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# **New Social Accounting Matrix for Jordan**

## **A 2015 Nexus Project Social Accounting Matrix**

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## ACRONYMS AND ABBREVIATIONS

BOPS	Balance of Payments Statistics
BPM6	Balance of Payments Manual, 6 <sup>th</sup> Edition
CGE	Computable General Equilibrium
COMTRADE	Commodity Trade Statistics Database
FAO	Food and Agriculture Organization
FAOSTAT	Food and Agriculture Organization's Statistical Database
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
GFS	Government Finance Statistics
GFSM	Government Finance Statistics Manual
GOS	Gross Operating Surplus
HEIS	Household Expenditure and Income Survey
IMF	International Monetary Fund
IOT	Input-Output Table
ISIC	International Standard Industrial Classification
SAM	Social Accounting Matrix
SUT	Supply-Use Table

## ABSTRACT

This new Social Accounting Matrix (SAM) for Jordan is a snapshot representation of the Jordanian economy in which productive activities, factors of production, and economic transactions between the main agents, including households, government, and the rest of the world, are illustrated in a circular flow. It has been constructed using IFPRI's Nexus format, which uses common data standards, procedures, and classification systems for constructing and updating national SAMs. This new SAM for Jordan is expected to be an important dataset for the Arab (Agricultural) Investment for Development Analyzer (AIDA), which is tool based on computable general equilibrium (CGE) model analyses. AIDA was developed to inform national and regional development strategies by providing evidence on the impact of agricultural investments on economic development.

The Jordanian SAM construction process relied on key national and international datasets, such as the Jordan Statistical Yearbook and the Industrial Survey that were published by the Department of Statistics (DOS), as well as the Government Finance Statistics and the Balance of Payments Statistics of the International Monetary Fund (IMF). Household accounts disaggregated into household groups were defined based on data from the Household Expenditure and Income Survey (HEIS) for Jordan for 2013.

The 2015 SAM for Jordan includes 56 sectors and 62 products. Factors of production are separated into three broad categories: labor, land, and capital. Labor is further disaggregated into eight sub-categories base on rural or urban residence and four education level categories. Capital is further disaggregated into four subcategories: crops, livestock, mining, and other.

# 1 SOCIAL ACCOUNTING MATRICES

A national social accounting matrix (SAM) is an economy-wide data framework that captures the detailed economic structure of a country. A SAM is a square matrix in which each account is represented by a row and a column.<sup>1</sup> Each cell reflects a payment from the column account to the row account, i.e., incomes appear along rows and expenditures along columns. Double-entry accounting requires that, for each account, total revenue (row total) equals total expenditure (column total). Table 1 shows an aggregate SAM, with verbal explanations in place of numbers.

**Activities and commodities:** Standard SAMs created under the Nexus Project<sup>2</sup> distinguish between “activities” (entities that carry out production) and “commodities” (representing markets for goods and non-factor services). SAM flows are valued at producer prices in activity accounts and at market prices in commodity accounts, i.e., inclusive of indirect taxes and transactions cost margins. Commodities consist of activity outputs, either exported or sold domestically, and imports. In the activity columns, payments are made to commodities (intermediate demand) and factors of production (value-added, equal to operating surplus and compensation of employees). In the commodity columns, payments are made to domestic activities, the rest of the world, and various tax accounts (for domestic and import taxes).

**Government income and payments:** The government in a Nexus SAM is disaggregated into a core government account and various tax collection accounts. Tax accounts are necessary since otherwise the economic interpretation of certain payments becomes ambiguous. Direct payments between the government and other domestic institutions are reserved for transfers. Payments from the government to factors are captured in the government services activity. Government consumption demand is a purchase of the output from the government services activity, which, in turn, pays labor.

**Domestic nongovernment institutions:** Domestic nongovernment institutions consist of households and enterprises. Enterprises earn factor incomes, reflecting their ownership of capital, and receive transfers from other institutions. Enterprise incomes are used for corporate taxes, enterprise savings, and transfers to other institutions. Unlike households, enterprises do not demand commodities. In the SAM, enterprises are an aggregation of financial and nonfinancial corporations, as defined within the System of National Accounts, the international standard system for national accounts.

<sup>1</sup> For a lengthier discussion on SAMs, see Pyatt and Round (1985) and Reinert and Roland-Holst (1997).

<sup>2</sup> The Nexus Project is a collaboration between international organizations and national statistical agencies and research institutions to improve the quality of social accounting matrices (SAMs) used for country-level computable general equilibrium (CGE) modeling. It establishes common data standards, procedures, and classification systems for constructing and updating national SAMs. The Project addresses the need for greater transparency and consistency in SAM construction to strengthen model-based research and policy analysis in developing countries and to support more robust cross-country comparisons of economic structure and policy. Its guiding principle is that all SAM data should be traceable to its original sources and/or assumptions. Nexus SAMs are freely available online or from collaborating organizations and statistical agencies.

The Nexus Project is led by the International Food Policy Research Institute (IFPRI). Participating organizations include the Food and Agriculture Organization (FAO), the International Fund for Agricultural Development (IFAD), the European Community's Institute for Prospective Technological Studies (JRC-IPTS), the World Bank, and the United Nations University's World Institute for Development Economics Research (UNU-WIDER). Nexus SAMs are often constructed together with national statistical agencies and are regularly updated to include the most recent available data. The African Growth and Development Policy Modeling (AGRODEP) network helps disseminate Nexus SAMs to African researchers.

IFPRI's participation in the Nexus Project is funded by the CGIAR Research Program (CRP) on Policies, Institutions and Markets (PIM). Please contact Dr. James Thurlow, IFPRI, Washington D.C. Email: [j.thurlow@cgiar.org](mailto:j.thurlow@cgiar.org).

**Table 1: Standard Nexus Macro Social Accounting Matrix**

	Activities	Commodities	Factors	Enterprises	Households	Government	Taxes	Investment	Rest of the World	Total
Activities		Marketed outputs			Private non-marketed consumption					Activity income
Commodities	Intermediate demand	Transaction costs			Private marketed consumption	Government consumption		Gross capital formation	Exports	Total demand
Factors	Value-added								Foreign transfers to factors	Factor income
Enterprises			Factor income to enterprises			Government transfers to enterprises			Foreign transfers to enterprises	Enterprise income
Households			Factor income to households	Enterprise transfers to households		Government transfers to households			Foreign transfers to households	Household income
Taxes	Taxes on producers	Taxes on products	Factor taxes	Corporate taxes	Household taxes					Tax income
Government				Enterprise transfers to government	Household transfers to government		Tax revenues paid to government		Foreign transfers to government	Government income
Savings				Enterprise savings	Household savings	Government savings			Foreign savings	Savings
Rest of the World		Imports	Factor payments abroad	Enterprise payments abroad	Household payments abroad	Government payments abroad				Foreign exchange outflow
Total	Activity expenditures	Total supply	Factor expenditures	Enterprise expenditures	Household expenditures	Government expenditures	Tax payments	Investment	Foreign exchange inflow	

Source: Authors

**Household consumption:** Nexus SAMs distinguish between home (own) consumption of activities and marketed consumption of commodities by households. Home consumption, which appears in the SAM as payments from household accounts to activity accounts, is valued at producer prices, i.e., without marketing margins and sales taxes that may be levied on marketed commodities. Final household consumption of marketed commodities appears as payments from household accounts to commodity accounts, valued at consumer prices, including marketing margins and taxes.

## 2 STANDARD NEXUS SOCIAL ACCOUNTING MATRIX ACCOUNTS

**Activities and commodities:** Standard SAMs created under the Nexus Project separate domestic production into 86 activities, as shown in Table 2. Each activity represents a group of industries from the International Standard Industrial Classification system (ISIC Revision 4) (UNDESA 2008). The 4-digit ISIC codes corresponding to each SAM activity are shown in Table A1 in the Appendix.<sup>3</sup> Agricultural activities are further disaggregated using FAO's classification system, as shown in Table A2 in the Appendix. Information on production technologies comes from national input-output tables (IOT) or supply-use tables (SUT). Activities and commodities have a one-to-one mapping based on a concordance between ISIC industries and Harmonized System products (HS Version 2007).<sup>4</sup> Some countries' national accounts capture how activities can produce multiple commodities – this information is discarded in Nexus SAMs. (See the description of Jordan's SAM in Section 5.)

**Factors of production:** Nexus SAMs separate factors of production into three broad categories: labor, land, and capital. Labor is further disaggregated across rural and urban areas and into four education-based categories, as shown in Table 3. Nexus SAMs follow official definitions of “rural” and “urban” areas, which may vary between countries, but are consistent with the definitions used in national and international statistics.<sup>5</sup> There is greater consistency in education categories across countries, since these are based on the number of years of schooling that workers report having completed (see Table 3 notes). Information on total labor value-added as a share of sectoral gross domestic product (GDP) is drawn from national IOTs or SUTs. This is disaggregated across labor subcategories using wage and salary data and imputed earnings for unpaid family members as reported in household and labor force surveys (see Section 5).

Capital is disaggregated into four subcategories: crops, livestock, mining, and other. Crop capital in each crop-based agricultural activity is the portion of gross operating surplus (GOS) and mixed income that is reported in national IOTs or SUTs and that is not assigned to either labor or land factors, i.e., it is a residual. Livestock capital is the total GOS generated in the three livestock activities, i.e., cattle, poultry, and other livestock, while mining capital is the total GOS earned in the four mining activities, i.e., coal and lignite, crude oil, natural gas, and other mining. Crop and livestock capital are separated from mining and other capital, since, in Nexus SAMs, the former are paid directly to households, while the latter are paid to enterprises. Mining capital is separated from “other” capital because its earnings are often subject to mining-specific taxes and royalties and are more likely to be repatriated to foreign-based companies.

