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# The structures of real estate and financial sectors with induced income circular flow – An Intercontinental study

Irfan Ahmed, Ph.D  
Assistant Professor

FINANCE AND BANKING DEPARTMENT  
COLLEGE OF BUSINESS ADMINISTRATION



# Introduction

- Knowledge of inter-industry connections is vital in policy implications since the policy makers prefer strongly interconnected sectors to the sectors with poor industry linkages.
- The connections are estimated as forward and backward linkages which provide indices to set the criteria for key sectors identification.
- Input-output multiplier analysis is widely used to study the structures of production and inter-industry linkages of the economies.
- The exclusion of income distribution and consumption expenditure in the traditional linkage analysis can be detrimental since endogenous income-expenditure impacts the inter-industry connections
- To include the phenomenon of income-expenditure, SAM provides a comprehensive framework with complete income circular flow.

# Objective

The objective of this study is threefold.

- Firstly, the study includes the income-expenditure phenomenon into the structure of production and identifies the key economic sectors.
- Secondly, the study compares the developed and developing economies in order to determine if the different regions and countries present the different or similar income circular flow.
- Thirdly and specifically the study takes into account the real estate sector and financial sector of the four economies to ascertain their linkages with other economic sectors.
- The current study includes four countries namely USA, Italy, Nigeria and Pakistan.

# Data and Method

## Social Accounting Matrix (SAM)

- A SAM provides an analytical framework to study the underpinnings of income circular flow that are resulted from the interactions among the institutions.
- It integrates the production activities, income generation and its distribution, expenditure and investment of economic agents thereby allows studying the growth of the economy.
- The SAMs for Nigeria for year 2010 and Italy for year 2012 have been developed by Ahmed et. al. (2018) and Ahmed et. al. (2019) respectively. Whereas the SAMs for USA for year 2012 and Pakistan for year 2011 have been developed by Socci et. al. (2015) and IFPRI (2012) respectively. The total number of sectors in Italy, USA, Nigeria and Pakistan is 64, 65, 66 and 63 respectively

# Data and Method

Basic Framework of SAM

		Commodities	Activities	Factors	Households	Firms	Government	Taxes	Capital Formation	ROW	Total
	n.	C1	C2	C3	C4	C5	C6	C7	C8	C9	
Commodities	R1		Intermediate consumption		Household consumption		Government consumption		Investment demand	Exports	Total demand
Activities	R2	Domestic supply									Total output
Factors	R3		Value added								Factor income
Households	R4			Compensation of employees		Transfers to households	Transfers to households			Foreign remittances	Household income
Firms	R5			Firms share of Profits						Firms incomes from abroad	Firms income
Government	R6			Government share of profits				Direct and indirect taxes		Government income from abroad	Government income
Taxes	R7	Taxes on products	Production taxes		Personal income tax	Company income tax					Taxes
Capital Formation	R8				Household savings	Firms savings	Government savings			Current account balance	Total savings
ROW	R9	Imports		Row share of profits		Payment to ROW					Foreign outflow
Total		Total supply	Total output	Factor income	Household expenditure	Firms expenditure	Government expenditure	Taxes	Total investment	Foreign inflow	

