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Social Accounting for Industrial and Transition Economies

Economy-wide Models for Analysis and Policy

Solomon I. Cohen

SOCIAL ACCOUNTING FOR INDUSTRIAL AND TRANSITION ECONOMIES

To Jack, Yousif and Zaki
Whose contributions have not gone unnoticed

Social Accounting For Industrial and Transition Economies

Economy-wide models for analysis and policy

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Preface

In the past two to three decades, there has been an increased momentum in the design, construction and use of social accounting matrices for developing countries, this is well documented in the accompanying volume to the current volume, S.I. Cohen: *Social Accounting and Economic Modelling for Developing Countries*, Ashgate Publishing, 2002.

The construction and use of the social accounting matrix (SAM) for structural and policy analysis of industrial economies is a later development, and is the subject matter of the current volume. Most likely, the first published analysis of a SAM for an industrial economy was that for the Netherlands, cf.. Cohen (1988). Since then I have run for several years, with various team members and associates, a research programme on SAM applications for industrial countries. The topics treated included the trade-off between growth and distribution, and effective state instruments to minimise this trade-off, regionalisation of the SAM, incorporation of spatial dimensions, simulation of the effects of demographic changes and ageing, and the analysis of inter-temporal changes in SAMs, SAM multipliers and their decomposition. The applications were extended to four Western European countries, namely the Netherlands, Germany, Italy and Spain.

The turnaround in the centrally planned economies of Eastern Europe, and their entry in a transitional phase in which markets would play a more dominant role, opened an important opportunity for application of social accounting in these countries. It was necessary to transform the national accounts statistics in these countries to standard uses as recommended by the United Nations and Eurostat, and to introduce modern forms of economic analysis beyond the typical input-output tables which were so popular in central planning. The SAM provided a comprehensive framework for organising national aacounts statistics. It also provided a viable framework for the analysis and shaping of economic policies in such areas as sectoral restructuring, household income distribution, maintenance of balanced government budgets and external finance. In this context, we had the opportunity of conducting and advising on SAM applications in, Chezchoslovakia, Bulgaria, Hungary, Poland, Rumania, and Russia. And lately, China has been added to this list. In this book we focus on the applications for Hungary, Poland, Russia and China.

Most of the SAM applications we treat in this volume have been published in economic journals. As usual, in such research programmes, which spread

over several years and count on inputs from different persons in different settings, there are tendencies for the designs, presentations and results of the research pieces to overlap. This raises a need for the consolidation of the parts in a harmonious whole. The current volume hopes to have been successful in this endeavour. Some of the published articles had to be substantially revised to avoid overlapping. Besides, greater insight was gained as more results from more applications became available over time; and this required the upgrading of previously executed analysis, and revision of empirical results. The final outcome are eight chapters falling in two blocks. Chapters 1, 2, 3 and 4 form one block that treats social accounting and economic modelling for transition economies and reflects on the results obtained, having in mind comparative results for market economies. Chapters 5, 6, 7 and 8 develop alternative social accounting frameworks for the analysis of different policy problems in the context of Western European industrial economies.

In chapter 1 we introduce the idea of the SAM, and review the construction of such matrices for Germany, Italy, the Netherlands, and Spain, as well as for Hungary and Poland. In the way of building up acquaintance and knowledge on SAMs, the chapter is further devoted to a cross-country comparison of the structural properties of the SAMs among the six countries. We separate the Western from the Eastern European countries to allow gaining insight into the effects of systemic differences on the economic structures.

In chapter 2 we compare and assess the future courses of economies in Eastern Europe, i.e. Poland and Hungary, in relation to the four representative economies in Western Europe (WE) mentioned above, on the basis of standardised SAMs and a SAM multiplier analysis that focuses on issues of growth and distribution.

In chapter 3 SAMs of the two largest centrally planned economies around 1990, Russia and China, are displayed and the size and distribution of their multiplier effects are investigated. Even though the comparative analysis is limited to one year only, the obtained results have a durability that is supported by contrasting trends in the two countries over the past decades.