<sup>3</sup> Mapping between Nexus SAM activities and ISIC Revision 3.1 codes (UNDESA 2002) are available upon request.

<sup>4</sup> The concordance between Nexus SAM commodities and HS 2007 codes are available upon request.

<sup>5</sup> Rural and urban status is based on workers' reported place of residence, rather than their place of work. This is consistent with most household and labor force surveys, and hence with most official statistics.

**Table 2. Activities and commodities in the standard Nexus Social Accounting Matrix**

Code	Description	Code	Description	Code	Description
maiz	Maize	eggs	Eggs	clth	Clothing
sorg	Sorghum and millet	smlr	Small ruminants	leat	Leather and footwear
rice	Rice	oliv	Other livestock	wood	Wood products
whea	Wheat and barley	fore	Forestry	papr	Paper products and publishing
ocer	Other cereals	aqua	Aquaculture	petr	Petroleum products
puls	Pulses	fish	Capture fisheries	fert	Fertilizers and herbicides
gnut	Groundnuts	coal	Coal and lignite	chem	Other chemicals
oils	Other oilseeds	coil	Crude oil	nmet	Non-metal minerals
cass	Cassava	ngas	Natural gas	metl	Metals and metal products
ipot	Irish potatoes	omin	Other mining	mach	Machinery & other equipment
spot	Sweet potatoes	meat	Meat processing	equi	Electrical equipment
root	Other roots	fsea	Fish & seafood processing	vehi	Vehicles & transport equipment
leaf	Leafy vegetables	dair	Dairy	oman	Other manufacturing
vege	Other vegetables	fveg	Fruit & vegetable processing	elec	Electricity, gas and steam
sugr	Sugarcane	foil	Fats and oils	watr	Water supply and sewage
toba	Tobacco	mmll	Maize milling	cons	Construction
cott	Cotton and fibres	smlm	Sorghum and millet milling	trad	Wholesale and retail trade
nuts	Nuts	rmlm	Rice milling	tran	Transportation and storage
bana	Bananas & plantains	wmlm	Wheat and barley milling	hotl	Accommodation
frui	Other fruits	gmll	Other grain milling	rest	Restaurants and food services
teal	Leaf tea	sref	Sugar refining	comm	Information & communication
coff	Coffee	pcof	Coffee processing	fsrv	Finance and insurance
coco	Cocoa	ptea	Tea processing	real	Real estate activities
flwr	Cut flowers	food	Other foods	bsrv	Business services
rubb	Rubber	feed	Animal feed	padm	Public administration
ocrp	Other crops	beve	Beverages	educ	Education
catt	Cattle	ptob	Tobacco processing	heal	Health and social work
milk	Raw milk	yarn	Cotton yarn	osrv	Other services
poul	Poultry	text	Textiles		

Source: Authors

**Table 3. Factors of production in the standard Nexus Social Accounting Matrix**

Code	Description	Notes
<b>Labor</b>		
flab-rn	Labor - rural uneducated	0-6 years of formal schooling
flab-rp	Labor - rural primary	7-11 years of formal schooling
flab-rs	Labor - rural secondary	12+ years of formal schooling and/or incomplete tertiary education
flab-rt	Labor - rural tertiary	Completed tertiary education (e.g., degree, certificate, diploma)
flab-un	Labor - urban uneducated	0-6 years of formal schooling
flab-up	Labor - urban primary	7-11 years of formal schooling
flab-us	Labor - urban secondary	12+ years of formal schooling and/or incomplete tertiary education
flab-ut	Labor - urban tertiary	Completed tertiary education (e.g., degree, certificate, diploma)
<b>Land</b>		
flnd	Land - agricultural crops	Harvested crop land
<b>Capital</b>		
fcap-c	Capital - crops	For agricultural crops (e.g., tractors, irrigation infrastructure)
fcap-l	Capital - livestock	For livestock (e.g., live animals, paddocks, beehives)
fcap-m	Capital - mining	For mining (e.g., mineral resources, mining equipment)
fcap-o	Capital - other	For all other sectors, including forestry and fisheries

Source: Authors

**Households:** Nexus SAMs separate national populations into 15 representative household groups, as shown in Table 4. As with labor, the SAM distinguishes between rural and urban households using a country’s official definition of these areas. Rural households are further disaggregated into households that earn crop and/or livestock incomes, i.e., farm households, and those that do not earn incomes from either source, i.e., nonfarm households.

**Table 4. Household types in the standard Nexus Social Accounting Matrix**

Code	Description	Notes
hhd-f1	Rural farm - quintile 1	Rural households with crop and/or livestock incomes separated into national per capita expenditure quintiles
hhd-f2	Rural farm - quintile 2	
hhd-f3	Rural farm - quintile 3	
hhd-f4	Rural farm - quintile 4	
hhd-f5	Rural farm - quintile 5	
hhd-n1	Rural nonfarm - quintile 1	Rural households without crop and/or livestock incomes separated into national per capita expenditure quintiles
hhd-n2	Rural nonfarm - quintile 2	
hhd-n3	Rural nonfarm - quintile 3	
hhd-n4	Rural nonfarm - quintile 4	
hhd-n5	Rural nonfarm - quintile 5	
hhd-u1	Urban - quintile 1	Urban households with or without crop and/or livestock incomes separated into national per capita expenditure quintiles
hhd-u2	Urban - quintile 2	
hhd-u3	Urban - quintile 3	
hhd-u4	Urban - quintile 4	
hhd-u5	Urban - quintile 5	

Source: Authors

Households are further disaggregated into per capita expenditure quintiles. Quintiles are defined at the national level, meaning that rural and urban quintiles are comparable and the combined population of each quintile across rural farm, rural nonfarm, and urban is a fifth of the national population. Per capita expenditure groups are not adjusted for adult-equivalency and include all consumption expenditure items reported in national household surveys. The latter implies that the definition of quintiles in Nexus SAMs may deviate slightly from those based on poverty-oriented consumption measures, which may exclude “non-essential” nonagricultural expenditure items (e.g., airplane tickets or gambling).

**Other accounts:** The remaining accounts in the Nexus SAMs are shown in Table 5. These include the transaction costs of moving goods between producers, domestic markets, and national borders, as well as the various indirect taxes imposed on marketed commodities.

**Table 5. Accounts in the standard Nexus Social Accounting Matrix**

Code	Description	Notes
a___	Activities	See Table 2 for the list of activity accounts
c___	Commodities	See Table 2 for the list of commodity accounts
f___	Factors	See Table 3 for the list of factor accounts
h___	Households	See Table 4 for the list of household accounts
trc	Transaction costs	From moving goods between producers, markets, and/or borders
ent	Enterprises	Financial and non-financial corporations
gov	Government	Government as an institution, not as a producing activity
atax	Taxes - activity	Indirect taxes on producers
dtax	Taxes - direct	Direct taxes on enterprises and households
etax	Taxes - export	Indirect taxes on exports
ftax	Taxes - factor	Direct taxes on factor incomes
mtax	Taxes - import	Indirect taxes on imports (import duties)
stax	Taxes - sales	Indirect taxes on domestic sales (VAT, GST and excise duty)
s-i	Savings-investment	Investment is gross fixed capital formation
dstk	Change in stocks	Inventory accumulation or depletion
row	Rest of world	All foreign countries and economies
total	Total	Row and column totals

Source: Authors

**Sex-disaggregated and regional accounts:** Standard Nexus SAMs often include variants with more detailed accounts, particularly by sex and for subnational regions. Each SAM variant aggregates back to the Standard Nexus SAM (note that the 86-sector national SAM is labeled “v86N”). It should be noted that adding more detail to a SAM often requires greater use of assumptions and proxy variables for distributing incomes and expenditures, and it can stretch the representativeness of survey data. The Nexus Project therefore publishes its national SAMs separately from its gendered and regional SAMs.

Gendered Nexus SAMs (v86G) disaggregate each labor category in Table 3 into male and female workers. Land, livestock, and agricultural capital are disaggregated based on the gender of the *de jure* household head whose household reports incomes from these factors. Each household group in Table 4 are disaggregated according to whether they have a male or female household head. Accounts that change between the Standard and Gendered Nexus SAMs are shown in Table 6.

**Table 6. Gendered accounts in the Nexus Social Accounting Matrix**

Code	Description
flab-__-m	Male labor (see Table 3 for further codes)
flab-__-f	Female labor (see Table 3 for further codes)
flnd-m	Crop land owned by male-headed households
flnd-f	Crop land owned by female-headed households
fcap-c-m	Crop capital owned by male-headed households
fcap-c-f	Crop capital owned by female-headed households
fcap-l-m	Livestock capital owned by male-headed households
fcap-l-f	Livestock capital owned by female-headed households
hhd-__-m	Male headed households (see Table 4 for further codes)
hhd-__-f	Female headed households (see Table 4 for further codes)

Source: Authors

**Regional Nexus SAMs** (v70R) aggregate the 86 activities into 70 activities, which are in turn disaggregated by subnational region. A mapping between N86 and N70 can be found in Table A3 in the Appendix. In some cases, only certain activities, such as agriculture, are regionally

disaggregated due to data limitations. All factors and households are defined by region, except for mining and “other” capital. Accounts that change between the Standard and Regional Nexus SAMs are shown in Table 7.

