Structural features of the Mozambique economy through the lens of a 2019 social accounting matrix

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Abstract: This study presents and discusses structural features of the Mozambique economy through the lens of a recently constructed 2019 social accounting matrix (SAM). This is an important reality check of the SAM construction process since it brings together various data sources that are not necessarily consistent with each other into a single framework. A number of dimensions are explored including industry composition and factor earnings, imports and exports, household income and expenditure and some labour market data. Agriculture remains a dominant industry in Mozambique accounting for over 70 per cent of employment although its contribution to GDP is about 25 per cent. On the other hand, services, public and private together, represent 48 per cent of GDP and 21 per cent of employment. Manufacturing plays a minor role at 10 per cent of GDP and just over 4 per cent of employment, while mining with just over 11 per cent of GDP, accounts for just over 1 per cent of employment. In spite of the importance of agriculture for employment, a little over a third of household income is earned in rural areas. Some simple multiplier calculations show low economic integration.

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1   Introduction

The Mozambique economy has, according to the World Development Indicators (WDI), been growing at robust rates of between 6–10 per cent per annum since the early 2000s. During the mid-2010s this growth slowed down to between 2.5–4 per cent, with negative growth in 2020 due to the COVID-19 pandemic. The year 2021 saw growth recover to just over 2 per cent with the lifting of pandemic restrictions and relatively favourable weather conditions (World Bank 2022). The IMF (2022) expects economic growth to increase, back to the earlier robust rates, over the next 5 years. However, the World Bank (WB) (2022) foresees several uncertainties, in particular around the restart of natural gas extraction and liquefied natural gas (LNG) production, in spite of supportive world prices. At this stage, they see recovery being led by agriculture and services with the former offering further potential to build back better from the pandemic. In particular, the WB sees reform in the agricultural sector as a major contributor to sustainable economic development given that a large part of the population is engaged in it. Such reforms need to be planned carefully as they consist of a number of components, some of which are recommended to be abolished while others are to be introduced. The timing of phasing out and phasing in these elements need to be such that harm to any one group of low-income households (rural vs urban) is avoided. In other words, there may be unintended negative consequences for some groups in the Mozambique society which need consideration by policy-makers.

An economy-wide approach is important for considering such agricultural reforms and those in other industries (detailed mining, manufacturing, and services). Economy-wide policy analysis requires economy-wide analysis tools, and if this is to be undertaken in a quantitative way — so that evidence can be presented easily — an economy-wide database needs to be considered. A social accounting matrix (SAM) is a database that is well suited to engage in economy-wide policy analysis since it offers a snapshot picture of an economy — of Mozambique in this case — in a fair amount of detail in terms of productive industries, product markets, factor markets and a range of institutions and transfers amongst them. Several types of models can be built with a SAM, including linear multiplier models and computable general equilibrium (CGE) models. In less developed countries (LDCs) models based on SAMs are popular as it creates a laboratory for sensible 'what if' type of policy analysis to be examined in an economy-wide context using a framework with policy relevant detail without having to resort to data-hungry time series.

Recently, a 2015 SAM for Mozambique by (Cruz et al. 2018) was updated to the year 2019 (Cruz et al. 2022). The 2019 update was justified due to changes in the economic structure as captured by a new and expanded Supply and Use Tables (INE 2022a) and National Accounts (INE 2021a) and the availability of a new Household Budget Survey (INE 2021b) data for the period 2019–20. Other data used for the 2019 update are: industry-level gross domestic product (GDP) data, Balance of Payment data, Government Finance Statistics and World Development Indicators. Moreover, a number of recent SAM applications (Betho et al. 2021; Hartley et al. 2016; Mondlane and van Seventer 2019a, 2019b) suggest the usefulness of a SAM update.

The process of compiling a SAM involves bringing together a range of disparate datasets which are reconciled in various ways. This process often reveals data gaps or mismatches. An iterative process is followed to reduce such gaps during the construction of the SAM. Where this is not possible because some data have already been published, data gaps can be addressed in the next edition of the compilation of the underlying data sources. However, to resolve them as part of a current SAM edition, the process often culminates in the use of one or other balancing routine. Without going into details, it is sufficient to point out at this stage that one way to check whether the results of a SAM update/construction seem plausible is by using it as a descriptive analysis

tool. Such analysis would reveal whether some of the structural features of the Mozambique economy are firmly rooted in its stylized facts.

Section 2 explains what a SAM is in some detail, while we discuss in section 3 features of economic structure, including value added, labour intensity and value-added multipliers. Section 4 considers trade with the rest of the world and the current account of the balance-of-payments, followed by government income and expenditure in section 5. Section 6 presents some details on household expenditure and income while labour market issues are discussed in section 7. Section 8 summarises and concludes.[1]

2   What is a SAM?

A SAM is in essence a clever bookkeeping mechanism. In it, the money flows in the real economy of a single country are presented in the form of a square matrix. This can be interpreted as an economy-wide accounting framework. Each account is shown by a row and matching column so that a non-zero cell of this matrix captures the payment received by the account with the row heading *from* the account with the column heading. The accounting is based on the principle of traditional double-entry bookkeeping in that for each account, total revenue (a row total) in what appears to be an oversized chess board, equals total expenditure (column total).

A distinction is made in a SAM between productive activities (industries) and markets for goods and non-factor services (commodities or products). Industry accounts are valued at basic prices while products are valued at market or purchaser prices. The latter includes product taxes and trade and transport margins. Products are either imported or produced by local industries.

The factors of production generate value added or GDP in each industry. They are payments by these industries to the production factor capital (gross operating surplus) and labour, and the use of land or livestock. Some of this income is transferred directly to a household account (income from labour, land, livestock), some of it is channelled to a dedicated enterprise account (gross operating surplus). The latter is distributed to households as the ultimate owners of the capital stock (by being shareholders in enterprises) after provision for taxes, transfers (to government and the rest of the world) and savings is made. Households and enterprises accounts may also receive some transfers from the government and the rest of the world.

Government consists of a number of tax collection accounts as well as a government outlay account. Government transfers to enterprises, households, government itself, and the rest of the world are taken as reported in the Government Budget, and Balance of Payment statistics.

Savings collected by the various institutions, including the rest of the world, are used to finance investment demand of particular types of commodities — such as machinery, transport equipment and construction works.

Apart from using a SAM for modelling what-if type of questions, it can also serve the purpose of a descriptive analysis tool. By extracting, reorganizing, and presenting data from a SAM it may be

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[1] National accounts and industry-level GDP of the 2019 SAM matches published data at macro and the 1-digit industry level (INE 2021a) by design. There are potentially some differences with the underlying detailed industry-level GDP but the latter is 'unpublished'. The same applies to other data such as detailed imports, exports, investment demand and household expenditure by commodity, which is only available from unpublished INE SUT data. Such differences are essentially the result of balancing the SAM. These differences are not explored in this paper.

possible to highlight structural features of the Mozambique economy at a given point in time (2019 in this case). It is this use of the SAM to which we now turn.

3   Economic structure

The exposition starts with the contribution by each of the 51 activities identified in the 2019 SAM to GDP at factor costs, i.e., excluding activity taxes (which are zero for Mozambique anyway). One could therefore also talk about GDP at basic prices in this case. Note that aggregation has an impact on the shares, hence the high share of wholesale and retail trade in Table 1 (columns 1-2). The same applies to the second (public administration) and the third (transportation storage) and entry in the table. Unsurprisingly, those activities feature highly in this ranking. The same also applies, albeit to a lesser degree, to the broad industry of metal and metal products. Nevertheless, more narrowly specified activities such as maize and coal also rank in the top ten as well as Information and communication services. Natural gas is found much lower in the ranking with a share of 2.3 per cent, although higher than construction and accommodation and food services as well as fruits and nuts.

In the second tableau, in which GDP is presented for seven highly-aggregated industries, it can be seen that agriculture is the second most important activity in the Mozambique economy after private services but more important than mining and manufacturing together. Back in the first tableau, the downstream activities of agriculture represent only 1.5 per cent (meat, cereal and vegetable processing and other foods but excluding beverages) of GDP. The reason is, as will be seen later, the dominance of subsistence agriculture, but it does show potential for expansion. More detail of these downstream activities would be required to develop a clearer picture of possible value chain development. Similarly, the high share of metals and metal products may call for more detail in SAM. Are there potential activities downstream from aluminium production or otherwise?

