (including property income)		5d-2	
		Income in connection with old age (retirement)		5d-3	
		Other transfers income		5d-4	
NPISH			5e		
10. Rest of the world		Current+ capital		10	
FISIM					

2. Industries			2		
6.---9. Capital	use of income stat. discr.	consumptn. cap. form.	6 --- 9		
			Total		

Source: Susana Santos, private communication

As said before, a social accounting matrix, while being derived from, and consistent with, the national accounts, is different in that it extends into the distributional area more thoroughly

than the accounts. For Portugal 2000, labor force is broken down by education and sex, and households are grouped into four types according to source of their main income. Education and sex are variables easy to determine from household surveys. Are they also relevant?

In a normal SAM the order of rows and columns follows that of the national accounts. In line with the national accounts it is usually production and value added that are called endogenous, while “final” demand is taken as exogenous, “running” the model. Analysis focusses on describing the flow of products through the establishments of an economy, under the laws of supply and demand. In this paper, however, our concern is not about circulation of products, but about circulation of income. The question is, given a certain value added generated in industries, how is this value added transformed into disposable income, by being appropriated, distributed and re-distributed through the economy, before it is finally being used for acquiring products. The national accounts show these flows for different institutional sectors, but only in an aggregated manner. All households are assembled in one sector, often together with private non-profit organisations. The sector accounts also show only one side of a transaction, the sender or the receiver, not both together. The SAM Portugal 2000, in contrast, reveals primary and secondary income flows between units, and disaggregates four classes of households. This allows a detailed study of income distribution.

Studying distribution rather than production requires a reconsidering of aggregation and disaggregation, on the one hand, and of the distinction between exogeneity and endogeneity, on the other. This reordering of accounts (rows and columns) has been performed in table 4. Value added is an exogenous variable, in this case, and endogenous are the different mechanisms of distribution and redistribution, while it is less interesting to know from which producer and which industry a particular value added is being derived. Three operations have thus been performed on the original table, for our purpose:

1. Products and industries have been aggregated to one account each (row/column 1, and 2 resp.)
2. The industries account (row/column 2) has been shifted to the exogenous part of the table (2. quadrant), together with accounts 6 –9, aggregating consumption and capital formation.
3. The rest of the world account and the banking imputation are treated as endogenous.

The question here is not where do the products go, but where does the money go? Where does the “harvest” of production, the first appearance of which is an abstract bookkeeping figure in some institutional accounts called “value added” end up, at last, after all social transformations into different kinds of income have been performed? The SAM for Portugal allows a first answer.

6. From value added to disposable income

Value added is a bookkeeping figure, derived as a residual from the accounting operations of the production account. The first kinds of income it generates are compensation of employees, and taxes on production, leaving operating surplus, or mixed income (in the case of unincorporated enterprises) as further residuals, the distribution of which is registered in the next account of primary income distribution. Table 5 shows in six columns how value added generated by Portuguese employees classified by sex and by education, is distributed into disposable income of the five sectors of national accounts, disaggregating the household sector according to type of main income. For example, of the value added by a male worker of lower education (3a-1) 63.9 percent arrive at a worker’s household (5d-1), 16.8 percent go to general government’ disposable income (5c), 10.6 percent to pensioners (5d-3). Figures are

similar for males with secondary education (3a-2) or tertiary education (3a-3), just as they are for the respective female working force (3a-4 to 3a-6). It seems that education and sex are unimportant in this distribution process. The negative figures for non-financial corporations are due to capital consumption which overshoots undistributed profits, yielding a negative net disposable income of this sector.