**Table 7. Regional accounts in the Nexus Social Accounting Matrix**

Code	Description
a____-r_	Activities by numbered region of operation (see Table 1 for further codes)
flab-__-r_	Labor by numbered region of employment (see Table 2 for further codes)
flnd- r_	Crop land by numbered region
fcap-c- r_	Crop capital by numbered region of use
fcap-l- r_	Livestock capital by numbered region of use
hhd-__- r_	Households by numbered region (see Table 4 for further codes)

Source: Authors

**Country-specific deviations from the standard structure:** The SAM structure presented above represents the minimum level of disaggregation required of a Nexus SAM. Some countries have more disaggregated accounts, but these can always be aggregated to the Standard Nexus accounts. Section 5 documents any extensions to the Standard Nexus SAM structure that were used in developing the SAM for Jordan.

### 3 NEXUS SOCIAL ACCOUNTING MATRIX ENTRIES AND GENERAL DATA SOURCES

The previous section outlined the broad structure of a Nexus SAM, including its standardized classification of accounts. This section describes the information included in each row and column entry in the SAM. One advantage of Nexus SAMs is that the Macro SAM has a common classification or definition of cell entries. This section describes each of the blocks of cells in the Macro SAM following the numbered sequence shown in Table 8.

The Macro SAMs are compiled using three key data sources. First, the International Monetary Fund’s (IMF) Government Finance Statistics (GFS) database provides detailed information on government revenues and expenditures and follows a standardized accounting framework. Nexus SAMs use the 2014 GFS Manual (GFSM) (IMF 2014b) – a mapping between GFSM codes and macro SAM accounts can be found in Table A4 in the Appendix. Second, the IMF maintains detailed Balance of Payments Statistics (BOPS) (IMF 2014a). Nexus SAMs use the sixth BOPS Manual (BPM) – a mapping between BPM6 codes and macro SAM accounts can be found in Table A5 in the Appendix. The conversion from US dollars to local currency uses the official exchange rate, as reported in the World Development Indicators (World Bank 2015). Third, countries maintain their own national accounts that include production and expenditure-based GDP estimates. To the extent possible, the Nexus SAMs, like most countries, follow the System of National Accounts (EC et al. 2009).

**Table 8: Numbered entries in a standard Nexus Social Accounting Matrix**

	Activities	Commodities	Factors	Enterprises	Households	Government	Taxes	Investment	Rest of the World
Activities		4			17				
Commodities	1	5			18	23		29	31
Factors	2								32
Enterprises			8			24			33
Households			9	12		25			34
Taxes	3	6	10	13	19				
Government				14	20		28		35
Savings				15	21	26		30	36
Rest of the World		7	11	16	22	27			

Source: Authors

## 1. Intermediate demand

(Commodities | Activities)

**Definition:** Intermediate demand includes payments by activities for the commodities used as non-factor inputs in production processes. For example, payments by the maize activity to the chemical commodity for the fertilizer inputs used to grow maize.

**Estimation:** Intermediate demand for each activity is estimated in three steps. First, the ratio of total intermediate demand to total value-added in each activity is derived from national IOT/SUTs and, where available, updated using more recent national accounts and/or agricultural and industrial survey data. Second, this ratio is used to derive the absolute level of total intermediate demand based on the estimated level of activity value-added (see Entry 2 below). Third, total intermediate payments are disaggregated across individual commodities using shares derived from national IOT/SUTs. Note that IOT/SUTs are usually only updated when national statistical agencies rebase national accounts. The quality or accuracy of intermediate input coefficients therefore declines over time until such time as the underlying IOT/SUTs are updated. The description of each SAM in Section 5 indicates the IOT/SUT's benchmark year.

## 2. Value-added

(Factors | Activities)

**Definition:** Value-added is the returns earned by factors during the production process, such as labor wages and salaries, land rents, and capital profits. Land and capital includes gross operating surplus (GOS), part of which may be reported as “mixed income” in national accounts or IOT/SUTs.

**Estimation:** Total value-added by activity is estimated in two steps. First, national accounts report the level of gross domestic product (GDP measured in basic prices) for aggregate sectors and these are assigned to groups of SAM activities. Second, aggregate GDP estimates are disaggregated to the level of the SAM activities using information on sub-sectoral production from sources beyond national accounts. The value of activity level agricultural production is estimated using production quantity and producer price data from national Ministries of Agriculture or from the FAO's FAOSTAT database (FAO 2015). Total value-added in each agricultural sector is estimated by multiplying the ratio of GDP to gross output (derived from IOT/SUTs) by the estimated value of activity gross output. Similarly, information on activity-level industrial production is derived from manufacturing or industrial surveys.

Labor value added is disaggregated across the worker categories in Table 3 using national household and/or labor force survey data.<sup>6</sup> Workers in these surveys report their sector and location of employment, their remuneration levels, and their education levels. Earnings from farm and non-farm enterprises are usually reported at the household level, and these are assigned to individual household members based on their reported employment status and sector of employment. It is assumed that paid and unpaid family members earn equal shares of household enterprise incomes (net of input costs).

## 3. Taxes on producers

(Taxes | Activities)

**Definition:** Net taxes on production (or net subsidies if SAM value is negative).

**Estimation:** The total value of activity taxes (atax) is taken from the IMF's GFS and includes “taxes on payroll and workforce” (GFSM code 112). This is disaggregated across activities using information from national tax authorities and/or from the IOT/SUT. For the latter, tax rates are derived from the IOT/SUT and then applied to the sectoral value of GDP and intermediate

<sup>6</sup> The national household surveys used to build Nexus SAMs are often the same as the surveys used to estimate poverty rates or weights for consumer price indices. These surveys are similar to the World Bank's Living Conditions Monitoring Surveys (LCMS).

payments (see Entries 1 and 2). This provides an initial estimate of net activity tax payments, which are then scaled to match the total value of activity tax collections.

#### 4. **Marketed output** (Activities | Commodities)

**Definition:** Value of domestically produced goods and services that are supplied to markets, either for domestic use or for export. Marketed output is net non-marketed or home produced and consumed goods and services (see Entry 18).

**Estimation:** This is a residual balancing item for activities. The value of gross output less the value of non-marketed consumption is paid from each activity to its corresponding commodity, thereby balancing activity rows and columns.

#### 5. **Transaction costs** (Commodities | Commodities)

**Definition:** Trade and transport costs associated with moving goods between producers, markets and national borders, either for domestic, import or export trade. For example, exporters incur transport fees when moving goods from their factories to the national border, whereas importers incur fees when delivering goods to domestic markets.

**Estimation:** There are two approaches to estimating transaction costs in Nexus SAMs. First, margin payments as a share of total demand are estimated using past IOT/SUTs. These rates are then applied to total demand estimates in the SAM to derive new transaction costs. Second, margins are estimated by the gap between producer and market prices, net of indirect taxes, using price data provided by national statistical agencies. The first approach is preferred and is the one typically used for Nexus SAMs (see detailed description of each SAM's data sources for information on which approach was used). Finally, transaction cost margins generate income for trade and/or transport activities.

#### 6. **Taxes on products** (Taxes | Commodities)

**Definition:** All indirect taxes imposed on goods and services (or net subsidies if SAM value is negative).

**Estimation:** Nexus SAMs separate taxes on products into three categories: sales taxes (stax), export taxes (etax), and import tariffs (mtax) (see Table 4). The total value of tax collections is taken from the IMF's GFS. Sales taxes are "taxes on goods and services" (GFSM code 114), which is a summation of various tax instruments, most importantly value-added taxes (GFSM 11411), sales taxes (GFSM 11412), and excise duties (GFSM 1142). Import tariffs (mtax) are "taxes on international trade and transactions" (GFSM 115), excluding "taxes on exports" (GFSM 1152), which are assigned to export taxes in the SAM.

Tax revenues are disaggregated across commodities using national tax authority data and/or tax rates estimated from the IOT/SUT. If the IOT/SUT is outdated, then weighted import tariff rates are taken from the United Nations Conference on Trade and Development's Trade Analysis Information System (UNCTAD 2015). Tax rates are applied to the level of domestic sales, imports or exports (see Entries 7 and 32). This provides an initial estimate of commodity level tax payments, which are then scaled to match the total value of each tax revenue category, as estimated above.

#### 7. **Imports** (Rest of World | Commodities)

**Definition:** Value of goods and services imported from abroad, less the cost of carriage, insurance and freight.

**Estimation:** The total value of imports is taken from national accounts, and this is then disaggregated into total goods and total services using current account data from the IMF's

BOPS (i.e., BPM6 codes BMG for “goods, debit” and BMS for “services, debit”). BOPS provides detailed information on services imports by commodity and this is used to assign imports to service commodities in the SAM (see Table A5 in the Appendix). Goods imports are disaggregated across commodities using 6-digit HS gross import flows from the United Nations Commodity Trade Statistics (COMTRADE) database (UNSD 2015).

#### **8. Factor income to enterprises** (Enterprises | Factors)

**Definition:** Mining and “other” capital payments to enterprises, after paying factor taxes and making transfers to the rest of the world (see Entries 10 and 11). These payments equal gross operating surplus, which includes the value of consumption of fixed capital during the production process.

**Estimation:** This is a residual balancing item for the mining and other capital accounts. Total capital income less capital taxes and foreign transfers is paid to the enterprise account, thereby balancing mining and other capitals’ rows and columns.