Table 1: Contribution to GDP at factor costs according to 2015 and 2019 SAMs for Mozambique (current prices)

		1	2		3	4
		2019 Value added	2019 Value added share %		2015 Value added	2015 Value added share %
	Tableau 1			Tableau 3		
1	Wholesale + retail trade	95,249	11.1	Transportation + storage	54,611	10.1
2	Public administration	64,691	7.6	Wholesale + retail trade	53,283	9.9
3	Transportation + storage	62,681	7.3	Education	48,664	9.0
4	Maize	59,614	7.0	Public administration	41,284	7.7
5	Coal + lignite	56,769	6.6	Maize	38,686	7.2
6	Education	40,549	4.7	Natural gas	25,399	4.7
7	Information + comms.	35,094	4.1	Electricity, gas + steam	19,664	3.6
8	Metals + metal products	30,427	3.6	Vegetables	19,585	3.6
9	Real estate activities	27,888	3.3	Real estate activities	18,947	3.5
10	Electricity, gas + steam	27,750	3.2	Information + comms.	18,158	3.4
11	Pulses	24,705	2.9	Business services	17,501	3.2
12	Business services	21,809	2.5	Construction	13,848	2.6
13	Other mining	21,272	2.5	Health + social work	11,440	2.1
14	Sorghum + millet	19,780	2.3	Metals + metal products	11,204	2.1

15	Natural gas	19,506	2.3	Fishing	8,734	1.6
16	Construction	16,156	1.9	Other foods	8,681	1.6
17	Accommod. + food services	15,632	1.8	Finance + insurance	8,590	1.6
18	Tobacco	15,308	1.8	Coal + lignite	8,399	1.6
19	Vegetables	15,285	1.8	Forestry	8,359	1.6
20	Fruits + nuts	14,690	1.7	Non-metal minerals	7,787	1.4
21	Health + social work	14,047	1.6	Cassava	6,374	1.2
22	Beverages + tobacco	12,865	1.5	Accommod. + food services	6,330	1.2
23	Forestry	12,833	1.5	Cereal + veg. processing	6,022	1.1
24	Chemicals	12,295	1.4	Groundnuts	6,005	1.1
25	Poultry	11,057	1.3	Pulses	5,887	1.1
26	Fishing	8,673	1.0	Wood + paper	5,866	1.1
27	Non-metal minerals	8,631	1.0	Tobacco	5,846	1.1
28	Other roots	8,522	1.0	Sugar cane	5,377	1.0
29	Other livestock	7,809	0.9	Other livestock	5,186	1.0
30	Other foods	7,398	0.9	Poultry	4,910	0.9
31	Sugar cane	7,381	0.9	Sorghum + millet	4,585	0.9
32	Other services	7,234	0.8	Other services	4,151	0.8
33	Wood + paper	6,470	0.8	Beverages + tobacco	3,267	0.6
34	Finance + insurance	6,134	0.7	Other manufacturing	3,167	0.6
35	Groundnuts	5,342	0.6	Machinery + equipment	2,777	0.5
36	Machinery + equipment	4,965	0.6	Chemicals	2,698	0.5
37	Rice	4,440	0.5	Meat	2,205	0.4
38	Other crops	4,414	0.5	Other mining	2,112	0.4
39	Cereal + veg. process.	3,943	0.5	Fruits + nuts	2,018	0.4
40	Other cereals	2,891	0.3	Other crops	1,998	0.4
41	Other manufacturing	2,731	0.3	Clothing	1,736	0.3
42	Water supply + sewage	2,197	0.3	Rice	1,697	0.3
43	Cassava	1,480	0.2	Other roots	1,572	0.3
44	Meat	1,396	0.2	Water supply + sewage	1,023	0.2
45	Cotton + fibres	1,352	0.2	Other oilseeds	915	0.2
46	Clothing	1,231	0.1	Cattle	750	0.1
47	Cattle	1,154	0.1	Textiles	586	0.1
48	Other oilseeds	854	0.1	Cotton + fibres	559	0.1
49	Textiles	522	0.1	Other cereals	232	0.0
50	Leather + footwear	146	0.0	Leather + footwear	105	0.0
51	Coffee + tea	19	0.0	Coffee + tea	7	0.0
	Total	855,281	100.0	Total	538,783	100.0

	Tableau 2			Tableau 4		
A	Agriculture	233,064	27.3	Agriculture	129,280	24.0
B	Mining	103,459	12.1	Mining	35,910	6.7
C	Manufacturing	85,020	9.9	Manufacturing	56,101	10.4
D	Utilities	26,902	3.1	Utilities	20,687	3.8
E	Construction	12,295	1.4	Construction	13,848	2.6
F	Private services	280,708	32.8	Private services	181,571	33.7
G	Public services (incl. Health + Educ)	113,832	13.3	Public services	101,387	18.8
	Total	855,281	100.0	Total	538,783	100.0

Source: 2019 and 2015 Mozambique SAMs and authors' calculations.

Construction is an important activity at 2.3 per cent of GDP but which subsectors of construction are the drivers is not clear from the SAM. Is it infrastructure or non-residential or residential

construction activities? Surprisingly small contribution are reported for industries such a textiles and clothing and banking. On the other hand, information and communication is relatively important with a share of just over 4 per cent.

In tableaus 3-4 (columns 3-4) the 2015 GDP values as reported in the 2015 SAM is reported. It should be noted that the SAM construction is not quite the same. The 2015 Use Table has been replaced by INE and the 2019 SAM features benchmarking on 1-digit industry-level GDP which was not the case in 2015, amongst other differences. At the level of the seven 1-digit industries, tableau 4 versus tableau 2, suggest that mining and agriculture have become more important since 2015 while services have become less important. Nevertheless, the same more detailed services sectors remain important contributors to GDP when comparing tableau 3 with tableau 1. Coal mining and metals and metal products have become more prominent while gas became less so.

Table 2: Income to workers' share in GDP for selected industries according to 2019 SAM for Mozambique (for detailed industries (tableau 1) and high-level industries (tableau 2)

		Share in total wage earning %	Labour share in value added %
	Tableau 1		
1	Other services	1.3	97.1
2	Public administration	12.9	96.4
3	Health + social work	2.8	94.7
4	Education	6.2	85.1
5	Construction	2.2	84.8
6	Other oilseeds	0.1	83.3
7	Sorghum + millet	3.7	81.9
8	Coal + lignite	10.6	81.9
9	Groundnuts	0.9	81.6
10	Vegetables	2.6	80.6
11	Other Industries	56.8	44.5
12	Total	100.0	56.5
	Tableau 2		
1	Agriculture	32.4	67.1
2	Mining	12.7	59.4
3	Manufacturing	6.4	36.6
4	Utilities	2.0	35.8
5	Construction	2.2	84.8
6	Private services	22.5	38.7
7	Public services	21.8	92.7
8	Total	100.0	56.5

Note: Tableau 1 shows the top 10 detailed SAM industries, ranked according to the share of labour in value added. Tableau 2 shows the same as tableau 1 for seven main industries, not ranked.

Source: 2019 Mozambique SAM and authors' calculations.

Gross domestic product or value added represents payments to the factors of production capital and labour, land, and livestock. Table 2 presents the top ten activities identified in the Mozambique SAM in terms of the shares of labour in value added. This offers a view on the functional distribution of income in Mozambique. At the economy-wide level, labour accounts for 56 per cent of GDP at basic prices, see row 11 of the first tableau where it can also be seen that as expected, public and related services (health and education) as well as other services are highly labour intensive (in terms of wage earnings share), followed by construction and agricultural crop activities.

This is confirmed in the second tableau for the seven highly-aggregated 1-digit industries, where, by simple subtraction of the rates from unity, it can be seen that manufacturing and utilities are more capital intensive followed by private services and mining. What is interesting (but not shown here), is that the all-important and substantially sized metals and metal products manufacturing subindustry (including aluminium) is, at close to 40 per cent, only a little more labour intensive than the manufacturing as a whole. This suggests that there may be other manufacturing industries that are even more capital intensive or that there could be more labour-intensive metal products activities, perhaps downstream from the metal (aluminium) activity. As mentioned above, more detail would be useful in this regard.

In the more aggregate setting of seven main industries, public services and construction are most labour intensive followed by mining and agriculture. Public services here includes both education and health. Mining's relatively high labour share in value added can be attributed to the more than 80 per cent share in coal mining. This is surprising since the main coal deposits in Mozambique are extracted by means of open cast.

Table 3: Income to capital's share in GDP for selected industries according to 2019 SAM for Mozambique (for detailed industries (tableau 1) and high-level industries (tableau 2)

		Share in gross operating surplus %	Capital share in value added %
	Tableau 1		
1	Real estate activities	5.2	98.5
2	Fishing	3.1	88.8
3	Clothing	0.3	88.6
4	Textiles	0.1	87.8
5	Non-metal minerals	1.8	87.7
6	Meat	0.3	85.2
7	Other mining	4.6	80.3
8	Machinery + equipment	1.0	80.2
9	Chemicals	1.8	78.6
10	Leather + footwear	0.0	76.6
11	Other Industries	81.7	39.1
12	Total	100.0	43.5
	Tableau 2		
1	Agriculture	20.6	32.9
2	Mining	11.3	40.6
3	Manufacturing	14.5	63.4
4	Utilities	4.6	64.2
5	Construction	0.5	15.2
6	Private services	46.2	61.3
7	Public services	2.2	7.3
8	Total	100.0	43.5

Note: Tableau 1 shows the top 10 detailed SAM industries, ranked according to the share of capital in value added. Tableau 2 shows the same as tableau 1 for seven main industries, not ranked.

Source: 2019 Mozambique SAM and authors' calculations.

Table 3 presents the mirror image of the labour share in value added. Here, the capital share in value added includes payments for the use of land and livestock. Apart from real estate activities, non-metal minerals, clothing and textiles, meat processing, fishing and other mining show some of the highest shares of value added that are appropriated by the production factor capital.

Surprisingly, textiles, clothing and leather products are amongst them, albeit small in size, the opposite is often the case in typical LDCs.

At the broad activity level, manufacturing and utilities are highest in terms of capital intensity followed by private services, mining, and agriculture.

Table 1 considered the direct contribution of each sector to GDP but ignores the indirect effects that each sector has to the other sectors in the economy through their intermediate inputs and sales.[2] Such indirect effects are taken into account in the next table in which the value-added multipliers are calculated as the matrix product of the value added — output ratios and the relevant matrix of the open Leontief inverse of the SAM.