The policy problem in chapter 4 is concerned with adaptations to the introduction, during a transitional phase, of market mechanisms in the otherwise centrally planned systems of Eastern Europe. In chapter 4 we build on the postulate that with a minimum of manipulations the SAM can be converted to either a fixed-price or flexible-price model, the latter is in fact a computable general equilibrium (CGE) model. The two representations of the economy are very handy in replicating a centrally planned and a free market situation, respectively. By running one and the same policy injection in both

versions, it is possible to detect the signs, sizes, and locations of the discrepancies. Furthermore, by applying sensitivity analysis, one can appraise the effectivity of different instruments in resolving the discrepancies. In this chapter we quantify and simulate SAM and CGE models for both Hungary and Poland during their early transitional phase.

Chapters 5, 6, 7 and 8 form another block that deals with in-depth national analysis of various issues of economic restructuring in industrial economies. Although the applications focus on the Netherlands, the issues dealt with are generally encountered in industrial economies, and especially in Western Europe. The applications use different configurations of social accounting matrices for multiple years.

In chapter 5 the conceptual framework of the SAM is introduced and tabulated for the Netherlands. The matrix is then put to an analysis of multipliers, thereby permitting the investigation of the structural properties of the Dutch economy. Key sectors that drive growth will be identified, as well as the distribution of growth incidence on household groups. The multipliers will also be decomposed in transfer, open-loop and closed-loop effects and analysed.

In chapter 6, making use of the social accounting framework, answers are sought for several questions relating to regional development. How can internally structuring forces and externally intervening forces, working together in the economy-wide circular flow, explain regional development during the 1980s in the Netherlands? When and where were the externally intervening forces more significant than the internally structuring forces? And in which direction would these forces be shaped in the future? The hypothesis we pose is that while the external forces are statistically more significant than the internal forces in generating growth and distributionary effects at the regional level, the combination of the two forces is different for different regions.

In chapter 7 a social accounting matrix was specially designed to examine the underlying factors behind the growth and decline of household groups belonging to metropolitan cities, large and small towns, and suburban and rural municipalities, and how these developments link with the economy-wide circular flow. It will be seen, for instance, that large towns and the services sector are experiencing negative growth bias in terms of both internal and external influencing forces. Taking into account the working of the circular flow, the social accounting model employed here suggests that a deconcentration of cities towards towns, rural municipalities, dormitory towns and small towns goes simultaneously with enhanced growth for the sectors of mining, banking and public utilities at the cost of light industry, construction and services.

The policy problem in chapter 8 is concerned with the long range effects of demographic change on economic growth and income distribution in Western Europe and the appraisal of alternative policies to mitigate negative effects. In chapter 8 the impact of changing demographic structures in industrial economies is studied by developing a social accounting framework that includes households by size. The functioning of the economy is investigated under a past economic demographic situation (Netherlands, 1981) and under a future simulated situation (2010) featuring a more differentiated demographic structure with a significant increase of the share of the one- and two-person households. Comparing the multiplier results of both SAMs, we shall find out that the income bias of the recent past towards the three- and more-person households tends to continue in the future. However, in the reconstructed SAM for 2010 there is a tendency towards a more progressive income distribution. The model simulates also the effects of the demographic changes on sectoral performance over time.

The completion of the research programme was made possible by the joint cooperation of a number of associates and co-authors. I like to acknowledge contributions of M.C. Braber, E. Gavrilenkov, Wu Gupei, F.N. Lafeber, T. Revesz, J.M.C. Tuyl, E. Zalai, M. de Zeeuw, L. Zienkowski, and Z. Zolkiewski. Typing and retyping were carefully done with the assistance of Annet van Loon and Jane Dolgova.

As was stated above, I have drawn in part on some of my published articles in economic journals and bundles. Appreciation goes to the following journals for the granted permission to employ the material: De Economist, Socio-Economic Planning Sciences, Journal of Policy Modelling, Economic Modelling, Acta Oeconomica.

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Chapter 1

Comparative SAM Matrices for West and East European Countries: Construction and Structural Differences

1. Introduction

By way of introduction it can be stated that the social accounting matrix, SAM, is compiled according to the same accounting principles as input-output tables, each transaction being recorded twice so that any ingoing in one account must be balanced by an outgoing of another account. However, the SAM contains a complete list of transactions describing income, expenditure and production flows among sectors, factors of production and groups of households. These transactions are usually grouped into several sets of accounts belonging to various economic agents, as will be elaborated later.