#### **9. Factor income to households** (Households | Factors)

**Definition:** Labor, land and agricultural capital payments to households, after paying factor taxes and making transfers to the rest of the world (see Entries 10 and 11). These payments equal compensation to workers and returns to land and agricultural capital.

**Estimation:** This is a residual balancing item for labor, land and agricultural capital accounts (i.e., crop and livestock capital). Total factor incomes less factor taxes and foreign transfers are paid to individual household accounts, thereby balancing these factors’ rows and columns. Labor payments to households are disaggregated across household and labor categories using information from national household or labor force surveys (see Entry 2 on treatment on workers’ shares of household enterprise incomes). Land and agricultural capital payments to households are disaggregated using survey households’ reported incomes from agricultural crops and livestock.

#### **10. Factor taxes** (Taxes | Factors)

**Definition:** Direct taxes paid by mining and “other” capital to the government.

**Estimation:** The value of capital tax collections is taken from the IMF’s GFS. Factor taxes are “taxes on property” (GFSM code 113), which is a summation of various taxes, including wealth and estate taxes and capital levies.

#### **11. Factor payments abroad** (Rest of World | Factors)

**Definition:** Labor, land and capital incomes paid to foreign households or enterprises. For example, workers belonging to foreign households may earn some or all of their labor incomes in domestic industries and this income may be repatriated back to these workers’ home countries. Similarly, some profits generated by foreign-owned mining companies may be repatriated to company headquarters in another country.

**Estimation:** Factor transfers to the rest of the world are from the IMF’s BOPS. Labor transfers are “compensation of employees, debit” (BPM6 code BMIPCE). Capital transfers are “investment income, debit” (BPM6 BMIPI), which includes, amongst others, payments on equity and investment funds to foreign investors.

#### **12. Enterprise transfers to households** (Households | Enterprises)

**Definition:** Indirect capital payments by enterprises to households, after paying corporate taxes and saving and making transfers to government and the rest of the world (see Entries 13, 14,

15 and 16). This includes indirect gross operating surplus paid from the earnings of household nonfarm enterprises.

**Estimation:** This is a residual balancing item for the enterprise account. Total enterprise income less taxes and transfers is paid to households, thereby balancing the enterprise row and column. Enterprise earnings are paid to households based on households' earnings from nonfarm enterprises, dividends and private pension funds as reported in national household surveys.

### **13. Corporate taxes** (Taxes | Enterprises)

**Definition:** Corporate and other direct taxes paid by enterprises to the government.

**Estimation:** The total value of taxes collected from enterprises is taken from the IMF's GFS. This includes taxes "payable by corporations and other enterprises" (GFSM code 1112) and "other taxes on income, profits, and capital gains" (GFSM 1113).

### **14. Enterprise transfers to government** (Government | Enterprises)

**Definition:** Transfers from enterprises to governments, other than direct tax payments (see Entry 13). For example, domestic banks may provide loans to the government, or parastatal enterprises may pay dividends or repay loans to the general government. Enterprises may also contribute to public social welfare schemes on behalf of their employees.

**Estimation:** Transfers received by the government from financial and non-financial corporations are taken from the IMF's GFS. This is "property income" (GFSM code 141), which includes, amongst others, interest and dividend payments and payments for rented public property. Transfers from enterprises also include "other taxes" (GFSM 116), which are either paid by business or are unidentifiable. Finally, enterprises include employer contributions to social security (GFSM 1212) and other social schemes (GFSM 1222).

### **15. Enterprise savings** (Savings | Enterprises)

**Definition:** Domestic private savings by enterprises. This includes reinvested earnings as well as the value of the consumption of fixed capital (i.e., provision for capital depreciation).

**Estimation:** Total domestic private savings is back-calculated by subtracting public and foreign savings from the value of gross capital formation (see Entries 21, 26, 29 and 36).

Unfortunately, few developing countries have the detailed national accounts data needed to disaggregate domestic private savings across enterprises and households. Accordingly, in the absence of detailed information, the Nexus SAMs assume that enterprises and households have similar savings rates, after enterprises have subtracted their allowance for the depreciation of working capital.

### **16. Enterprise payments abroad** (Rest of World | Enterprises)

**Definition:** Secondary income transfers from domestic financial and non-financial enterprises to the rest of the world.

**Estimation:** The value of enterprise foreign payments comes from the IMF's BOPS. This includes "other transfers, debit" (BPM6 code BMISOOT).

### **17. Private non-marketed consumption** (Activities | Households)

**Definition:** Activity output that is both produced and consumed within the household, i.e., "own" or "home" consumption.

**Estimation:** Non-marketed consumption is estimated in three steps. First, the share of total private consumption for each Nexus SAM commodity is estimated using aggregate private consumption from national accounts and commodity-level consumption from national household surveys. Second, the share of home consumption in total consumption of each commodity is estimated using the household surveys, and this share of then used to separate total commodity consumption into marketed and non-marketed components. Third, home consumption is disaggregated across household groups using household survey data. Home consumption is defined as any products not purchased in markets, including the consumption of both home-produced products and products received “in-kind” from other households (i.e., without monetary payment).

## **18. Private marketed consumption** (Commodities | Households)

**Definition:** Commodities that are purchased in markets and consumed by households.

**Estimation:** Marketed consumption is estimated in three steps. First, the share of total private consumption for each Nexus SAM commodity is estimated using aggregate private consumption from national accounts and commodity-level consumption from national household surveys. Second, the share of home consumption in total consumption of each commodity is estimated using the household surveys, and this share of then used to separate total commodity consumption into marketed and non-marketed components. Third, marketed consumption is disaggregated across household groups using household survey data. Marketed consumption is defined as any products purchased in markets, i.e., not home produced or received “in-kind” from other households.

## **19. Household taxes** (Taxes | Households)

**Definition:** Direct income or personal taxes paid by households. For example, households often “pay as you earn” (PAYE) taxes to the government based on their wages and salaries.

**Estimation:** Total tax collection is taken from the IMF’s GFS. It includes taxes on income, profits and capital gains that are “payable by individuals” (GFSM code 1111). This is disaggregated across the household groups in the Nexus SAMs using personal income tax rates reported by households in the national household survey. If tax data is not available or is poorly captured in the survey, then incomes from secondary and tertiary educated labor is used as a proxy for disaggregating total direct tax collections (see Table 3).

## **20. Household transfers to government** (Government | Households)

**Definition:** Payments by household to the government other than for direct taxes (see Entry 19). For example, households may contribute to public social welfare schemes, including retirement and healthcare funds.

**Estimation:** The total value of transfers is taken from the IMF’s GFS. This is social security and other social contributions, including payments by employees (GFSM codes 1211 and 1221), self-employed and unemployed people (GFSM 1213), and unallocable and imputed contributions (GFSM 1214 and 1223). Household transfers to government also include various other revenue sources, including from sales of goods and services (GFSM 142), and fines penalties and forfeits (GFSM 143).

## **21. Household savings** (Savings | Households)

**Definition:** Domestic private savings by households.

**Estimation:** Total domestic private savings is back-calculated by subtracting public and foreign savings from the value of gross capital formation (see Entries 21, 26, 29 and 36).

Unfortunately, few developing countries have the detailed national accounts data needed to disaggregate domestic private savings across enterprises and households. Accordingly, in the absence of detailed information, the Nexus SAMs assume that enterprises and households have similar savings rates, after enterprises have subtracted their allowance for the depreciation of working capital. Household savings are then disaggregated across household groups in the SAM using information from national household surveys. Although survey households often report the value of deposits made into bank accounts or the amount of savings during the year, including private pension contributions, this information is often poorly captured. In such cases, proxy indicators are derived from household earnings from enterprises and incomes from higher educated labor.

## **22. Household payments abroad** (Rest of World | Households)

**Definition:** Secondary income transfers from households to the rest of the world.

**Estimation:** The value of household foreign payments comes from the IMF's BOPS. This includes "personal transfers, debit" (BPM6 code BMISOPT). Transfers are disaggregated across household groups in the SAM using information from national household surveys that capture the amount of remittances households sent abroad.

## **23. Government consumption** (Commodities | Government)

**Definition:** Government recurrent spending on goods and services. Public consumption demand by the government institution is the primary source of demand for services produced by government activities, which consist of public administration, education, and health and social work.

**Estimation:** The total value of government consumption is taken from a country's national accounts data. This is cross-checked against recurrent expenditures in the IMF's GFS, which reports government's "compensation of employees" (GFSM code 21), "use of goods and services" (GFSM 22), and "consumption of fixed capital" (GFSM 23). Total consumption is disaggregated across commodities using budget shares derived from the IOT/SUT, and then adjusted to reflect changes in the composition of supply of public administration, education, and health and social work services.

## **24. Government transfers to enterprises** (Enterprises | Government)

**Definition:** Transfers from the government to enterprises. For example, the government may pay interest or repay the principal on a loan from a domestic bank, or the government may lend money to parastatal companies.

**Estimation:** Transfers paid by the government to financial and non-financial corporations are taken from the IMF's GFS. This is interest payments to nongovernment residents (GFSM code 242), subsidies to public corporations and private enterprises (GFSM 25) and "other expenses" (GFSM 28). The latter includes property expenses like dividend and rental payments.

## **25. Government transfers to households** (Households | Government)

**Definition:** Payments by the government to households. For example, governments may pay households from a public pension or cash transfer scheme.

**Estimation:** The total value of transfers is taken from the IMF's GFS. This is social benefits (GFSM code 27), which includes social security, social assistance, and other employment-related social benefits, each of which may be paid in cash or in-kind.