One complication is that the SAM makes a distinction between home consumption and marketed consumption by households. Home consumption is recorded in the SAM as a final demand directly supplied by industries, while marketed demand is supplied by the product accounts. There are therefore potentially two drivers of the multiplier process, i.e., a 1 unit (or MT million) increase in industry home consumption and a 1 unit (or MT million) increase in marketed product demand. For reasons of convenience, own consumption by households in the 2019 Mozambique SAM has been reallocated and merged with marketed consumption by households so as to create a unified multiplier measurement.

Multipliers in and off themselves are useful when doing impact analysis as they can be used to 'multiply' a change in final demand of a specific product that is associated with a policy intervention or exogenous shock. To do so, SUT multipliers are driven by a 1 unit (or 1 MT million) increase in final demand for a product. Thus, output in an industry is directly raised by the same amount as the assumed increase final demand. For analysis of structural features, we also want to understand the indirect multiplier effects on their own. The latter can be seen as the knock-on effects and act as an indication of the interconnection of the various industries in the economy. This requires decomposing the multiplier into initial GDP, direct GDP impacts and indirect GDP impacts.

While the textbook approach (Miller and Blair 2009: 195–96) suggest that the basic principle of SUT-based models — in which products as well as industries are identified — exogenous change is driven by exogenous product demand, it does not seem to be possible to develop an industry-by-commodity direct impact matrix. The dimensions of direct impact matrices are either industry-by-industry or product-by-product. Because we want to express the multipliers in terms of GDP the industry-by-industry direct impact matrix would be the obvious choice.[3]

The total and direct requirement matrices that we are interested in can be derived using the industry technology or the commodity technology assumption. The latter is, however, not possible if the number of products — as in the Mozambique SAM — is larger than the number of industries (Miller and Blair 2009: 212). We therefore have to work with the industry technology assumption

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[2] But ignoring the household income–expenditure loop. Doing so is often referred to as the 'open' (to households) multiplier.

[3] This comes with a warning from Miller and Blair (2009: 197) in that the multiplier process in an industry-by-industry model is driven by final demand expressed in terms of industries. This is a concept that is not very convenient in the SUT context where final demand is expressed in terms of products. Miller and Blair suggest that the industry-by-industry format can still be used for structural change analysis — which is what we are in a sense trying to do. They point to a product-to-industry final demand transformation in the same way that the SUT allows for a product-to-industry output transformation in order to make the industry-by-industry SUT multiplier model internally and conceptually coherent.

in which different products produced by an industry are all assumed to have the same intermediate input pattern of that industry.[4]

We can now turn to the results. The first observation to make here is that value added multipliers are usually higher than unity for a middle-income country (such as, say, South Africa). The table suggest that this is not the case for Mozambique. One reason is that imports and indirect taxes on products which act as a leakage from the initially assumed increase in demand but also indirect intermediate demand, are relatively high in Mozambique. In general, this suggests that the economy is less self-sufficient compared to, say, South Africa, which is a reasonable stylized fact. More self-sufficiency implies more connections or linkages amongst industries (via the product markets) and therefore tend to yield higher multipliers.

Table 4 shows results. The industries are ranked according to total GDP multiplier impacts in column 5. For example, for a one unit (or 1 MT million) increase in (transformed) final demand of Other livestock, GDP increases by 0.992 (MT million). In column 1, it can be seen that this industry accounts for 0.9 per cent in Mozambique's total GDP according to the underlying SAM data. If final demand in other livestock increases by one unit, its output increases initially by the same. The GDP embodied in that output is shown in the second column, i.e., the ratio of GDP to output. The direct GDP requirements as discussed earlier, are reported in the third column. The first element of the column can be interpreted as the GDP embodied in the sum of the industry inputs per unit worth of other livestock industry output. In a sense, this captures the GDP embodied in the first round of the multiplier process.

Table 4: Value-added multipliers for top and bottom ranked industries based on the supply-use component of a 2019 SAM for Mozambique

		1	2	3	4	5	6
		GDP	Initial	Direct	Indirect	Total	Dir + Ind
		Share %	GDP/X	GDP	GDP	GDP	/Total GDP %
1	Other livestock	0.9	0.9909	0.0006	0.0008	0.9924	0.1
2	Cattle	0.1	0.9798	0.0014	0.0018	0.9830	0.3
3	Poultry	1.0	0.9634	0.0025	0.0033	0.9693	0.6
4	Pulses	3.3	0.8591	0.0835	0.0115	0.9541	10.0
5	Maize	7.0	0.8666	0.0382	0.0101	0.9150	5.3
6	Sugar cane	0.8	0.8988	0.0069	0.0092	0.9149	1.8
7	Vegetables	1.8	0.8977	0.0070	0.0093	0.9140	1.8
8	Sorghum + millet	2.5	0.8944	0.0072	0.0096	0.9113	1.9
9	Tobacco	1.8	0.8892	0.0076	0.0101	0.9069	2.0
10	Electricity, gas + steam	2.9	0.6277	0.2496	0.0238	0.9012	30.3
11	Groundnuts	0.6	0.7523	0.0992	0.0242	0.8757	14.1
12	Fruits and nuts	1.7	0.8160	0.0126	0.0167	0.8453	3.5
13	Other cereals	0.3	0.8079	0.0131	0.0175	0.8385	3.7
14	Other roots	1.0	0.7935	0.0142	0.0189	0.8265	4.0
15	Water supply + sewage	0.3	0.3442	0.4375	0.0426	0.8243	58.2
37	Fishing	1.5	0.3508	0.1338	0.0896	0.5742	38.9
38	Wholesale + retail trade	11.1	0.3556	0.1619	0.0556	0.5731	38.0
39	Cassava	0.2	0.4475	0.0638	0.0512	0.5625	20.4

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[4] As opposed to the commodity technology assumption in which each product has the same intermediate input pattern in all the industries that produce it. The choice of technology is actually not relevant in the case of the 2019 Mozambique SAM since its supply matrix is diagonal.

41	Other manufacturing	0.3	0.4103	0.1047	0.0375	0.5525	25.7
42	Metals + metal products	3.2	0.3771	0.1265	0.0454	0.5491	31.3
43	Transportation + storage	6.6	0.4515	0.0613	0.0276	0.5405	16.5
44	Education	4.1	0.4618	0.0504	0.0254	0.5377	14.1
45	Leather + footwear	0.0	0.4636	0.0480	0.0147	0.5263	11.9
46	Textiles	0.1	0.2907	0.2042	0.0301	0.5249	44.6
47	Construction	1.4	0.3059	0.1503	0.0635	0.5197	41.1
48	Clothing	0.1	0.3804	0.0991	0.0376	0.5170	26.4
49	Wood and paper	0.7	0.2459	0.1595	0.0547	0.4600	46.5
50	Machinery + equipment	0.5	0.1699	0.1693	0.0616	0.4008	57.6
51	Health + social work	1.6	0.2774	0.0655	0.0331	0.3760	26.2
52	Coffee + tea	0.0	0.0404	0.0667	0.0901	0.1973	79.5
	Total	100					

Source: 2019 Mozambique SAM and authors' calculations.

The fifth column accounts for initial, direct, and indirect GDP, where the latter (column 4) is calculated as the difference with the sum of initial and direct GDP in columns 2 and 3 respectively. The indirect GDP measure accounts for the GDP embodied in all the rounds of the multiplier process in addition to the initial and direct GDP impacts. Direct and indirect GDP for Other livestock, Cattle and Poultry are seen to be very low and their high ranking for total GDP is mostly due to the high GDP to output ratios, i.e., the initial effect. This suggests that these industries have very low reach into the Mozambique economy despite the high GDP multipliers. What may, therefore, be of more interest is to consider the ratio of the difference between total and initial GDP impact to the initial GDP impact for each industry. This is shown in the last column. Thus, the initial per unit GDP of other livestock is only raised by 0.1 per cent when accounting for the backward linkages in the Mozambique economy as represented by the 2019 SAM.

In Table 4, it can be seen that the highest GDP multipliers are mainly found amongst agricultural products but that this is explained mainly because of the initial per unit GDP embodied in their production. Pulses (row 10) and groundnuts (row 12) are the only crops that are able the generate a double-digit percentage lift from initial to total GDP impacts. Others that do so are non-agriculture industries.

In the bottom part of the table, those industries with the lowest GDP multipliers are shown. Although there are some crops amongst them, they make a very low contribution to GDP (see column 1) and, apart from casava, have limited reach into the rest of the economy through the backward linkages. Most other industries reported in the bottom half of the table are part of manufacturing and services. They seem to connect much more to the Mozambique economy than agriculture which makes sense due to the subsistence characteristics of the latter.

While agriculture may not be linking much to the rest of the economy in terms of backward linkages, the potential for forward linkage is ignored in the discussion above. Without going into a formal forward linkage analysis, it may be worth checking out how food processing fares in terms of the measures introduced in Table 4.

Table 5 shows that food processing and related industries are middle of the park in terms of GDP multipliers, ranging from 22–36 but that their direct and indirect GDP requirements are relatively high. From a policy perspective, this may be of interest. Getting more produce to the market and making it available downstream activities could be beneficial. The industries shown in Table 5 represent less than 5 per cent of total GDP (including beverages and accommodation and food services). As mentioned earlier there seems to be considerable potential for expansion of food processing and it has benefits build a bridge to agriculture.