The SAM itself is nothing more or less than the transformation of the circular flow in the national economy into a matrix of transactions between the various agents. In a first phase an aggregate SAM is structured entirely from published data of the national accounts, corresponding with the circular flow; as such the SAM is no more than a presentation of available national statistics in a matrix form. In a second phase, the disaggregation of the SAM takes place depending on the purpose of the analysis and on available data sources.

The idea of a social accounting matrix, SAM, can be traced back to Quesnay's Tableau Economique in 1758. The idea was revived only 200 years later. Hicks coined the term social accounting in 1942; the realisation of a SAM was the work of Stone in 1947; and it was associates of Stone, working in the context of developing countries, who presented the first comprehensive publication of a SAM, cf. Pyatt and Roe (1977).

In the past two to three decades, there has been a noticeable shift of interest from the basic input-output matrix to the social accounting matrix, as evident from the increased momentum in the design, construction and

use of social accounting matrices in developing countries, see Cohen (2002).

There have been several considerations working in favour of extending the input-output towards the social accounting framework. First, the SAM is a helpful tool in setting up integrated statistical accounts of households, firms and government, in addition to those of activities, in transparent and consistent manners. The advantage of forcing national statistics into a social accounting framework is that the statistician can discover inconsistencies and gaps, which went, unnoticed before. Second, SAM facilitates the initialisation of corresponding economy-wide models. The discipline of building an explicit SAM assures that the initial values of the variables in the modelled system are internally consistent. Third, once a SAM is available it can be used to give a quantitative diagnosis of the structure of the whole economy, which is hardly feasible in the conventional presentation of national statistics. Fourth, there has been an increasing requirement by policy-makers and the larger public in developing countries to appraise development in terms of both growth and equity objectives. The SAM simultaneously integrated disaggregated data on production, income and expenditure, thereby allowing a systematic recording of circular transactions that are necessary for the study of growth and its distribution. Especially in the context of developing countries, the SAM has demonstrated its ability to analyse the underlying growth and equity properties of these economies. Fifth, the availability of SAMs for different countries and for more years allowed for the fruitful use of cross-country and inter-temporal comparisons on the structure and performance of economic systems, and investigates the economic mechanisms behind superior and inferior performances.

The construction and use of social accounting for developed economies is a later development and is the main concern in this volume. One of the first publications on the construction and use of the SAM for an industrial economy was for the Netherlands, Cohen (1988). The analysis contributed to a better understanding of the driving power of different sectors in causing economic growth and redistributionary incomes on earning households. The analysis evaluated also the growth and redistribution effects of state injections in sectoral activities and transfers among households. More SAM applications to the Netherlands and other industrial economies such as Germany, Italy and Spain followed suit. Chapters 5, 6, 7 and 8 will highlight various refinements that were incorporated in social accounting and economic modelling in the context of industrial economies.

The turnaround in the centrally planned economies of Eastern Europe,

and their entry in a transitional phase in which markets would play a more dominant role, opened an important opportunity for application of social accounting in these countries in recent years. In countries that are undergoing a transition from a planning-oriented economy towards a more market-oriented economy, the system of national accounts statistics had to be overhauled, and the SAM offered new and wider perspectives for such redesigns. More knowledge on the differences between planning and market systems and the functioning of the two systems as a whole can give much insight into the transformation process. As will be shown in a couple of chapters in this book, economy-wide models, like SAM, are very useful in identifying the content and direction of, and reaction to, basic economic changes in the transition phase from one to the other system. Chapters 1, 2, 3 and 4 of this volume will deal primarily with social accounting and economic modelling in transitional economies, even though in chapters 1 and 2 we shall apply comparative evaluations between Eastern and Western European countries.

Being the first chapter, the aim of this chapter is to briefly describe the main features of the SAM, explain how it is constructed, and review procedures for tabulation of standardised SAMs for countries that belong to different economic systems and that use basically different systems of national accounts statistics. Once the SAMs for Western and Eastern European countries are standardised, we shall reflect in this chapter on the structural differences between market- and planning- oriented economic systems as being represented by the selected six Western and Eastern European countries. We shall start with more analytical uses of the SAM from the next chapter onwards.