## 26. Government savings

(Savings | Government)

**Definition:** Recurrent fiscal surplus for the government (of deficit if cell entry is negative). Note that this is the difference between revenues and recurrent expenditures, i.e., before public capital investment. Recurrent expenditures include public consumption spending (see Entry 25) and transfers to domestic and foreign institutions (see Entries 24, 25 and 27).

**Estimation:** This is the residual balancing item for the government account, although it cross-checked against the difference between total revenues and total recurrent expenses in the IMF's GFS (GFSM codes 1 and 2). Any deviation from GFS data is due to the Nexus SAM giving preference to statistics from national accounts (for indirect tax collections and government consumption spending, see Entries 3, 6 and 23) and to the IMF's BOP database (for foreign transfers, see Entries 27 and 35).

## 27. Government payments abroad

(Rest of World| Government)

**Definition:** Transfers from the government to the rest of the world. For example, government may provide foreign aid to other countries, or must pay interest or repay loans to foreign governments and financial enterprises.

**Estimation:** The value of government foreign payments comes from the IMF's BOPS, and is cross-checked against the IMF's GFS. BOPS-based payments include "general government transfers, debit" under secondary income (BPM6 code BMISG). GFS-based payments include interest payments to nonresidents (GFSM code 241), and grants paid to foreign governments and international organizations (GFSM 26).

## 28. Tax revenues paid to government

(Government | Taxes)

**Definition:** Revenues transferred from individual tax accounts to the government account.

**Estimation:** This is a residual balancing item for the tax accounts in the SAM. The distinction between taxes and the government account allows the SAM to disaggregate indirect taxes on commodities, i.e., sales taxes, export taxes, and import tariffs (see Entry 6).

## 29. Gross capital formation

(Commodities | Investment)

**Definition:** Combination of gross fixed capital formation (GFCF) and changes in stocks or inventories. GFCF is the spending on commodities involved during the investment in capital stock. For example, investment typically involves the purchase of machinery, vehicles and equipment, as well as payments for constructing new factories and storage facilities. Changes in stocks occur when businesses carry-over stock for sale in subsequent years, or when they sell products in the current year that were produced in previous years. Positive values in the SAM indicate an accumulation of stocks and negative values indicate a depletion of stocks. Finally, note that the Nexus SAMs combine private, public and foreign investment, just as they combine private, public and foreign savings (see Entries 15, 21 and 26).

**Estimation:** The Nexus SAMs distinguish between GFCF (s-i) and changes in stocks (dstk). SAM entries are determined in two steps. First, the total value of GFCF and stock changes are taken from official national accounts data. Second, these total values are disaggregated across commodities using expenditure shares from the IOT/SUT. In some cases, countries report the composition of GFCF on an annual basis, in which case this information is used in place of the IOT/SUT shares. The same is true for stock changes, although most countries only report detailed stock changes when a new IOT/SUT is produced during the rebasing of national accounts. Although commodity level stock changes in Nexus SAMs typically deviate from national accounts, this is not overly concerning since they are usually an exogenous decision variable in economy-wide models.

### 30. Inventory or stock change adjustment

(Savings | Investment)

**Definition:** The accumulation of stocks for sale in subsequent years are added to the amount of savings available in the country (and a depletion of stocks reduces savings). For example, if an activity produces a machine this year for sale next year then they are effectively saving the value of the machine (or investing in future sales). This transfer of total stock changes to the savings account was not shown in Table 1, because it nets to zero in SAMs that aggregate gross fixed capital formation (GFCF) and changes in stocks.

**Estimation:** This is a residual balancing item for the change in stocks account (see Entry 29). The total value of stock changes is paid to the savings account. A positive value means a net accumulation of stocks and a negative value means a net depletion.

### 31. Exports

(Commodities | Rest of World)

**Definition:** Value of goods and services exported abroad.

**Estimation:** The total value of exports is taken from national accounts, and this is then disaggregated into total goods and total services using current account data from the IMF's BOPS (i.e., BPM6 codes BXG for "goods credit" and BXS for "services credit"). BOPS provides detailed information on services exports by commodity and this is used to assign exports to service commodities in the SAM (see Table A5 in the Appendix). Goods exports are disaggregated across commodities using 6-digit HS gross export flows from the United Nations Commodity Trade Statistics (COMTRADE) database (UNSD 2015).

### 32. Foreign transfers to factors

(Factors | Rest of World)

**Definition:** Labor, land and capital incomes received from the rest of the world. For example, workers belonging to domestic households may earn some or all of their labor incomes working in a foreign country and this income may be repatriated. Similarly, domestically-owned companies may repatriate profits earned abroad.

**Estimation:** Factor transfers from the rest of the world are from the IMF's BOPS. Labor receipts are "compensation of employees, credit" (BPM6 code BXIPCE). Capital receipts are "investment income, credit" (BPM6 BXIPI), which includes, amongst others, income on foreign equity and investment funds.

### 33. Foreign transfers to enterprises

(Enterprises | Rest of World)

**Definition:** Secondary income transfers from the rest of the world to domestic financial and non-financial enterprises.

**Estimation:** The value of enterprise foreign receipts comes from the IMF's BOPS. This includes "other transfers, credit" (BPM6 code BXISOOT).

### 34. Foreign transfers to households

(Households | Rest of World)

**Definition:** Secondary income transfers from households to the rest of the world. For example, households may receive remittance incomes from family members working abroad.

**Estimation:** The value of household foreign incomes comes from the IMF's BOPS. This includes "personal transfers, credit" (BPM6 code BXISOPT). Transfers are disaggregated across household groups in the SAM using information from national household surveys that capture the amount of remittances households received from abroad.

### 35. Foreign transfers to government

(Government | Rest of World)

**Definition:** Transfers from the rest of the world to the government. For example, government may receive foreign aid from other countries.

**Estimation:** The value of government foreign receipts comes from the IMF's BOPS, and this is cross-checked against the IMF's GFS. BOPS-based receipts include "general government transfers, credit" under secondary income (BPM6 code BXISG). GFS-based payments include grants received from foreign governments and international organizations (GFSM code 131 and 132).

### 36. Foreign savings

(Savings | Rest of World)

**Definition:** Current account balance equal to total foreign capital or savings inflows.

**Estimation:** This is the residual balancing item for the rest of world account, although it cross-checked against the current account balance reported in the IMF's BOPS (BPM6 code 1). Any deviation from BOPS data – and this is usually small – is due to the Nexus SAM giving preference to total the value of imports and exports reported in national accounts (see Entries 7 and 31).

## 4 BALANCING NEXUS SOCIAL ACCOUNTING MATRICES

Nexus SAMs are constructed in three stages using the IFPRI SAM Building Toolkit. The toolkit uses a standardized template in Microsoft Excel® to construct and export an unbalanced SAM to a compilation and balancing program that is executed using the General Algebraic Modeling System (GAMS) software.

During the first stage of the use of the SAM Toolkit, a Macro SAM is constructed using the data described in previous sections. The three main data sources for the Macro SAM are national accounts, the IMF's Government Finance Statistics (GFS) database, and the IMF's Balance of Payments Statistics (BOPS) database. Unfortunately, in many developing countries these three data sources are not fully reconciled. For example, the total value of exports and imports in national accounts may not exactly match the values appearing in BOPS. Preference is given to certain data sources. For instance, Nexus SAMs always use national accounts data instead of trade data from BOPS or government consumption spending estimates from GFS. Similarly, preference is given BOPS over GFS when estimating transfers between the government and the rest of the world. Row and column totals in the Macro SAM are reconciled manually through various residual balancing items:

- Marketed supply balances the activity accounts (see cell 4 in Table 8)
- Transfers to households or enterprises balances the factor accounts (see cells 8 and 9)
- Transfers to households balances the enterprise account (see cell 12)
- Household and government savings balance the household and government accounts (see cells 21 and 26)
- Foreign savings balances the rest of world account (see cell 36).

During the second stage, income and expenditure shares derived from surveys and other sources are used to disaggregate the Macro SAM entries across detailed activities, commodities, factors, and households. Sectoral and product data is used to disaggregate production and trade, and survey data is used to disaggregate factor and household incomes and consumer demand. There are always imbalances between the level of supply and demand for commodities and

between household incomes and expenditures. These imbalances are manually checked for misclassification issues and logical errors in data collection and reporting. However, imbalances invariably remain. So, Nexus SAMs use cross-entropy estimation techniques to reconcile row and column totals at the detailed commodity and household level. For more information on cross-entropy-based reconciliation of SAM accounts, see Robinson et al. (2001).

Finally, in the third stage of the application of the SAM Toolkit, Standard Nexus SAM entries are further disaggregated to include sex-disaggregated and regional information. As above, separating activities, factors, and households always introduces new imbalances. These are reconciled using a second round of cross-entropy estimation techniques.

## 5 JORDAN SOCIAL ACCOUNTING MATRIX AND DATA SOURCES

The 2015 Jordan SAM presents the latest consistent economy-wide dataset for the economy. It follows the standard Nexus structure, as described in Section 2.

Table 9 lists the data sources used to construct the 2015 Jordan SAM. The number of activities/commodities used is based on the number of standard Nexus accounts considered when constructing the SAM (see Table 2). All major data sources are consistent with those used for standard Nexus SAMs, as described in Section 3.