Table 5: Value-added multipliers for selected industries based on the supply-use component of a 2019 SAM for Mozambique

		1	2	3	4	5	6
		GDP	Initial	Direct	Indirect	Total	Dir + Ir
		Share %	GDP/X	GDP	GDP	GDP	/Total GDP %
22	Meat	0.2	0.1406	0.5110	0.0709	0.7225	80.5
25	Accommod. + food services	1.8	0.4983	0.1235	0.0570	0.6787	26.6
30	Other foods	0.9	0.2975	0.2986	0.0596	0.6557	54.6
34	Beverages + tobacco	1.5	0.4137	0.0984	0.0973	0.6094	32.1
36	Cereal + veg. processing	0.5	0.1426	0.3871	0.0622	0.5919	75.9

Source: 2019 Mozambique SAM and authors' calculations

4 Trade and balance of payment

Next, we turn our attention to how the Mozambique economy connects to the rest of the world as reported in the new 2019 SAM. Table 6 shows details of commodity imports with three tableaus. Tableau 1 ranks the top 10 products by the shares in total imports while the second tableau ranks the products in terms of import penetration, i.e., what is the share of each product's imports in its total marketed supply. The third tableau summarizes for broad industries.

In the first tableau, it can be seen that none of the top products by value of imports in 2019 according to the SAM are perhaps surprising. The exception us perhaps Business services, the largest component of which includes Scientific, technical and similar consulting. This may be associated with new mining activities. According to the underlying INE Use Table data, a large share of other mining imports also includes specialized services to the mining industry. Interestingly, the underlying data reports zero imports of bauxite, which is curious given the location of the Mozal aluminium smelter near Maputo. The reason is that bauxite is first refined into alumina (aluminium oxide). In a smelter, the alumina is then process into aluminium at high temperatures which uses large amounts of electricity. Mozal does not engage in bauxite refining and uses alumina imported from Australia as its raw material. Alumina is included in metals and metal products (row 8). The relatively high share of imports of electricity (row 10) can perhaps be associated with the smelter. The top 10 account for 87 per cent of total imports.

Table 6: Share in total imports and imports as a share of total supply (values in MT million)

	Tableau 1	Imports	Share %
1	Business services	174,020	22.7
2	Machinery + equipment	163,785	21.3
3	Chemicals	78,773	10.3
4	Other mining	74,598	9.7
5	Petroleum	60,564	7.9
6	Transportation + storage	38,573	5.0
7	Other foods	22,024	2.9
8	Metals + metal products	20,631	2.7
9	Non-metal minerals	17,914	2.3
10	Electricity, gas + steam	17,705	2.3
	Tableau 2	Imports share of demand %	Imports
1	Business services	83.8	174,020
2	Machinery + equipment	66.4	163,785
3	Other mining	65.0	74,598

		Imports share of supply %	% of imports
4	Petroleum	63.5	60,564
5	Other cereals	57.9	11,450
6	Chemicals	52.1	78,773
7	Leather and footwear	49.7	2,119
8	Textiles	47.5	11,700
9	Non-metal minerals	46.5	17,914
10	Other manufacturing	38.7	7,127
	Tableau 3	**Imports share of supply %**	**% of imports**
1	Agriculture	9.4	2.8
2	Mining	31.9	9.8
3	Manufacturing	44.2	54.6
4	Utilities	27.5	2.3
5	Construction	10.2	0.6
6	Private services	25.7	29.9
7	Public services	0.2	0.1
8	Total	28.6	100.0

Source: 2015 Mozambique SAM and authors' calculations.

In the second tableau it can be seen that some of the high import shares are matched by high shares of import in total marketed supply. Import penetration is particularly high of business services which may raise attention from policy-makers for potential sector development. The commodity group other cereals is linked to the import of wheat (which make the economy vulnerable to global geopolitical events) while other mining is related to mining services as discussed earlier. Overall (3rd tableau), low import penetration and import shares are typical for agriculture, construction and public services while that of electricity is relatively high as discussed earlier.

Table 7 presents data for exports in the same format as previously with imports. Top ten shares in total exports are shown in the first tableau while the second tableau reports on the export–output ratios and the third tableau on broad product groups. The products listed in the first tableau make intuitively sense. Business services and transportation services are somewhat surprising since they also feature high in terms of imports. The high level of aggregation may contribute to high trade levels of service trade going both directions. However, the underlying data — not shown here — reveals that this trade involves 'scientific, technical and similar consulting' in both ways. If there is such two-way trade in a narrowly defined service, there may be opportunity to develop. In the case of transport services, the underlying data shows that the bulk (about 85 per cent) is for supporting and auxiliary transport services. The latter may be related to port activities.

Table 7: Share in total exports and exports as a share of total demand (values in MT mill)

	Tableau 1	Exports	Share %
1	Metals + metal products	66,289	21.3
2	Coal + lignite	48,599	15.6
3	Transportation + storage	36,560	11.8
4	Natural gas	30,441	9.8
5	Wood and paper	19,112	6.2
6	Electricity, gas + steam	18,635	6.0
7	Accommodation + food services	14,382	4.6
8	Business services	12,754	4.1
9	Other foods	10,311	3.3
10	Beverages + tobacco	9,508	3.1

	Tableau 2	Exports % of supply	Value
1	Natural gas	89.8	30,441
2	Coffee + tea	64.6	389
3	Other crops	64.5	5,755
4	Metals + metal products	63.7	66,289
5	Coal + lignite	56.1	48,599
6	Wood + paper	49.1	19,112
7	Cotton + fibres	46.8	1,865
8	Accommodation + food services	45.3	14,382
9	Fruits and nuts	41.2	8,313
10	Electricity, gas + steam	32.5	18,635
	Tableau 3	Exports % of supply	% of total exports
1	Agriculture	11.6	8.6
2	Mining	33.9	25.6
3	Manufacturing	12.4	37.7
4	Utilities	28.9	6.0
5	Construction	0.0	0.0
6	Private services	7.7	22.0
7	Public services	0.0	0.0
8	Total	11.6	100.0

Source: 2019 Mozambique SAM and authors' calculations.

The export penetration shares of the second tableau are headed by some obvious candidates such as natural gas, coal and metals and accommodation to a lesser degree. Other reasonably high shares are reported for wood and fruits and nuts. The former appears to involve mainly sawmilling products while the latter is not just cashew — although it still makes up two-thirds — with the rest being fresh fruit. Other reasonably high export-focussed products such as cotton fibres and coffee and tea are very small in size.

Table 8: Net trade (values in MT million)

	Imports	Exports	Net Trade
Agriculture	21,420	26,597	5,177
Mining	74,940	79,669	4,729
Manufacturing	419,012	117,211	-301,801
Utilities	17,758	18,642	884
Construction	4,586		-4,586
Private services	229,245	68,419	-160,825
Public services	542	84	-459
Total	767,503	310,622	

Source: 2019 Mozambique SAM and authors' calculations.

At the broad level, it can be seen that, when compared with the previous table, agriculture may be a net exporter. This is indeed the case as shown in Table 8, the industry as a whole is exporting about 25 per cent more than its importing. Electricity also exports more than it imports. Such interindustry trade is probably related to the dedicated high-voltage powerline infrastructure from Cahora Basa and to the Mozal aluminium smelter. In the case for manufacturing and private services, imports dominate exports by a number of factors for each, as can be seen in Table 8.

Table 9: Current account of the balance of payment aggregates according to the 2019 SAM and the Mozambique Central Bank (MT million)

	Receipts	Payments	Receipts	Payments
	MT million	MT million	% of GDP	% of GDP
Merchandise	248,385	538,301	25.8	55.9
Services	62,237	229,202	6.5	23.8
Capital primary income/expenditure	8,088	28,282	0.8	2.9
Labour primary income/expenditure	8,205	6,524	0.9	0.7
Enterprises secondary income/expenditure	13,947	0	1.4	0.0
Household secondary income/expenditure	10,533	6,127	1.1	0.6
Government secondary income/expenditure	60,002	12,302	6.2	1.3
Total	411,397	820,738	42.7	85.3
Curr acc deficit / surplus on BoP	-409,341		-42.5	

Source: 2019 Mozambique SAM and authors' calculations.

Trade in goods and services can also be examined in the context of the overall balance of payment embedded in the SAM. Table 9 reports numbers from the SAM expressed in local currency and as a ratio to GDP.

The table above shows large deficits for good and services as well as primary income of the production factor capital. Although non-residents are also transferring primary and secondary incomes from Mozambique, the receipts are higher. Interestingly, Mozambique enterprises earn secondary income abroad, but there are no outgoing payments. Government receives just over MT60 billion from the rest of the world which represents more than 6 per cent of GDP. Government also makes payments which amount to 1.3 per cent of GDP. These payments are taken from the government finance accounts and are much higher than the IMF numbers.[5] Together with large trade deficits for goods and in particular for services, the balance of payment shows a substantial current account deficit as much as 42.5 per cent of GDP which constitutes foreign savings in the country's overall savings — investment balance and thus contributes to the financing of capital formation.

5   Government income and expenditure

Table 10 reports on the current account of the government.[6] For all entries except expenditure on goods and services[7] the underlying source is the Government Finance Statistics (GdM 2020). Tableau 1 reports outlays (including savings as a balancing item) and tableau 2 refers to receipts.