Table 5 Incidence of net value added generated by different groups of employees(3a-1 to 3a-6) contained in disposable income of sectors and different groups of households (5a to 5e)

Disposable income of	Net 3a-1	value 3a-2	added 3a-3	by 3a-4	wage 3a-5	labor 3a-6
5a Nonfinancial corporations	-0,009	-0,008	-0,009	-0,008	-0,008	-0,008
5b Financial corporations	0,015	0,015	0,016	0,015	0,015	0,015
5c General government	0,168	0,165	0,171	0,161	0,160	0,166
5d-1 HHs, wages and salaries	0,639	0,625	0,655	0,602	0,596	0,626
5d-2 HHs, mixed and capital inc.	0,030	0,039	0,025	0,057	0,058	0,053
5d-3 HHs, retirement income	0,106	0,108	0,094	0,120	0,120	0,097
5d-4 HHs, other transfers	0,016	0,022	0,012	0,021	0,028	0,018
5e NPISH	0,019	0,019	0,019	0,018	0,018	0,019
10 Rest of the world	0,005	0,005	0,005	0,004	0,004	0,005

For explanation of headings see table 4

Table 6 Incidence of mixed income, operating surplus, and taxes on production in disposable income of sectors and groups of households

	Net 3b-1	value 3b-2	added 3b-3	by 3b-4	self- 3b-5	empl. 3b-6	op. s. 3c	taxes 3d
5a	-0,003	-0,004	-0,005	-0,005	-0,005	-0,004	-0,050	-0,003
5b	0,006	0,007	0,010	0,009	0,009	0,007	0,040	0,014
5c	0,081	0,095	0,115	0,100	0,111	0,090	0,146	0,472
5d-1	0,127	0,211	0,323	0,248	0,301	0,176	0,124	0,064
5d-2	0,685	0,568	0,463	0,462	0,487	0,618	0,356	0,044
5d-3	0,072	0,095	0,059	0,127	0,066	0,087	0,156	0,215
5d-4	0,014	0,007	0,012	0,038	0,007	0,006	0,039	0,030
5e	0,011	0,012	0,014	0,013	0,014	0,012	0,025	0,030
10	0,002	0,003	0,003	0,003	0,003	0,003	0,052	0,043

In table 6 mixed income is again classified by sex and education of its earners. Thus 68.5 percent of value added generated by a self-employed un-educated male (3b-1) goes to households living mainly on mixed income (5d-2), which is symmetric to the situation of employed households: the main part of value added generated goes to its earner, as one would expect. A similar figure holds for highly educated female labor (3b-6), namely 61.8 percent. For other labor the figure is lower. Value added created by a self-employed female of lower education (3b-4) flows to mixed income households only at a rate of 46.2 percent. 12.7 percent go to pensioners' households (5d-3), a sign perhaps that these incomes are earned by necessity as a complement to low pensions. Column 3c shows where net operating surplus of corporations ends up. 35.6 percent go to mixed income households, probably by way of interest payments and dividends, 15.6 percent go to pensioners, 12.4 percent to workers' households, 14.6 percent flow into disposable income of general government (3c) and 5.2 percent go abroad (10). The government's share in value added (3d, taxes on production) remains with the government (47.2 percent) or goes to pensioners (21.5 percent).

Tables 5 and 6 exhibit shares of distribution. It is also interesting to look at the absolute figures of value added distribution (table 7).

Table 7 The overall incidence of value added components in disposable income (million Euros)

Net disposable income of	3a comp. empl.	3b mixed inc.	3c oper.surpl.
5a Nonfinancial corporations	-515,3	-20,0	-1085.7
5b Financial corporations	929,6	36,4	871.9
5c General government	10139,6	450,6	3169.1
5d-1 HHs, wages and salaries	38379,0	928,9	2699.1
5d-2 HHs, mixed and capital inc.	2412,8	2899,1	7856.6
5d-3 HHs, retirement income	6551,4	436,2	3410.4
5d-4 HHs, other transfers	1089,3	97,0	842.0
5e NPISH	1143,3	59,2	554.7
10 Rest of the world	291,1	12,9	1147.5

Table 7 describes the distribution of value added generated by wage labour, self-employed, and capital in the economy of Portugal. Disposable income is negative for non-financial corporations because it is net of large consumption of capital. In contrast, net disposable income of financial corporations is positive and originates mainly in compensation of employees (929.6) and operating surplus (871.9) transferred to them through payments of interest from households. General government's disposable income stems mainly from compensations of employees (10139.6) and operating surplus (3169.1).