2. Construction of Standard SAMs for Four Western European Countries

As was just stated the SAM itself is nothing more or less than the transformation of the circular flow in the national economy of figure 1.1 into a matrix of transactions between the various agents as in tables 1.1 and 1.2, which will be shortly reviewed. In the lower bound of figure 1.1, households supply labour and capital to firms who are organisers of production activities; households are paid back in return for the use of their labour and capital factors.

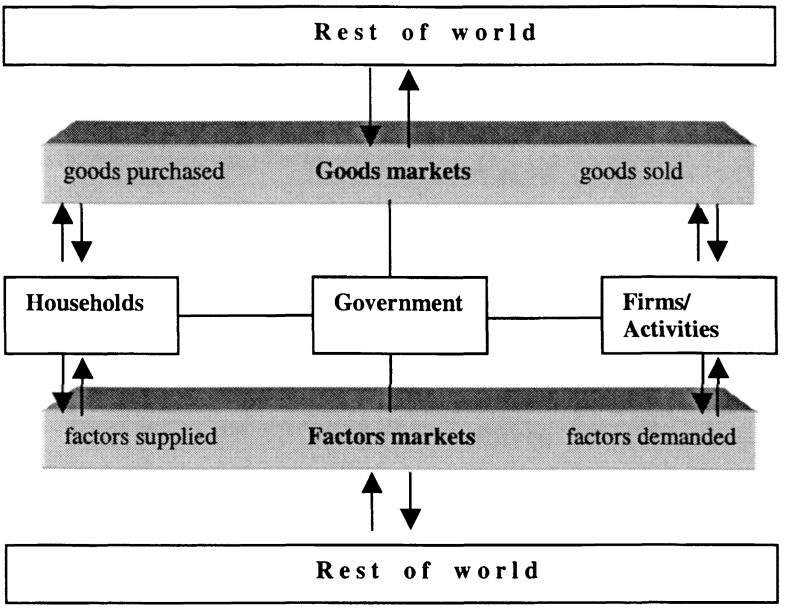

Figure 1.1. Circular Flow

In the upper bound, households spend their incomes on products that are delivered by the firms/activities. In the centre there is the government, which is involved in transfers to and from households and firms/activities. Furthermore, there are the economic relations between the country and the rest of the world.

A SAM contains the following list of accounts:

- Want accounts; indexed as 1.
- Factor of production accounts; indexed as 2.
- Institution accounts; indexed as 3. A distinction is made between current and capital transactions. Current transactions are disaggregated by whether they belong to households, firms, and government. Capital transactions are aggregated for all institutions in one national capital account.
- Activity accounts, and rest of the world accounts, indexed as 4.

The content of the SAM can be introduced further by means of table 1.1. The first set of accounts represents the want accounts. It is not obligatory to include these accounts in the SAM, but by incorporating the want accounts, we increase focus on a whole range of goods and services which are representative of levels of well being. These will usually include expenditure on food, housing, clothing, health, education, transport and other goods and services. It is informative to know, for instance, how much each specific household group spends on food and how this expenditure flows to agriculture and the non-agricultural sectors.

The factor of production accounts are meant to show how the value added generated in the various production activities are allocated over the production factors, and subsequently how these factor incomes are distributed to the current institutions. The SAMs constructed here make a distinction between the two major factors of production, namely labour and capital; either may be disaggregated further.

The institution current accounts are split up into accounts for households, firms and government. For any institution, by adding the different sources of incomes in the rows, we find the total incomings of that institution. In the columns we see how the institutions pay out some of their incomings as direct taxes and transfer payments, spend on consumer goods, and transfer their savings to the combined national capital account.

The capital transfers between the separate institutions - flow of funds - are netted and can therefore be left out from the SAM. It follows that domestic and foreign savings should be spent on capital goods. As a result, the national capital account shows total savings equal total investment.

The activity accounts show on the row the money receipts of the producing sectors from the sale of private and public consumption goods, investment goods, intermediate goods and exports. Column-wise, the sales revenue of the producing sectors go in part as value added to factors of production, indirect taxes, depreciation costs, and purchase of intermediate goods and imports. The sales revenue of each production activity is taken up in part by purchases of raw materials which may be either domestically produced or imported, these besides indirect taxes and subsidies and depreciation costs. Part of the production costs takes the form of value added paid out to the factors of production labour (wages) and capital (profits).