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[5] Consistency requires to select one or the other.

[6] Public sector investment demand is considered to be a capital account expenditure and is as such mixed with private sector investment demand. A breakdown of total investment demand has not been pursued for this SAM but would in principle be possible if such data were available.

[7] Taken from the INE (2021a) supply-use tables and consistent with the INE (2021b) national accounts.

Table 10: Current Account of the Government according to the 2019 SAM (MT million)

	Tableau 1	Outlays	Share %	% GDP	Tableau 2	Receipts	Share %	% GDP
1	Finance + insurance	6,482	2.0	0.7	Royalties	2,729	0.8	0.3
2	Public administration	124,556	37.5	12.9	Enterprise transfers	8,694	2.6	0.9
3	Education	46,809	14.1	4.9	Household transfers	4,611	1.4	0.5
4	Health + social work	41,199	12.4	4.3	Intra government	4,955	1.5	0.5
5	Enterprise transfers	18,310	5.5	1.9	Domestic sales tax	90,186	27.1	9.4
6	Household transfers	17,396	5.2	1.8	Import duties	17,155	5.2	1.8
7	Intra government	4,955	1.5	0.5	Corporate tax	106,658	32.1	11.1
8	Rest of the world transfers	12,302	3.7	1.3	Income tax	37,343	11.2	3.9
9	Savings	60,323	18.2	6.3	Rest of the world transfers	60,002	18.1	6.2
10	Total	332,333	100.0	34.5	Total	332,333	100.0	34.5

Source: 2019 Mozambique SAM and authors' calculations.

Current expenditure on goods and services is taken from the National Accounts (INE 2021a) and amounts to MT219,047 million. This is represented in the first four entries of Table 10's first tableau and 66 per cent of total outlays and 23 per cent of GDP. The breakdown into broad product groups is based on the SAM. Government transfers to households amounts to 1.8 per cent of GDP, less than transfers to enterprises. The latter includes interest payments on government debt. Government savings accounts for 6.3 per cent of GDP. It should be noted that this refers to the government's current account only. Government investment is not identified as such in the SAM.

On the revenue side, corporate tax and domestic sales tax are the main contributors, together accounting for just under 60 per cent of total revenue and 20 per cent of GDP. Transfers from the rest of the world are substantial, making up more than 18 per cent of total revenue and more than 6 per cent of GDP while personal income tax is modest at just over half of that and import duties further back at 5 per cent of total revenue. Royalties — income from state-owned enterprises and natural resource extraction royalties — is less than 1 per cent of total revenue but may rise in the future when natural gas exploitation gains significance.

6 Household income and expenditure

This section starts with a presentation of patterns of household expenditure on goods and services. The underlying data sources are INE Supply and Use Tables (INE 2022a) for total product expenditure and the household survey (INE 2021b) for the household detail. Some of that expenditure is on items produced by households and is here referred to as 'own consumption'.[8] For reasons of convenient display, the next table reports on expenditure patterns for low-income rural, low-income urban and their high-income counterparts as well as all households. Low income is defined here as the bottom 80 per cent of the total population (rural + urban) in terms of the expenditure of the households that they are part of.[9]

The information in Table 11 is organized in the following way. Tableau 1 reports on low-income rural households, tableau 2, low-income urban households, and tableau 3 for all households.

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[8] Production for own consumption to be precise.

[9] Household expenditure is used here instead of income as the latter is considered to be a less reliable measure due to under reporting.

Tableaus 4 and 5 show high-income household expenditures in rural and urban areas respectively. The second column in each tableau presents the expenditure shares on goods and services in descending order of importance. The first column shows the share of each expenditure that is covered by own consumption of the household's production, subsistence consumption, if you like.

For example, in tableau 1 it can be seen that low-income households' expenditure on maize constitutes the highest share with almost 23 per cent of their total expenditure of which 99.2 per cent is own consumption of the household's total consumption. Broadly speaking most rural low-income households' expenditure has a very high own consumption content. Where it is low, it involves processed foods and beverages. Pure marketed products amongst the top 25 are chemicals, transportation, processed cereals and vegetables, clothing, information and communication, and health services. The share of other marketed goods and services are less than 1 per cent. For urban low-income households, the opportunity to engage in own consumption is less as can be seen in tableau 2. Foods ranks highest but it is mainly processed. There is some evidence of peri-urban food growing of maize, pulses, vegetables and fruit. other services (row 16) also appears to have an own consumption element to it as well as poultry. reporting on shares is sometimes deceptive. Clothing appears to rank lower amongst urban low-income households, but this may well be the result of some other expenditures being much higher such as transportation, chemicals, processed cereals amongst others. In the end, the sum of all shares has to add up to 100 per cent. Nevertheless, even at the level of all households (i.e., including high-income households, see tableau 3), maize consumption is ranked the highest and the own consumption share is not much lower compared to rural low-income households in tableau 1. Surprisingly, education ranks 6th highest and this is not just because high-income households are now included as well. Even for low-income households in rural areas, education ranks 23 (tableau 1) while for urban low-income households this is 11 (tableau 2) and for urban areas just inside the top ten (tableau 1).

Other surprises are real estate services and forestry. The former is reported in tableau 3 where it can be seen in row 5 to have a very high share of own consumption which is supported by the underlying supply–use data. Based on the household survey data for marketed household expenditure, this expenditure is assigned to high-income households only.[10] In tableau 5, it occupies the top ranking for high-income urban households suggesting the existence of a lively upmarket urban property market with most of it happening under the radar. Forestry demand by households probably accounts for use of firewood or charcoal and is just outside the top 10 for all households combined (row 11) with a 66 per cent own consumption share. This expenditure also appears to be widespread amongst urban households (see row 4 of tableau 2), possibly in peri-urban areas.

All households, expenditures on education is ranked at number seven with 4.7 per cent although it is less important to low-income households, in particular, in rural areas where it is ranked 23rd and 11th in urban areas. Indeed, education expenditure by urban high-income households is ranked 2nd highest at 7.9 per cent and 6th for rural high-income households. Whether this is public or private education is not clear. Nevertheless, such divergence in expenditure on education may bias future income earning potential in favour of high-income earners. Transportation is more important to rural high-income household compared to urban high-income household possibly because of higher distances but Information and communication is not, presumably because of less availability.

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[10] The household survey does not identify own consumption of real estate services. Marketed consumption is therefore used as a proxy. Moreover, according to the household survey data, none of the other household groups engage in the use of this service.

Table 11: Household expenditure shares for all households and broad income groups

		Share of	Share in		Share of	Share in		Share of	Share in		Share of	Share in		Share of	Share in
		own PCE	total PCE		own PCE	Total PCE		own PCE	Total PCE		own PCE	total PCE		own PCE	total PCE
		Rural %	Low inc %		Urban %	Low inc %		All %	Hhlds %		Rural %	High inc %		Urban %	High inc %
	Tableau 1	hhd-rl,	hhd-rl	Tableau 2	hhd-ul	hhd-ul	Tableau 3	hhd-tot	hhd-tot	Tableau 4	hhd-rh	hhd-rh	Tableau 5	hhd-uh	hhd-uh
1	Maize	99.2	22.6	Other foods	0.0	16.2	Maize	98.6	10.0	Maize	99.2	11.1	Real estate activities	79.8	11.9
2	Sorghum+millet	99.6	9.5	Maize	96.2	8.5	Other foods	0.1	8.3	Other foods	0.1	7.7	Education		7.9
3	Other foods	0.1	9.3	Fishing	10.9	7.3	Chemicals		5.5	Transportation+storage		6.4	Beverages + tobacco		7.6
4	Pulses	76.8	8.3	Forestry	40.0	6.8	Beverages+tobacco	0.3	5.4	Beverages+tobacco	1.1	6.0	Wholesale+retail trade		6.6
5	Forestry	95.6	6.2	Pulses	30.4	6.5	Real estate activities	79.8	5.2	Chemicals		6.0	Transportation+storage		6.6
6	Fishing	32.6	5.5	Chemicals		6.4	Transportation+storage		5.0	Education		5.5	Chemicals		6.0
7	Vegetables	72.8	5.0	Cereal+veg.process.		6.4	Education		4.7	Fishing	31.2	4.5	Cereal+veg.process		5.7
8	Chemicals		4.3	Transportation+storage		5.8	Pulses	56.5	4.6	Cereal+veg.process		4.5	Other foods	0.0	5.5
9	Beverages + tobacco	0.8	3.1	Vegetables	33.3	4.9	Cereal+veg.process.		4.4	Pulses	50.7	4.0	Petroleum		4.6
10	Poultry	86.1	2.2	Beverages + tobacco		3.1	Fishing	20.8	4.2	Forestry	79.8	3.8	Other services	17.1	4.5
11	Transportation+storage		2.0	Education		2.8	Forestry	66.0	4.1	Petroleum		3.7	Finance+insurance		3.9
12	Groundnuts	82.6	2.0	Meat		2.8	Sorghum+millet	99.6	3.7	Wholesale+retail trade		3.5	Meat		3.4
13	Cereal+veg.process.		1.9	Other roots	14.1	2.1	Wholesale+retail trade		3.4	Sorghum+millet	99.8	3.4	Information+comms		2.4
14	Clothing		1.8	Information+comms		1.9	Vegetables	51.0	3.3	Vegetables	55.0	3.0	Fishing	3.0	2.3
15	Rice	99.0	1.8	Fruits+nuts	21.4	1.8	Petroleum		2.7	Meat		2.8	Other manufacturing		2.1
16	Other roots	49.3	1.5	Other services	17.1	1.5	Other services	17.1	2.6	Clothing		2.7	Machinery+equipment		2.0
17	Fruits+nuts	75.3	1.5	Poultry	46.3	1.5	Meat		2.4	Other services	17.1	2.1	Health+social work		2.0
18	Health+social work		1.3	Sorghum+millet	98.3	1.4	Finance+insurance		1.9	Machinery+equipmnt		2.1	Forestry	12.5	1.9
19	Other livestock	100.0	1.2	Clothing		1.3	Information+comms		1.8	Information+comms		2.0	Vegetables	14.8	1.6
20	Cassava	93.6	1.0	Groundnuts	38.6	1.3	Clothing		1.7	Fruits+nuts	48.0	1.7	Pulses	10.8	1.5
21	Machinery+equipmnt		0.9	Water supply+sewage		1.3	Machinery+equipmnt		1.6	Poultry	63.4	1.7	Clothing		1.5
22	Meat		0.8	Other cereals	1.1	1.3	Health+social work		1.5	Other manufacturing		1.7	Other roots	2.8	1.3
23	Education		0.8	Rice	96.1	1.1	Other roots	23.2	1.5	Other roots	25.8	1.7	Fruits+nuts	6.4	1.2
24	Information+comms		0.8	Machinery+equipmnt		1.0	Poultry	59.9	1.4	Finance+insurance		1.2	Poultry	15.7	0.8
25	Other cereals	4.8	0.8	Health+social work		0.8	Fruits+nuts	38.2	1.4	Health+social work		1.1	Maize	92.7	0.8
	Other (ranked 25+)		3.9	Other (ranked 25+)		4.1	Other (ranked 25+)		7.8	Other (ranked 25+)		6.5	Other (ranked 25+)		4.4
	Total		100.0	Total		100.0	Total		100.0	Total		100.0	Total		100.0