**Table 9. Summary of data sources for the Jordan Social Accounting Matrix**

Data needs	Data year	Country data sources	Reference
<b>Macroeconomic structure</b>			
National accounts	2015	Jordan Statistical Yearbook 2017	Department of Statistics (2017)
Government finance	2015	GFS2015 online database	IMF (2016a)
Balance of payments	2015	BPM6 online database	IMF (2016b)
<b>Input-output table (IOT)</b>			
Aggregate structure	2006		
<b>Disaggregating activities</b>			
Aggregate sectors	2015	Jordan Statistical Yearbook, 2017	DOS (2017a)
Crops and livestock subsectors	2014	FAOSTAT online database	FAO (2016)
Industrial subsectors	2015	Industrial Survey	DOS (2017b)
<b>Disaggregating commodities</b>			
Private consumption	2013	Household Income and Expenditure Surveys (HIES)	OAMDI (2017)
Public consumption	2015	Jordan Statistical Yearbook 2017	Department of Statistics (2017)
Gross fixed capital formation	2015	Jordan Statistical Yearbook 2017	Department of Statistics (2017)
Goods trade	2015	COMTRADE online database	UNCTAD (2016)
Services trade	2015	BPM6 online database	IMF (2016b)
Indirect tax rates	2015	Central Bank of Jordan, Annual report	CBJ (several issues)
Import tariffs	2014	Trade Analysis Information System most favoured nation rates	UNCTAD (2015)
Subsidy rates	2015	Central Bank of Jordan, Annual report	CBJ (several issues)
Disaggregating labor	2016	Labor Market Panel Surveys	OAMDI (2018)
Disaggregating households	2013	Household Income and Expenditure Surveys (HIES)	OAMDI (2017)

Source: Authors

In order to validate the main statistical datasets used, IFPRI co-organized with the United Nations Economic and Social Commission for Western Asia (UNESCWA) a technical workshop on

the Jordanian SAM that involved the participation of representatives of the institutions from which these datasets were obtained. This workshop was held on 15 October 2019 in Amman.

**Activities:** Jordan's national accounts provided GDP estimates for 21 sectors, which were disaggregated to the Nexus 86 activities using (i) crop production and price data from FAOSTAT (see Section 3); and (ii) industrial data from the 2015 Industrial Survey. An updated IOT was estimated using the technical coefficients derived from the 2006 SAM containing 81 activities and 81 commodities, which were aggregated to the Nexus 86 activities using the ISIC Revision 4 concordance (see Table A1 in the Appendix).

**Commodities:** National accounts report GDP by expenditure group, i.e., private and public consumption, investment demand, and exports and imports. These groups were disaggregated across the Nexus commodities using the following data:

- Six-digit COMTRADE and itemized IMF BOPS data were used to disaggregate international goods and services trade, respectively.
- The 2013 Household Income and Expenditure Survey (HIES), which is a nationally representative household survey, was used to disaggregate total private consumption spending across activities and commodities.
- Public consumption spending was disaggregated across public administration, health, and education using GDP information from national accounts, after subtracting other sources of consumption and intermediate demand.
- Import tariffs were extracted from UNCTAD's Trade Analysis Information System and scaled to match data on total import duties collected from the IMF's GFS database. Initial indirect tax rates were estimated based on the information provided by Central Bank of Jordan (CBJ, various issues) and the Ministry of Finance.

**Labor:** The updated IOT separates sectoral GDP into compensation of employees and gross operating surplus. Labor value-added was disaggregated using sector-level income shares of household members derived from the 2013 HIES. This survey provides information on wage earnings, as well as farm and non-farm enterprise revenues.

**Households:** Household incomes and expenditures were disaggregated across representative household groups using information from the 2013 HIES. Households receive factor incomes based on reported earnings of individual household members. The value-added generated by cropland and livestock capital were paid to household groups based on their reported farm enterprise revenues. Direct tax payments were assumed to be proportional to secondary and tertiary-educated workers' wage and non-farm enterprise earnings. Finally, transfers received from the government and the rest of the world were assigned to households using information from the survey. More specifically, the ratio of transfer earnings to total household consumption was used to estimate initial transfer incomes. These were then scaled uniformly across all households in order to match the total value of transfers appearing in government and balance of payments statistics.

**Data file:** The Microsoft Excel® file containing the 2015 SAM for Jordan ("Jordan SAM\_2015.xlsx") includes two worksheets:

- *Notes:* Description of the Jordan Nexus SAM accounts.
- *Jordan-SAM:* The 2015 Jordan SAM with the standard 86-sector Nexus structure.

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## APPENDIX

**Table A1. Detailed classification of Nexus 86 activity accounts**

Nexus Activity		International Standard Industrial Classification (ISIC) Revision 4	
Code	Description	Code	Description
maiz	Maize	0111	Growing of cereals (except rice), leguminous crops and oil seeds
sorg	Sorghum and millet	0111	Growing of cereals (except rice), leguminous crops and oil seeds
rice	Rice	0112	Growing of rice
whea	Wheat and barley	0111	Growing of cereals (except rice), leguminous crops and oil seeds
ocer	Other cereals	0111	Growing of cereals (except rice), leguminous crops and oil seeds
puls	Pulses	0111	Growing of cereals (except rice), leguminous crops and oil seeds
gnut	Groundnuts	0111	Growing of cereals (except rice), leguminous crops and oil seeds
oils	Other oilseeds	0111	Growing of cereals (except rice), leguminous crops and oil seeds
cass	Cassava	0113	Growing of vegetables and melons, roots and tubers
ipot	Irish potatoes	0113	Growing of vegetables and melons, roots and tubers
spot	Sweet potatoes	0113	Growing of vegetables and melons, roots and tubers
root	Other roots	0113	Growing of vegetables and melons, roots and tubers
leaf	Leafy vegetables	0113	Growing of vegetables and melons, roots and tubers
vege	Vegetables	0113	Growing of vegetables and melons, roots and tubers
sugr	Sugar cane	0114	Growing of sugar cane
toba	Tobacco	0115	Growing of tobacco
cott	Cotton and fibers	0116	Growing of fiber crops
nuts	Nuts	0125	Growing of other tree and bush fruits and nuts
bana	Banana and plantains	0125	Growing of other tree and bush fruits and nuts
frui	Fruits	0121	Growing of grapes
		0122	Growing of tropical and subtropical fruits
		0123	Growing of citrus fruits
		0124	Growing of pome fruits and stone fruits
		0125	Growing of other tree and bush fruits and nuts
		0126	Growing of oleaginous fruits
coco	Cocoa	0127	Growing of beverage crops
coff	Coffee	0127	Growing of beverage crops
teal	Tea	0127	Growing of beverage crops
flwr	Cut flowers	0130	Plant propagation
rubbr	Rubber	0119	Growing of other non-perennial crops
ocrp	Other crops	0119	Growing of other non-perennial crops
		0128	Growing of spices, aromatic, drug and pharmaceutical crops
		0129	Growing of spices, aromatic, drug and pharmaceutical crops
		0161	Support activities for crop production
		0163	Post-harvest crop activities
catt	Cattle	0141	Raising of cattle and buffaloes
		0141	Raising of cattle and buffaloes
		0146	Raising of poultry
		0146	Raising of poultry
smlr	Small ruminants	0144	Raising of sheep and goats
oliv	Other livestock	0142	Raising of horses and other equines
		0143	Raising of camels and camelids
		0145	Raising of swine/pigs
		0149	Raising of other animals
		0162	Support activities for animal production
fore	Forestry	0170	Hunting, trapping and related service activities
		02xx	Forestry and logging
aqua	Aquaculture	032x	Aquaculture
fish	Fishing	031x	Fishing

Nexus Activity		International Standard Industrial Classification (ISIC) Revision 4	
coal	Coal and lignite	05xx	Mining of coal and lignite
coil	Crude oil	061x	Extraction of crude petroleum
ngas	Natural gas	062x	Extraction of natural gas
omin	Other mining	07xx	Mining of metal ores
		08xx	Other mining and quarrying
		09xx	Mining support service activities
		101x	Processing and preserving of meat
meat	Meat processing	101x	Processing and preserving of meat
fsea	Fish and seafood processing	102x	Processing and preserving of fish, crustaceans and mollusks
fveg	Fruit & vegetable processing	103x	Processing and preserving of fruit and vegetables
foil	Fats and oils	104x	Manufacture of vegetable and animal oils and fats
dair	Dairy	105x	Manufacture of dairy products
mml	Maize milling	1061	Manufacture of grain mill products
sml	Sorghum and millet milling	1061	Manufacture of grain mill products
rml	Rice milling	1061	Manufacture of grain mill products
wml	Wheat and barley milling	1061	Manufacture of grain mill products
gmll	Other grain milling	106x	Manufacture of grain mill products, starches and starch products
sref	Sugar refining	1072	Manufacture of sugar
pcof	Coffee processing	1079	Manufacture of coffee products
ptea	Tea processing	1079	Manufacture of tea products
food	Other foods	107x	Manufacture of other food products (excl. sugar: 1072 above, coffee and tea products)
feed	Animal feed	108x	Manufacture of prepared animal feeds
beve	Beverages	11xx	Manufacture of beverages
ptob	Tobacco processing	12xx	Manufacture of tobacco products
yarn	Yarn	1311	Preparation and spinning of textile fibers
text	Textiles	13xx	Manufacture of textiles
clth	Clothing	14xx	Manufacture of wearing apparel
leat	Leather and footwear	15xx	Manufacture of leather and related products
wood	Wood products	16xx	Manufacture of wood and of products of wood and cork, except furniture
papr	Paper and publishing	17xx	Manufacture of paper and paper products
		18xx	Printing and reproduction of recorded media
petr	Petroleum	19xx	Manufacture of coke and refined petroleum products
fert	Fertilizer and pesticides	2012	Manufacture of fertilizers and nitrogen compounds
		2021	Manufacture of pesticides and other agrochemical products
chem	Other chemicals	20xx	Manufacture of chemicals and chemical products (excl. 2012 and 2021 above)
		21xx	Manufacture of basic pharmaceutical products and pharmaceutical preparations
		22xx	Manufacture of rubber and plastics products
		23xx	Manufacture of other non-metallic mineral products
nmet	Non-metal minerals	23xx	Manufacture of other non-metallic mineral products
metl	Metals and metal products	24xx	Manufacture of basic metals
		25xx	Manufacture of fabricated metal products, except machinery and equipment
equi	Electrical equipment	26xx	Manufacture of computer, electronic and optical products
		27xx	Manufacture of electrical equipment
mach	Machinery & other equipment	28xx	Manufacture of machinery and equipment n.e.c.
vehi	Vehicles & transport equipment	29xx	Manufacture of motor vehicles, trailers and semi-trailers
		30xx	Manufacture of other transport equipment
oman	Other manufacturing	31xx	Manufacture of furniture
		32xx	Other manufacturing
		33xx	Repair and installation of machinery and equipment
elec	Electricity, gas and steam	35xx	Electricity, gas, steam and air conditioning supply
watr	Water supply and sewage	36xx	Water collection, treatment and supply
		37xx	Sewerage