Table 1.1. Sam Entries

	(1) Wants	(2) Factors	(3) Institutions				(4) Activities		Totals
			Households	Firms	Government	Capital	Production sectors	Rest of World	
Wants			households spendings						Wants expenditure
Factors							Domestic value added	Foreign factor payment	Factors income
Institutions Households		Households factor income			Public transfer to households			Transfers	Households income
Firms		Firms factor income			Public debt servicing				Firms income
Government		Public enterprise profit	Households direct taxes	Firms direct taxes			Indirect taxes	Transfers	government income
National capital			Households savings	Firms savings	Public savings		Depreciation	Deficit balance of payments	Gross capital formation
Activities Production sectors	Private consumption				Public consumption	Investment goods	Intermediate goods	Exports	Gross production
Rest of World			Transfers		Transfers		Imports		Outgoings
Totals	Wants receipts	Factors income	Households income	Firms income	Public income	Gross capital formation	Gross production	Receipt rest of world	Grand total

Finally, in the rest of the world account, imports and exports are matched with incoming and outgoing foreign transfers. Intermediate goods, consumer goods, investment goods and exports. The row gives the distribution of imports on consumption goods, investment goods, intermediate goods and transit imports for re-exports. The column gives the expenditure of the external world in the form of net factor incomes from abroad, net household and government transfers, net capital inflow and export and transit balances of goods and services.

We show as an example the aggregate SAM of Germany in table 1.2, those of the other Western European countries are in the appendix. These are no more than a presentation of available national accounts statistics in a matrix form. Table 1.3 displays the example of the obtained SAM for Poland; the SAM of Hungary is in the appendix.

Table 1.2 SAM for Germany (1984, billion marks)

	1	2	3	4	5	6	7	8	9	Total
1 Wants				1003.6						1003.6
2 Labour								950.5	3.5	954.0
3 Capital								393.4	10.6	403.9
4 Households		954.0	343.0			299.0			-12.1	1583.8
5 Firms			81.7			4.0			-0.5	85.2
6 Government	87.8		-20.7	489.8	37.8		19.7	79.8	-17.2	671.0
7 Capital				90.5	47.3	23.8		222.0	-22.3	361.2
8 Activities	823.3					350.2	310.6	1508.5	476.9	3469.5
9 ROW	92.5						30.9	315.4	60.6	499.4
Total	1003.6	954.0	403.9	1583.8	85.2	677.0	361.2	3469.5	499.4	9037.6

Table 1.3. SAM for Poland (1987, billion zlotys)

	1	2	3	4	5	6	7	8	9	Total
1 Wants				8736						8736
2 Labour								8332		8332
3 Capital								7431		7431
4 Households		6740	851			1561			375	9526
5 Firms			5616			316				5932
6 Government		1592	964	180	2616			72	57	5481
7 Capital				610	3316	-164		1130	-8	4884
8 Activities	8371					2937	4425	19373	3516	38623
9 ROW	365					831	458	2286	109	4049
Total	8736	8332	7431	9526	5932	5481	4883	38623	4049	92994

Once the matrix was constructed, each account within it was disaggregated on the basis of additional data from surveys of the labour force, household income and expenditure, input-output deliveries, finance, government, trade and other statistics to give the disaggregated SAM, which is really what we are after. The disaggregated SAM tables are found in the appendix at the end of the book with notes on their construction and data sources.

With the comparative analytical purposes in mind, as set out in the introduction above, the individual SAMs have been standardised to give the following details.

1. The wants account is subdivided in six groups of products: foodstuffs, housing, clothing and footwear, medical care and hygiene, recreation and culture and transport, and other goods and services with few exceptions regarding Italy.
2. The factors account distinguishes between labour and capital.
3. The households are classified by income deciles, with the exception of Spain for which directly available data are more aggregate.
4. The classification of activities covers five sectors: agriculture, industry, trade, transport and services.

All SAMs were calculated and stored in spreadsheet format, which has the advantage that row and column totals can be checked simultaneously while changing any cell in the matrix. Additional matrix operations can also be easily performed in a spreadsheet.