Source: 2019 Mozambique SAM and authors' calculations.

Households' expenditure on goods and services are not the only outlays they face. Table 12 considers all household outlays for the same broad household groups as in the previous table. In rows 1-2, a distinction is made between own and marketed household expenditure on goods and services.

Table 12: Household outlays, shares

		Rural low income %	Rural high income %	Urban low income %	Urban high income %	All households%
	Tableau 1	hhd-rl	hhd-rh	hhd-ul	hhd-uh	Total
1	Own PCE	59.1	23.8	20.0	8.9	25.5
2	Mrkt PCE	39.8	62.1	77.0	63.2	58.2
3	Trnsf to Govt	0.1	1.2	0.0	0.9	0.6
4	Inc tax	0.8	5.4	1.8	7.9	5.0
5	Trnsf to RoW	0.0	0.6	0.1	1.5	0.8
6	Savings	0.2	7.0	1.0	17.7	9.9
7	Total	100.0	100.0	100.0	100.0	100.0
	Tableau 2	hhd-rl	hhd-rh	hhd-ul	hhd-uh	Total
1	Own PCE	63.1	10.8	8.3	17.7	100.0
2	Mrkt PCE	18.6	12.4	14.0	55.0	100.0
3	Trnsf to Govt	5.2	22.8	0.5	71.5	100.0
4	Income tax	4.2	12.5	3.8	79.6	100.0
5	Trnsf to RoW	0.7	8.1	1.1	90.1	100.0
6	Savings	0.7	8.1	1.1	90.1	100.0
7	Total	27.2	11.6	10.6	50.6	100.0

Source: 2019 Mozambique SAM and authors' calculations.

In tableau 1 it can be seen that own consumption is the most important outlay for low-income rural households while marketed consumption is dominant for the other groups. As expected, urban high-income households' income tax payments share is relatively high which is to a lesser extent the case for rural high-income households as their consumption on what they produce themselves is relatively high. Low-income households in general do not engage much in savings.

The distribution of each broad outlay across household groups is reported in the second tableau. It is surprising to see in the first row the high share of own consumption by urban high-income households. This can be explained by the allocation of own consumption of Real estate services to these households as reported in the underlying INE Supply-Use data and household survey and discussed earlier.

In terms of marketed consumption, the share of urban high-income households is the highest, as expected. The share of rural high-income households is modest although the share of marketed consumption in their total outlays (row 2) is relatively high. This may be because there are not many of these households residing in rural areas.[11] Urban high-income households account for the majority of income tax and of savings with about 80 per cent and 90 per cent respectively.

More on income distribution as reported in the 2019 SAM is shown in Table 13 where the sources of income for households are presented.

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[11] Population data from the household survey show that this group represents 6% of total population.

Table 13: Distribution of sources of income for selected types of households

		Rural low-income households %	Rural high-income households %	Urban low-income households %	Urban high-income households %	%
	Tableau 1	hhd_rlo	hhd_rhi	hhd_ulo	hhd_uhi	Total
1	Low-skilled rural labour flab_rlo	45.1	57.5			18.9
2	High-skilled rural labour flab_rhi	2.3	10.9			1.9
3	Low-skilled urban labour flab_ulo			55.0	38.9	25.5
4	High-skilled urban labour flab_uhi			5.0	36.1	18.8
5	Capital stock fcap					
6	Land flnd	11.1	3.0	1.5	0.3	3.7
7	Livestock fliv	0.4	1.8	1.4	1.4	1.1
8	Enterprises ent	38.5	25.4	33.1	18.5	26.3
9	Government gov	1.7	1.0	2.9	2.9	2.3
10	Rest of the world row	0.8	0.5	1.3	2.0	1.4
	Tableau 2	100.0	100.0	100.0	100.0	100.0
1	Low-skilled rural labour flab_rlo	64.8	35.2			100.0
2	High-skilled rural labour flab_rhi	33.5	66.5			100.0
3	Low-skilled urban labour flab_ulo			22.8	77.2	100.0
4	High-skilled urban labour flab_uhi			2.8	97.2	100.0
5	Capital stock fcap					
6	Land flnd	82.3	9.3	4.2	4.1	100.0
7	Livestock fliv	9.1	18.2	12.6	60.1	100.0
8	Enterprises ent	39.9	11.2	13.3	35.6	100.0
9	Government gov	20.1	4.8	13.1	62.0	100.0
10	Rest of the world row	16.1	4.3	9.5	70.1	100.0
	Total	**27.2**	**11.6**	**10.6**	**50.6**	**100.0**

Source: 2019 Mozambique SAM and authors' calculations.

Across the top of

Table 13, low and high income are aggregated for rural and urban areas. As before, low-income accounts for the first four quintiles of the households identified in the SAM and high income represents the fifth quintile. The data originate from the Mozambique Household Survey (INE 2021b), matched to Macro SAM National Accounts. Sources of income are shown as row headings. Low-skilled labour — denoted with a 'l' — represents all labour except workers with tertiary education (diplomas and degrees) as highest level attained — denoted with a 'h' — and by rural and urban areas with 'r' being rural and 'u' urban.
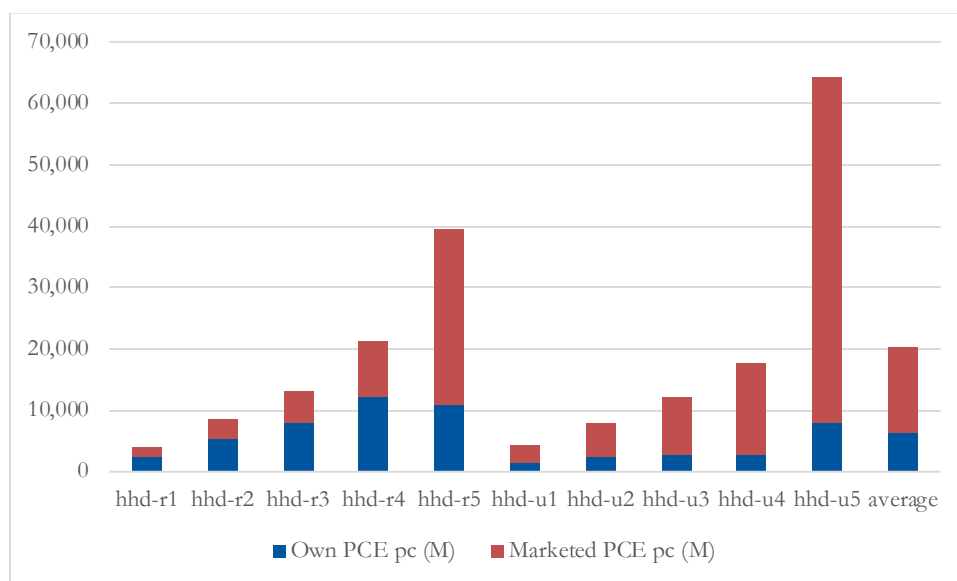
Income from the production factor capital makes a distinction between capital embedded in land and livestock and standard capital stock. Income from the first two is distributed directly to households. Income from standard capital stock is initially all transferred to enterprises who, in turn, pay corporate tax, retain earnings for saving, transfer to the rest of the world before

distributing to households. The row with heading 'fcap' is therefore empty as there is no direct distribution of gross operating surplus to households.