Nexus Activity		International Standard Industrial Classification (ISIC) Revision 4	
		38xx	Waste collection, treatment and disposal activities; materials recovery
cons	Construction	41xx	Construction of buildings
		42xx	Civil engineering
		43xx	Specialized construction activities
trad	Wholesale and retail trade	45xx	Wholesale and retail trade and repair of motor vehicles and motorcycles
		46xx	Wholesale trade, except of motor vehicles and motorcycles
		47xx	Retail trade, except of motor vehicles and motorcycles
tran	Transportation and storage	49xx	Land transport and transport via pipelines
		50xx	Water transport
		51xx	Air transport
		52xx	Warehousing and support activities for transportation
		53xx	Postal and courier activities
hotl	Accommodation & food services	55xx	Accommodation
rest	Restaurants and food services	56xx	Food and beverage service activities
comm	Information and communication	58xx	Publishing activities
		59xx	Motion picture, video, TV program production, sound and music publishing
		60xx	Programming and broadcasting activities
		61xx	Telecommunications
		62xx	Computer programming, consultancy and related activities
		63xx	Information service activities
fsrv	Finance & insurance	64xx	Financial service activities, except insurance and pension funding
		65xx	Insurance, reinsurance and pension funding, except compulsory social security
		66xx	Activities auxiliary to financial service and insurance activities
real	Real estate activities	68xx	Real estate activities
bsrv	Business services	69xx	Legal and accounting activities
		70xx	Activities of head offices; management consultancy activities
		71xx	Architectural and engineering activities; technical testing and analysis
		72xx	Scientific research and development
		73xx	Advertising and market research
		74xx	Other professional, scientific and technical activities
		75xx	Veterinary activities
		77xx	Rental and leasing activities
		78xx	Employment activities
		79xx	Travel agency, tour operator, reservation service and related activities
		80xx	Security and investigation activities
		81xx	Services to buildings and landscape activities
		82xx	Office administrative, office support and other business support activities
padm	Public administration	84xx	Public administration and defence; compulsory social security
educ	Education	85xx	Education
heal	Health and social work	86xx	Human health activities
		87xx	Residential care activities
		88xx	Social work activities without accommodation
osrv	Other services	90xx	Creative, arts and entertainment activities
		91xx	Libraries, archives, museums and other cultural activities
		92xx	Gambling and betting activities
		93xx	Sports activities and amusement and recreation activities
		94xx	Activities of membership organizations
		95xx	Repair of computers and personal and household goods
		96xx	Other personal service activities

Nexus Activity	International Standard Industrial Classification (ISIC) Revision 4
	97xx Activities of households as employers of domestic personnel
	98xx Undifferentiated goods/service activities of private households for own use
	99xx Activities of extraterritorial organizations and bodies

Source: Authors

Note: n.e.c. = "not elsewhere considered".

**Table A2. Detailed classification of Nexus 86 agricultural activity accounts**

Code	Description (FAOSTAT crop and livestock product codes in parentheses)
maiz	Maize (56)
sorg	Millet (79); Sorghum (83)
rice	Paddy rice (27)
whea	Wheat (15); Barley (44)
ocer	Rye (71); Oats (75); Buckwheat (89); Quinoa (92); Fonio (94); Triticale (97); Canary seed (101); Mixed grain (103); Cereals not elsewhere specified (108)
puls	Dry beans (176); Dry broad beans and horse beans (181); Dry peas (187); Chick peas (191); Dry cow peas (195); Pigeon peas (197); Lentils (201); Bambara beans (203); Vetches (205); Lupins (210); Pulses not elsewhere specified (211)
gnut	Groundnuts with shell (242)
oils	Soybeans (236); Coconuts (249); Palm oil fruit (254); Palm kernels (256); Palm oil (257); Olives (260); Karite nuts (sheanuts) (263); Castor oil seed (265); Sunflower seed (267); Rapeseed (270); Tung nuts (275); Jojoba seed (277); Safflower seed (280); Sesame seed (289); Mustard seed (292); Poppy seed (296); Melonseed (299); Tallowtree seed (305); Vegetable tallow (306); Stillingia oil (307); Cottonseed (329); Linseed (333); Hempseed (336); Oilseeds not elsewhere specified (339)
cass	Cassava (125)
ipot	Potatoes (116)
spot	Sweet potatoes (122)
root	Yautia (cocoyam) (135); Taro (cocoyam) (136); Yams (137); Roots and tubers not elsewhere specified (149)
leaf	Cabbages and other brassicas (358); Artichokes (366); Asparagus (367); Lettuce and chicory (372); Tomatoes (388); Cauliflowers and broccoli (393); Pumpkins, squash and gourds (394); Cucumbers and gherkins (397); Eggplants (aubergines) (399)
vege	Chilies and peppers, green (401); Green onions and shallots (402); Dry onions (403); Garlic (406); Leeks and other alliaceous vegetables (407); Green beans (414); Green peas (417); Leguminous vegetables not elsewhere specified (420); String beans (423); Carrots and turnips (426); Okra (430); Green maize (446); Mushrooms and truffles (449); Chicory roots (459); Carobs (461); Fresh vegetables not elsewhere specified (463)
sugr	Sugar cane (156); Sugar beet (157); Sugar crops not elsewhere specified (161)
toba	Unmanufactured tobacco (826)
cott	Kapok fruit (310); Seed cotton (328); Flax fiber and tow (773); Hemp tow waste (777); Jute (780); Bastfibers, other (782); Ramie (788); Sisal (789); Agave fibers not elsewhere specified (800); Manila fiber (abaca) (809); Fiber crops not elsewhere specified (821)
nuts	Brazil nuts with shell (216); Cashew nuts with shell (217); Chestnut (220); Almonds with shell (221); Walnuts with shell (222); Pistachios (223); Kola nuts (224); Hazelnuts with shell (225); Areca nuts (226); Nuts not elsewhere specified (234)
bana	Bananas (486); Plantains (489)
frui	Oranges (490); Tangerines, mandarins, clementines and satsumas (495); Lemons and limes (497); Grapefruit (including pomelos) (507); Citrus fruit not elsewhere specified (512); Apples (515); Pears (521); Quinces (523); Apricots (526); Sour cherries (530); Cherries (531); Peaches and nectarines (534); Plums and sloes (536); Stone fruit not elsewhere specified (541); Pome fruit not elsewhere specified (542); Strawberries (544); Raspberries (547); Gooseberries (549); Currants (550); Blueberries (552); Cranberries (554); Berries not elsewhere specified (558); Grapes (560); Watermelons (567); Other melons (including cantaloupes) (568); Figs (569); Mangoes, mangoosteens, and guavas (571); Avocados (572); Pineapples (574); Dates (577); Persimmons (587); Cashew apple (591); Kiwi fruit (592); Papayas (600); Fresh tropical fruit not elsewhere specified (603); Fresh fruit not elsewhere specified (619)
coco	Cocoa beans (661)
coff	Green coffee (656)
teal	Tea (667); Maté (671); Tea not elsewhere specified (674)
flwr	Not reported in FAOSTAT
rubb	Natural rubber (836); Natural gums (839)