3. Reconstructing Statistics and SAM Tabulations for Eastern European Countries

There are several problems connected with the construction of standard SAMs for Eastern Europe comparable to those of Western Europe. The System of National Accounts (SNA), held in Western Europe, and the Material Product System (MPS), held in Eastern Europe, differ (a) in the ways detailed items are defined or assigned and (b) how balances are consolidated. With regard to (a), appendix 2 at the end of this book contains a discussion of the treatment of several detailed items in both systems. Adjustment for all these detailed items is not feasible. On the other hand, the differences lose their relevance and significance in the context of the broad classification of the SAM followed. With respect to (b), the consolidation of balances, appropriate supplementation of the data

and conversions have been applied to conform to SNA.

The conventional SAM accounting scheme is sufficiently flexible to accommodate for the P-system as it does for the M-system. The main difference between the two systems lies in the principle that, in the extreme, the P-system property belongs to the state with minor private ownership, while in the M-system property is both publicly and privately owned. As far as statistics are concerned, there are differences in degree and not in substance. In practice, in the P-system there can be a significant share of the so-called 'other income', which originates mainly from the operation of private farms, small unincorporated enterprises, handicrafts and household production, while in the M-system state ownership is no less significant. In the factor account, all incomes are distributed over labour and capital, the bulk of which in the M-system is transferred to households and small parts are retained by firms and government and in the P-system it is largely retained by the firms and government.

In principle, with a view to the transition, a distinction by type of firms, whether public or private, can be useful. Such a distinction is also feasible. For example, for Poland it was possible to distinguish between socialised firms, private firms, private farms, banking and insurance companies. It is to be noted that the size of the private sector outside agriculture and the number of so-called commercial banks in Poland and Hungary was in both 1981 and 1990 not yet important, but started to grow faster from 1990 onwards. For the moment, only one account for all firms combined is used, with a possibility of elaboration in the future.

The *government* sector in P- and M-systems has similar tasks, but with different emphasis. The different degrees of emphasis on government versus social security expenditures in the two systems makes it desirable to classify the government sector into government and social security, separately. Besides, the social security funds in the P-system are often covered on budget rather than on insurance basis. For the aggregated comparison in this chapter we do not separate social security from government, as yet.

The main transactions relating to the *capital accumulation* account are savings (in cash or in the bank) and credits. Although both activities are performed in P- and M-systems, there are large differences between the two economic systems in the field of finance. Covering these differences would require a further disaggregation of the capital accumulation account in the form of flow of funds tables. This was not done in the present research, due to the scarcity of consistent data on financial flows.

Considering the *activities* account, the main feature of the MPS, and perhaps the most wellknown, is the consideration of material productions

as being the sole production activities. Marxist economists, in conformity with the classical economists, regard services as non-productive activities. As a result, in official statistics, the non-material services were excluded from the national accounts and input-output tables. Both intermediate deliveries between material and non-material sectors of activity and the consumption of non-material services were often recorded as direct transfers between firms or between firms and government. As GDP and input-output tables are now available according to SNA principle: (at least partly), the content of the activities account does not differ much any more between Eastern and Western European countries. For the level of aggregation used in the SAM, it was possible to use an almost identical classification for the six countries.

Transactions with the *Rest of the World* take the form of income and capital transfers, and value of imports and exports of goods and services. There are no differences between the two types of economies in the above respect, except that statistical sources may be incomplete for Poland and Hungary in the case of transfers, causing some bias.

4. Structural Differences in the Six SAMs

A comparison of structural parameters of the SAMs for countries belonging to different economic systems can be useful in reviewing basic structural differences behind the systems. The purpose of this section is to use the SAMs for gaining insight into the structural differences between market- and planning-oriented economic systems, while reserving the more analytical tasks to subsequent chapters. One way of presenting the underlying structure of the SAM is to express each entry as a percentage of the grand total of matrix. Examples are presented in tables 1.4 and 1.5 for Germany and Poland, taking as 100% the matrix total found at the bottom of last column and last row. The appendix contains tables for the other countries. Expressing the entries in terms of the grand total of the matrix has the advantage of providing a comparable basis for evaluating the relative importance of individual flows in the various countries. Alternative presentations are when the total of individual columns or individual rows are taken as 100%.

Already on the basis of the aggregated SAM and such calculated percentages as mentioned above, one can observe important structural differences between the two economic systems as represented by the six selected countries. Table 1.6 presents some key percentages derived from the SAMs in the appendix. Rows 1 to 4 give gross output, intermediate