As expected, low-income households in rural as well as urban areas derive most income from low-educated labour employment. Interestingly, this also applies to both urban and rural high-income household which suggests that education is not quite as powerful an indicator of income earnings potential in urban areas as was suggested earlier. This is particularly the case in rural areas where highly educated employment constitutes a low share of high-income households. The split between low and high skilled wage earnings is more even in urban areas and the sum of the two — income earned from employment — constitutes almost 75 per cent. Hence, income from capital (indirectly via enterprises) is less than 20 per cent. Income earned by the other groups of households is derived to a lesser degree from employment and therefore relatively more from enterprises. In rural areas, low-income households rely relatively more on returns from the production factor land.

Government transfers are small in the overall scheme of things but appear to be biased to urban areas and high income. This can be seen more clearly in row 9 of the second tableau. Row 7 reveals a seemingly anomaly, in that most income from livestock flows to high-income urban households although the overall share is low. Interestingly, enterprise income benefits rural low-income households to a surprisingly large degree. This may have to do with the household survey's recording of income earned from mixed sources by these households which could also have been reported as wage income of self-employed farmers. Transfers received by households from the Rest of the World appear to benefit high-income households most (row 10 of tableau 2).

Figure 1: Per capita expenditure 2019, M '000.

Source: 2019 Mozambique SAM and authors' calculations.

Final to this section, expenditure per capita for all types of households is shown in Figure 1 using the full household detail. It can be seen that only the highest income quintiles in both rural and urban area spend more than the economy-wide average.

Interestingly, per capita *own consumption* of rural high-income households is the second highest amongst all household income groups and about 3.5 times higher than that of the lowest rural quintile. Even urban high-income households per capita own consumption is about three times higher than the lowest rural household income group. In terms of *total expenditure*, the disparity is

even more apparent with a factor of almost 16 between urban high income and the lowest quintiles in both urban and rural areas.

7   Labour market issues

Policy makers are keen to understand demand for skills and occupations in order to develop their skills and education policies. Moreover, policy makers have (as they should) a keen interest in the employment generating impact of particular policy intervention. Using the SAM in its current format, we can only take a view on highest level of education attained and the occupational dimension is ignored in what follows.

Employment data that is associated with the 2019 SAM is derived from various sources as described by (Cruz et al. 2022). At the economy-wide level (see next table), the household survey data suggests that close to 60 per cent of the almost 12.9 million workers has no education, 25 per cent has finished primary school, 10 per cent secondary school and just over 5 per cent has some form of tertiary education completed.

Table 14: Total employment by skill (highest level of education attained)

		Workers ('000)	Share %
1	No education	7,671	59.6
2	Primary education	3,256	25.3
3	Secondary education	1,243	9.7
4	Tertiary education	695	5.4
	Total	12,865	100.0

Source: 2019 Mozambique SAM supporting data and authors' calculations.

Table 15 reports the top 15 industry shares in employment of each highest level of education attained and for total employment. In tableau 1 it can be seen that workers without education are mainly employed in agriculture. The first non-agriculture industry is Other services (row 7) followed by Wholesale and retail trade services (row 11). Non agriculture industries are more represented amongst workers with more education as can be seen the tableaus 2–4. Such industries include construction, metals and metal products, accommodation and food services and public administration. The latter as well as the health and social work and education industries are a particularly important employer for higher educated and also, albeit to a lesser extent, secondary workers. Business services, financial services and information and communication are also important employers of tertiary-educated workers. Tableau 5 summarises the distribution for total employment, i.e., across all skill groups. agriculture dominates with wholesale and retail trade, public administration, construction and education the only non-agriculture industries amongst the top 15.

Table 15: Top 10 SAM activities' share of employment by education attainment

	Tableau 1	Employment: No Education %		Tableau 2	Employment: Primary Education %
1	Maize	27.2	1	Maize	14.8
2	Pulses	10.9	2	Wholesale + retail trade	11.7
3	Sorghum + millet	10.5	3	Other services	7.6
4	Vegetables	7.2	4	Construction	6.5
5	Tobacco	6.0	5	Tobacco	6.1
6	Fruits + nuts	4.5	6	Pulses	5.9
7	Other services	3.3	7	Sorghum + millet	5.7

#	Sector	%	#	Sector	%
8	Other roots	3.2	8	Fruits + nuts	4.6
9	Poultry	2.8	9	Vegetables	3.9
10	Groundnuts	2.6	10	Public administration	3.5
11	Wholesale + retail trade	2.5	11	Metals + metal products	3.3
12	Other livestock	2.4	12	Accommodation + food services	2.8
13	Rice	2.2	13	Sugar cane	2.3
14	Sugar cane	2.2	14	Forestry	1.9
15	Other crops	1.7	15	Other roots	1.8
	Other (rank16+)	10.7		Other (rank16+)	17.5
	Total	100.0		Total	100.0

#	Tableau 3	Employment: Secondary Education %	#	Tableau 4	Employment: Tertiary Education %
1	Public administration	16.0	1	Public administration	26.5
2	Wholesale + retail trade	12.7	2	Education	20.4
3	Maize	7.6	3	Wholesale + retail trade	9.2
4	Coal + lignite	7.4	4	Health + social work	7.0
5	Education	6.6	5	Business services	4.9
6	Other services	5.6	6	Forestry	4.9
7	Construction	4.8	7	Coal + lignite	4.4
8	Forestry	3.4	8	Information + communication	3.1
9	Accommodation + food services	3.4	9	Other services	3.0
10	Beverages + tobacco	3.3	10	Metals + metal products	2.7
11	Information + communication	3.3	11	Beverages + tobacco	2.2
12	Pulses	3.0	12	Construction	1.8
13	Sorghum + millet	2.9	13	Maize	1.6
14	Health + social work	2.7	14	Accommodation + food services	1.4
15	Transportation + storage	2.1	15	Finance + insurance	1.3
	Other (rank16+)	15.3		Other (rank16+)	5.7
	Total	100.0		Total	100.0

#	Tableau 5	Total Employment %	#	Tableau 5 (cont.)	Total Employment %
1	Maize	20.8	9	Fruits + nuts	4.0
2	Pulses	8.3	10	Construction	3.1
3	Sorghum + millet	8.0	11	Other roots	2.5
4	Wholesale + retail trade	6.2	12	Forestry	2.1
5	Vegetables	5.5	13	Education	2.0
6	Tobacco	5.3	14	Groundnuts	2.0
7	Other services	4.6	15	Sugar cane	2.0
8	Public administration	4.2		Other (rank16+)	19.6
				Total	100.0

Source: 2019 Mozambique SAM supporting data and authors' calculations.

For broad industries the distributions are summarised in Table 16. It can be seen that agriculture dominates the low end of the labour market and private and public services the upper end. Mining mainly employs secondary and tertiary educated workers while manufacturing employs a substantial share primary-educated workers.

On the whole, agriculture accounts for more than 70 per cent of total employment, followed by private services with 14 per cent and Public services (including health and social work and education) and manufacturing.

The previous tables considered the direct contribution of each sector to employment, but it ignores the indirect effects that each sector has on employment in other sectors in the economy through their intermediate inputs and sales. The next table shows employment multipliers calculated as the matrix product of a vector of total employment — output ratios and the Leontief inverse of the

supply-use part of the SAM. In doing so initial, direct, and indirect employment effects are taken into account.

The same approach is followed as for Table 4 in that the SAM makes a distinction between home consumption and marketed consumption by households. Again, for reasons of convenience, own consumption by households has been merged with marketed consumption by households so as to create a unified multiplier measurement. As discussed above, we try to make a distinction between direct, indirect, and total employment requirements and to do so, use the industry-by-industry approach.

Table 16: Top 10 SAM activities' share of employment by education attainment

	Tableau 1	No Education %		Tableau 2	Primary Education %
1	Agriculture	89.1	1	Agriculture	55.8
2	Mining	0.2	2	Mining	0.1
3	Manufacturing	1.7	3	Manufacturing	8.3
4	Utilities	0.0	4	Utilities	0.1
5	Construction	1.6	5	Construction	6.5
6	Private services	6.8	6	Private services	24.2
7	Public services	0.6	7	Public services	5.1
	Total	7,666		Total	3,264
	Tableau 3	Secondary Education %		Tableau 4	Tertiary Education %
1	Agriculture	26.1	1	Agriculture	8.9
2	Mining	8.2	2	Mining	5.0
3	Manufacturing	7.3	3	Manufacturing	5.5
4	Utilities	0.2	4	Utilities	1.1
5	Construction	4.8	5	Construction	1.8
6	Private services	27.8	6	Private services	24.2
7	Public services	25.5	7	Public services	53.6
	Total	1,237		Total	697
	Tableau 5	Total Employment %		Tableau 5 (cont.)	Total Employment %
1	Agriculture	70.2	5	Construction	3.1
2	Mining	1.2	6	Private services	14.2
3	Manufacturing	4.1	7	Publ. services (incl Health + Educ.)	7.0
4	Utilities	0.1	8	Total	12,865

Source: 2019 Mozambique SAM supporting data and authors' calculations

In Table 17, it can be seen that for example, a MT1 million increase in (transformed) final demand of Sorghum and millet will result in an increase in almost 43 workers. The table is sorted from highest total employment requirement per unit of (transformed) final demand. The multipliers are highest for crop production exceptions are other services (row 9) and various livestock (see rows 12,14 and 15).