Disposable income of households also originates from many sources. The main income comes directly from the main activity as one would expect, but other distributive flows also play a role. Thus the original source of employee households' income are wages and salaries (38379.0), but some operating surplus accrues to them as property income (2699.1). Possibly though this is merely the operating surplus imputed to owner-occupation dwellings. The bulk of operating surplus does not remain with their producer institutions but is payed out to households of mainly mixed income (7856.6) In other words, the owners of property largely coincide with self-employed labor. This is an interesting finding and may explain increasing income polarisation better than any personal variable.

8. Conclusion

Our experimental compilation proves that it is possible to apply a social accounting matrix to income analysis in a meaningful way. The distribution path of certain income from the source where it was generated to its final destination before it is spent for a product can well be monitored, in this way. Yet, an important link to microeconomic studies is still missing. Income polarisation is assessed, traditionally, in terms of a measure of dispersion. Such a measure cannot yet be constructed from an ordinary SAM. A SAM, while taking account of different sources of income and grouping households according to social criteria, provides no information about the ratio of income per capita, which is the essential variable of distribution studies. In order to connect the SAM approach to these studies it is necessary to disaggregate the household sector further, and introduce income brackets for each social group. If you had five income brackets, for example, for each of the four social groups distinguished in the Portuguese table this would raise the number of household groups to twenty which is a

reasonable number in ordinary input-output analysis of production and may thus also be useful for the analysis of distribution.

A SAM is often made the statistical foundation of a computable general equilibrium model (CGE model). No attempt has been made here in that direction. On the contrary, care has been taken to formulate a pure accounting approach, which means not to answer the question of what would happen if a simulated change took place in the system, but what has happened in the year and country observed. "In fact greater precision generally implies non-linear models and will usually require additional data to that which is included in our SAM framework, such as data on elasticities of substitution in production or consumption. In avoiding such a diversion we must be content to work with fixed-coefficient linear models in the knowledge that they are well tried and proven means of obtaining a first cut at order of magnitude in relation to many problems." (Pyatt and Roe 1977, p. 68) There is nothing to add to this prudent assessment of the technique by its early founders. For studying the dynamics of the system it may, in fact, be more informative to set up a sequence of disequilibrium accounts by developing the Leontief inverse into its geometric series ($I + A + A^2 + \dots$) rather than to model a path of continuous equilibria. The sequence of disequilibria may picture a wave which originates from a shock, spreads out over the system, and diminishes in amplitude as the network distance to the origin of the shock increases.

In summary, traditional analysis of income distribution suffers from two defects. Being based on the microeconomic theory of households, - and household surveys as its only source of statistical data, - it treats income as a homogeneous variable, ignoring dissimilarity in effort and prestige (and thus welfare) connected to a specific form. In searching all explanatory variables only within the object of investigation of the household itself (on data collectable through household surveys) it misses out effects of structural variables embedded in the overall economic network of income flows. A SAM analysis is able to venture into these important areas, revealing the composition of disposable income of different social strata in terms of the primary value added generated in production.

The paper has made an exploratory step in this direction. Further research must follow. The new method proposed here, deviating from the established use of SAMs, consists in (full or partial) aggregation of product flows and industries (as being less important in the analysis as against a further disaggregation of the household sector) and a re-cast of the definition of endogenous and exogenous variables. Demonstrating the analytical power of this approach requires time series of social accounting matrices which are scarce now, and a clear project of the future, as distributional conflicts grow in their demand for political action and statistical data. There is no political action recommended from the fore-going experimental analysis except this: OECD should begin collecting existing national SAMs and encourage their compilation. SAMs are no longer a planning tool for developing countries, only.

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