Code	Description (FAOSTAT crop and livestock product codes in parentheses)
ocrp	Hops (677); Pepper (piper spp.) (687); Dry chillies and peppers (689); Vanilla (692); Cinnamon (canella) (693); Cloves (698); Nutmeg, mace and cardamoms (702); Anise, badian, fennel and coriander (711); Ginger (720); Spices not elsewhere specified (723); Peppermint (748); Dried pyrethrum (754)
catt	Cattle meat (867); Indigenous cattle meat (944); Live weight cattle meat (945)
milk	Whole fresh cow milk (882); Whole fresh buffalo milk (951); Whole fresh sheep milk (982); Whole fresh goat milk (1020); Whole fresh camel milk (1130)
poul	Chicken meat (1058); Duck meat (1069); Indigenous duck meat (1070); Live weight duck meat (1071); Goose and guinea fowl meat (1073); Indigenous goose meat (1077); Live weight goose meat (1078); Turkey meat (1080); Indigenous bird meat not elsewhere specified (1084); Other live weight poultry meat (1085); Indigenous turkey meat (1087); Live weight turkey meat (1088); Bird meat not elsewhere specified (1089); Indigenous chicken meat (1094); Live weight chicken meat (1095)
eggs	Hen eggs in shell (1062); Other bird eggs in shell (1091)
smlr	Sheep meat (977); Greasy wool (987); Indigenous sheep meat (1012); Live weight sheep meat (1013); Goat meat (1017); Indigenous goat meat (1032); Live weight goat meat (1033)
oliv	Buffalo meat (947); Indigenous buffalo meat (972); Live weight buffalo meat (973); Pig meat (1035); Indigenous pig meat (1055); Live weight pig meat (1056); Horse meat (1097); Ass meat (1108); Mule meat (1111); Indigenous horse meat (1120); Live weight horse meat (1121); Indigenous ass meat (1122); Live weight ass meat (1123); Indigenous mule meat (1124); Live weight mule meat (1125); Camel meat (1127); Indigenous camel meat (1137); Live weight camel meat (1138); Rabbit meat (1141); Indigenous rabbit meat (1144); Live weight rabbit meat (1145); Other rodent meat (1151); Indigenous rodent meat (1154); Live weight rodent meat (1155); Other camelid meat (1158); Indigenous other camelid meat (1161); Live weight other camelids meat (1162); Game meat (1163); Meat not elsewhere specified (1166); Snails (1176); Natural honey (1182); Beeswax (1183); Silk-worm cocoons (1185)

Source: Authors

**Table A3. Concordance between Nexus 70 and Nexus 86 activity accounts**

Nexus description	N70	N86	Nexus description	N70	N86
Maize	maiz	maiz	Fats and oils	foil	foil
Sorghum and millet	sorg	sorg	Grain milling	gmll	mmll
Rice	rice	rice	Grain milling	gmll	smll
Other cereals	whea	whea	Grain milling	gmll	rmll
Other cereals	ocer	ocer	Grain milling	gmll	wmll
Pulses	puls	puls	Grain milling	gmll	gmll
Groundnuts	gnut	gnut	Sugar refining	sref	sref
Other oilseeds	oils	oils	Other foods and feed	food	pcof
Cassava	cass	cass	Other foods and feed	food	ptea
Other roots	root	ipot	Other foods and feed	food	food
Other roots	root	spot	Other foods and feed	feed	feed
Other roots	root	root	Beverages	beve	beve
Vegetables	vege	leaf	Tobacco processing	ptob	ptob
Vegetables	vege	vege	Textiles	text	yarn
Sugarcane	sugr	sugr	Textiles	text	text
Tobacco	toba	toba	Clothing	clth	clth
Cotton and fibres	cott	cott	Leather and footwear	leat	leat
Fruits and nuts	frui	nuts	Wood and paper products	wood	wood
Fruits and nuts	frui	bana	Wood and paper products	papr	papr
Fruits and nuts	frui	frui	Petroleum products	petr	petr
Coffee and tea	teal	teal	Other chemicals	fert	fert
Coffee and tea	coff	coff	Other chemicals	chem	chem
Cocoa	coco	coco	Non-metal minerals	nmet	nmet
Other crops	flwr	flwr	Metals and metal products	metl	metl
Other crops	ocrp	rub	Machinery and equipment	mach	mach
Other crops	ocrp	ocrp	Machinery and equipment	equi	equi
Cattle and milk	catt	catt	Machinery and equipment	vehi	vehi
Cattle and milk	milk	milk	Other manufacturing	oman	oman
Poultry and eggs	poul	poul	Electricity, gas and steam	elec	elec
Poultry and eggs	poul	eggs	Water supply and sewage	watr	watr
Other livestock	smlr	smlr	Construction	cons	cons
Other livestock	oliv	oliv	Wholesale and retail trade	trad	trad
Forestry	fore	fore	Transportation and storage	tran	tran
Fisheries	fish	aqua	Accommodation and food services	hotl	hotl
Fisheries	fish	fish	Accommodation and food services	hotl	rest
Coal and lignite	coal	coal	Information and communication	comm	comm
Crude oil	coil	coil	Finance and insurance	fsrv	fsrv
Natural gas	ngas	ngas	Real estate activities	real	real
Other mining	omin	omin	Business services	bsrv	bsrv
Meat, fish and dairy	meat	meat	Public administration	padm	padm
Meat, fish and dairy	fsea	fsea	Education	educ	educ
Meat, fish and dairy	dair	dair	Health and social work	heal	heal
Fruit & vegetable processing	fveg	fveg	Other services	osrv	osrv

Source: Authors

**Table A4. Detailed classification of the government account**

Government Financial Statistics Manual (IMF GFSM 2014)		Nexus SAM Entries*	
Code	Description	Row	Column
1	Revenue		
11	Taxes		
111	Taxes on income, profits, and capital gains		
1111	Payable by individuals	dtax	hhd-__
1112	Payable by corporations and other enterprises	dtax	ent
1113	Other taxes on income, profits, and capital gains	dtax	ent
112	Taxes on payroll and workforce	ftax	flab-__
113	Taxes on property	ftax	fcap-__
114	Taxes on goods and services	stax	c____
115	Taxes on international trade and transactions		
1151	Customs and other import duties	mtax	c____
1152	Taxes on exports	etax	c____
1153	Profits of export or import monopolies	mtax	c____
1154	Exchange profits	mtax	c____
1155	Exchange taxes	mtax	c____
1156	Other taxes on international trade and transactions	mtax	c____
116	Other taxes	dtax	ent
12	Social contributions		
121	Social security contributions		
1211	Employee contributions	gov	hhd-__
1212	Employer contributions	gov	ent
1213	Self-employed or unemployed contributions	gov	hhd-__
1214	Unallocable contributions	gov	hhd-__
122	Other social contributions		
1221	Employee contributions	gov	hhd-__
1222	Employer contributions	gov	ent
1223	Imputed contributions	gov	hhd-__
13	Grants	gov	row
14	Other revenue		
141	Property income	gov	ment
142	Sales of goods and services	gov	hhd-__
143	Fines, penalties, and forfeits	gov	hhd-__
144	Transfers not elsewhere classified	gov	hhd-__
145	Premiums, fees, and nonlife insurance claims	gov	ment
2	Expense		
21	Compensation of employees	c____	gov
22	Use of goods and services	c____	gov
23	Consumption of fixed capital	c____	gov
24	Interest		
241	To nonresidents	row	gov
242	To residents other than general government	ent	gov
243	To other general government units	ent	gov
25	Subsidies	ent	gov
26	Grants	row	gov
27	Social benefits	hhd-__	gov
28	Other expense	ent	gov

Source: Authors

Note: \* Table 5 describes the Nexus SAM account codes.

**Table A5. Detailed classification of the Rest of World account**

Code	Balance of Payments (IMF BOP6)		Nexus SAM Entries*	
		Description	Row	Column
BCA	Current account			
BGS	Goods and services			
BG	Goods			
BXG	Credit		c_____	row
BMG	Debit		row	c_____
BS	Services			
BXS	Credit		c_____	row
BXSR	Maintenance and repair services n.i.e.		ctrad	row
BXSTR	Transport		ctran	row
BXSTV	Travel		chotl	row
BXSOCN	Construction services		ccons	row
BXSOIN	Insurance and pension services		cfsrv	row
BXSOFI	Financial services		cfsrv	row
BXSORL	Charges for the use of intellectual property n.i.e.		cbsrv	row
BXSOTCM	Telecommunication, computer, and information services		cbsrv	row
BXSOOB	Other business services		cbsrv	row
BXSOPCR	Personal, cultural, and recreational services		cosrv	row
BXSOGGS	Government goods and services n.i.e.		cpadm	row
BMS	Debit		row	c_____
BMSR	Maintenance and repair services n.i.e.		row	ctrad
BMSTR	Transport		row	ctran
BMSTV	Travel		row	chotl
BMSOCN	Construction services		row	ccons
BMSOIN	Insurance and pension services		row	cfsrv
BMSOFI	Financial services		row	cfsrv
BMSORL	Charges for the use of intellectual property n.i.e.		row	cbsrv
BMSOTCM	Telecommunication, computer, and information services		row	cbsrv
BMSOOB	Other business services		row	cbsrv
BMSOPCR	Personal, cultural, and recreational services		row	cosrv
BMSOGGS	Government goods and services n.i.e.		row	cpadm
BIP	Primary income			
BXIP	Credit			
BXIPCE	Compensation of employees		flab-__	row
BXIPI	Investment income		fcap-__	row
BXIPO	Other primary income		fcap-__	row
BMIP	Debit			
BMIPCE	Compensation of employees		row	flab-__
BMIPI	Investment income		row	fcap-__
BMIPO	Other primary income		row	fcap-__
BIS	Secondary income			
BXIS	Credit			
BXISG	General government		gov	row
BXISO	Financial and nonfinancial corporations, households, and NPISHs			
BXISOPT	Personal transfers		hhd-__	row
BXISOOT	Other current transfers		ent	row
BMIS	Debit			
BMISG	General government		row	gov
BMISO	Financial and nonfinancial corporations, households, and NPISHs			
BMISOPT	Personal transfers		row	hhd-__
BMISOOT	Other current transfers		row	ent

Source: Authors

\* Table 5 describes the Nexus SAM account codes; Table 1 describes the activities and commodities.

Note: n.i.e. = "not included elsewhere"; NPISH = Non-profit institutions serving households

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