In the last column, the ratio of total to initial per unit employment is calculated. The knock-on effect of Groundnut production (row 3) through its backward linkages is about 13 per cent of the initial per unit employment. This turns out to be the highest amongst the top 15 industries. Next in this regard is Pulses (row 7), followed by Other crops (row 8) and Maize (row 4). All other agricultural activities in the top 15 have an insignificant employment reach into the Mozambique economy.

Table 17: Employment multipliers for top- and bottom-ranked industries based on the supply-use component of a 2019 SAM for Mozambique

		1	2	3	4	5	6
		Empl	Initial	Direct	Indirect	Total	Dir + Ind
		Share %	Empl/X	Empl	Empl	Empl	/Total Empl %
1	Sorghum and millet	8.0	42.354	0.035	0.316	42.705	0.8
2	Vegetables	5.5	41.834	0.034	0.305	42.172	0.8
3	Groundnuts	2.0	35.493	4.393	0.953	40.839	13.1
4	Maize	20.8	38.818	1.462	0.341	40.621	4.4
5	Tobacco	5.3	38.501	0.037	0.331	38.869	0.9
6	Other cereals	1.0	37.390	0.064	0.572	38.026	1.7
7	Pulses	8.3	32.901	3.135	0.418	36.454	9.7
8	Other crops	1.5	32.051	1.791	0.702	34.544	7.2
9	Other services	4.6	32.674	1.051	0.372	34.098	4.2
10	Sugar cane	2.0	31.173	0.034	0.302	31.509	1.1
11	Other roots	2.5	29.296	0.069	0.618	29.983	2.3
12	Cattle	0.3	29.600	0.007	0.060	29.667	0.2
13	Fruits and nuts	4.0	28.544	0.061	0.549	29.154	2.1
14	Other livestock	1.7	28.704	0.003	0.027	28.734	0.1
15	Poultry	1.9	28.018	0.012	0.109	28.139	0.4
37	Other manufacturing	0.1	2.002	0.283	0.110	2.395	16.4
38	Chemicals	0.2	1.910	0.258	0.104	2.272	15.9
39	Leather + footwear	0.0	1.852	0.144	0.043	2.039	9.2
41	Information + comms.	0.6	1.000	0.484	0.455	1.939	48.4
42	Coal and lignite	1.0	1.563	0.147	0.053	1.763	11.3
43	Real estate activities	0.0	0.109	1.113	0.269	1.490	92.7
44	Non-metal minerals	0.1	1.123	0.252	0.101	1.476	23.9
45	Water supply + sewage	0.0	0.300	0.876	0.143	1.320	77.3
46	Machinery + equipment	0.1	0.573	0.449	0.180	1.202	52.3
47	Clothing	0.0	0.738	0.262	0.144	1.145	35.5
48	Transportation + storage	0.7	0.765	0.212	0.102	1.079	29.1
49	Finance and insurance	0.1	0.127	0.416	0.350	0.893	85.7
50	Electricity, gas + steam	0.1	0.302	0.501	0.081	0.884	65.8
51	Natural gas	0.1	0.449	0.247	0.089	0.785	42.8
52	Other mining	0.1	0.284	0.253	0.092	0.629	54.9

Note: units are per MT1 million.

Source: 2019 Mozambique SAM and authors' calculations.

As with GDP in Table 4, the bottom half of the table shows the lowest employment multipliers. Again, mainly a cross section of non-agricultural industries are shown, including mining and utilities. Most industries listed do seem have a significant reach into the Mozambique economy with direct and indirect requirements being much higher than for agricultural production. However, the top 15 industries with the highest employment multipliers and lowest connection to the rest of the economy represent about 70 per cent of total employment while those with the lowest employment multipliers account for just over 3 per cent of employment.

For reasons of completeness, Table 18 shows the same measurements for selected industries in the middle of the park. Their common characteristic is that they can be considered as industries downstream from agriculture. They account almost 3 per cent to total employment (as much as the bottom 15 industries ranked by employment multiplier in the previous tables) and show a
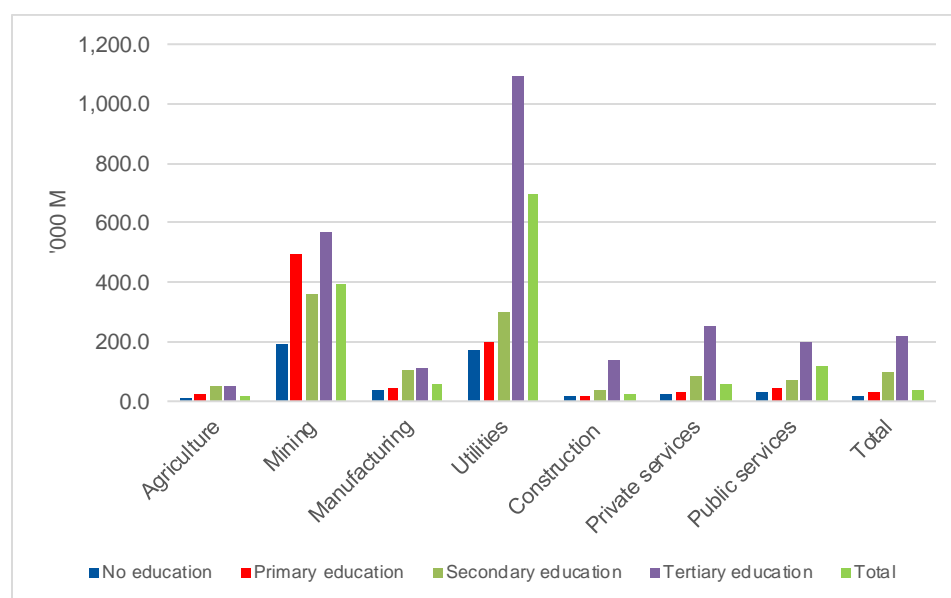
relatively high reach into the rest of the economy through their backward linkages when looking at the last column. Thus, while these industries may in and of themselves not be major employment generators they may do so upstream in agriculture.

Table 18: Employment multipliers for selected industries based on the supply-use component of a 2019 SAM for Mozambique

		1	2	3	4	5	6
		Empl	Initial	Direct	Indirect	Total	Dir + Ind
		Share %	Empl/X	Empl	Empl	Empl	/Total Empl %
19	Cereal + veg. processing	0.1	0.6022	16.1863	1.7615	18.5500	96.8
22	Meat	0.0	0.3552	11.9578	0.1966	12.5097	97.2
23	Other foods	0.3	1.3449	9.3941	1.3539	12.0930	88.9
25	Accommod. + food services	1.5	6.4097	2.9932	1.1680	10.5708	39.4
26	Beverages + tobacco	1.0	4.1662	0.3824	2.1134	6.6619	37.5

Source: 2019 Mozambique SAM and authors' calculations.

Figure 2: Wage earnings per worker

Source: 2019 Mozambique SAM and supported data and authors' calculations.

In the final exposition of SAM and its supported data, Figure 2 shows wage earnings rates (i.e., wage earnings per unit of labour employed) for broad industries in the Mozambique economy and level of education as well as the economy-wide average rate, with the latter being the key benchmark.[12]

For the bar in bottom right-hand corner of the chart, the benchmark is calculated at just under 38,000. There appears to be a large premium on tertiary education in services, construction, and utilities, in particular the latter. This premium is less so for agriculture, mining, and manufacturing.

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[12] Total wage earnings are available from the National Accounts and total employment is derived from the World Bank's World Development Indicators (see Cruz et al. 2018). Note also that the wage earnings and employment distributions across education level is for some industries derived using proxies of similar industries from the household survey data where there was no coverage. Moreover, total employment for some detailed industries is indirectly based on wage earning industries shares. As a result, some detailed industries will have the same wage rates, although this is not visible in the next graph.

A similar, but less pronounced premium appears to be the case for secondary education. In terms of industries, mining and utilities pay the highest wages across all levels of education, while agriculture pays the least.

8   Summary and conclusions

This paper examined various structural aspects of the Mozambique economy through the lens of a recently constructed 2019 SAM. The case for doing this is that it serves as a reality check of the SAM. A number of dimensions are explore including industry composition and factor earnings, imports and exports, household income and expenditure and some labour market issues.

Agriculture remains a dominant industry accounting for over 70 per cent of employment although its contribution to GDP is only about 25 per cent. On the other hand, services, both public and private, represent 48 per cent of GDP and 21 per cent of employment. Manufacturing plays a minor role at 10 per cent of GDP and just over 4 per cent of employment, while mining with just over 11 per cent of GDP accounts for only 1.2 per cent of employment. In spite of the importance of agriculture for employment, just over a third of household income is earned in rural areas. Some simple multiplier calculations show low economic integration.

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List of acronyms

CEEG	Centro de Estudos Económicos e de Gestão (Centre for Economic and Management Studies, University of Eduardo Mondlane, Maputo)
GDP	gross domestic product
IMF	International Monetary Fund
INE	Instituto Nacional de Estatística (Public Sector Statistical Office, Maputo)
IOF	Inquérito Sobre Orçamentos Familiares (Household Budget Survey)
MEF-DNPED	Ministry of Economy and Finance
MT	Mozambican metical
SAM	social accounting matrix
SUT	supply-use table
SUTSAM	supply-use SAM, with single household and single labour account
UCPH-DERG	Development Economic Research Group (University of Copenhagen)
UNU-WIDER	World Institute for Development Economic Research (United Nations University)
WB	World Bank
WDI	World Development Indicators (World Bank)