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# Data and Method

## Leontief Input-Output Model

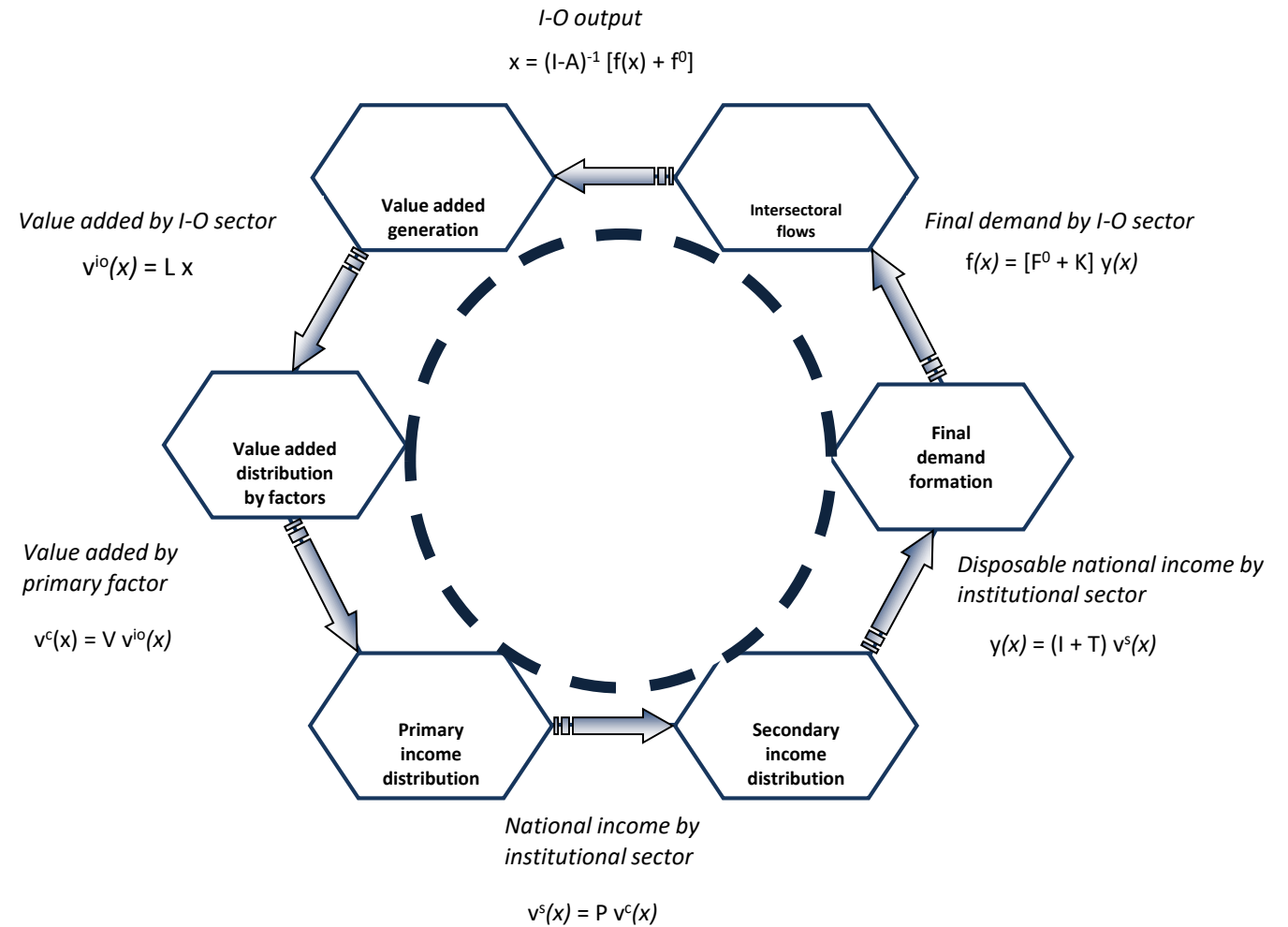
- The well defined Leontief model:

$$\mathbf{x} = (\mathbf{I} - \mathbf{A})^{-1} \mathbf{f} = \mathbf{L}\mathbf{f}$$

- Here  $(\mathbf{I} - \mathbf{A})^{-1}$  is called Leontief inverse and is denoted by  $\mathbf{L}$ . It is also called a multiplier matrix whose element  $l_{ij}$  gives the additional output of industry  $i$  in response to a unit change in the final demand of output of industry  $j$ .
- The Leontief inverse  $\mathbf{L}$  is used to identify the backward and forward linkages of the sectors of the economy.

# Data and Method

## Extended input-output model



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# Results

## Dispersion Analysis

- The unity is the average value of the index.
  - The sectors are related backwardly and forwardly on the basis of following index values:
- |                |   |                                       |
|----------------|---|---------------------------------------|
| • Strong       | = | Linkage index $\Rightarrow$ 1         |
| • Intermediate | = | $1 >$ linkage index $\Rightarrow$ 0.9 |
| • Weak         | = | $0.9 >$ linkage index                 |



## Economic Sectors

Sr.	Italy	USA	Nigeria	Pakistan
1	Agriculture	Farms	Rice unprocessed	Wheat
2	Forestry	Forestry, fishing, and related activities	Wheat unprocessed	Paddy - IRRI
3	Fisheries	Oil and gas extraction	Maize	Paddy - Basmati
4	Mining	Mining, except oil and gas	Sorghum	Raw Cotton
5	Food and Beverages	Support activities for mining	Millet	Sugarcane
6	Textiles	Utilities	Other Cereals	Maize
7	Wood products	Construction	Vegetables	Oilseeds
8	Paper products	Wood products	Bananas	All other crops
9	Printing and recording services	Nonmetallic mineral products	Plantains and others	Potato
10	Refined petroleum	Primary metals	Pineapples	Other vegetables
11	Chemicals and chemical products	Fabricated metal products	Oranges	Fruits & edible nuts
12	Pharmaceuticals	Machinery	Other Fruits and nuts	Cattle, sheep, goats etc.
13	Rubber and plastics products	Computer and electronic products	Soya beans	Raw milk
14	Other non-metallic mineral products	Electrical equipment	Groundnuts	Poultry
15	Basic metals	Motor vehicles	Oilseeds and oleaginous fruits	Forestry and Hunting
16	Fabricated metal products	Other transportation equipment	Cassava unprocessed	Fishing
17	Computer, electronic and optical products	Furniture and related products	Yams	Mining of crude oil
18	Electrical equipment	Miscellaneous manufacturing	Potatoes	Mining of natural gas
19	Machinery and equipment n.e.c.	Food and beverage and tobacco products	Sweet potatoes	Mining of coal
20	Motor vehicles	Textile product mills	Edible roots and tubers	Other mining
21	Other transport equipment	Apparel and leather products	Stimulant and spice etc.	Meat & meat products
22	Furniture; other manufactured goods	Paper products	Pulses	Milk, cream, ghee, butter, curd, cheese, ice-cream
23	Repair and installation services	Printing and related support activities	Other crops	Vegetable & animal oils & fats
24	Electricity, gas, steam and air-conditioning	Petroleum and coal products	Processed cassava	Wheat milling (Wheat Flour)
25	Natural water; water treatment and supply services	Chemical products	Processed rice	Rice husking & milling - IRRI
26	Sewerage	Plastics and rubber products	Processed wheat	Rice husking & milling - Basmati
27	Constructions	Wholesale trade	Other processed food & beverage etc.	Sugar
28	Repair services of motor vehicles	Retail trade	Livestock & poultry	All other food, beverage and tobacco products
29	Wholesale trade services	Air transportation	Forestry	Cotton ginning (lint)
30	Retail trade services	Rail transportation	Fish-unprocessed-capture	Cotton spinning & preparation of fibres
31	Land transport services	Water transportation	Fish-unprocessed-aqua	Cotton weaving
32	Water transport services	Truck transportation	Fish-processed-capture	Knitted, crocheted textile articles

33	Air transport services	Transit and ground passenger transportation	Fish-processed-aqua	Wearing apparel
34	Warehousing	Pipeline transportation	Coal mining	Manufacture of all other textiles
35	Postal and courier services	Other transportation and support activities	Crude petroleum and natural gas	Leather and leather products
36	Accommodation and food services	Warehousing and storage	Metal ores	Wood products
37	Publishing services	Publishing industries (includes software)	Cement, and minerals etc.	Petroleum products
38	Programming and broadcasting services	Motion picture and sound recording industries	Oil refined	Fertilizers & Pesticides
39	Telecommunications services	Broadcasting and telecommunications	Textile, leather, apparel and footwear	Chemicals (not including: fertilizers, pesticides)
40	Consultancy services; information services	Information processing services	Wood and wood products	Cement, and all quarry-related products
41	Financial services	Federal Reserve banks	Pulp, paper and paper products	Glass and glass products
42	Insurance	Securities, commodity contracts, and investments	Fertilizers & chemical products etc	Iron, steel and nonferrous metals
43	Services auxiliary to financial services and insurance services	Insurance carriers and related activities	Non-metallic products	Metal products (cutlery, buckets, etc.)
44	<b>Real estate</b>	Funds and other financial vehicles	Plastic and rubber products	Domestic appliances and office machinery
45	Imputed rents of owner-occupied dwellings	<b>Real estate</b>	Basic metal, iron and steel	General and specialized machinery
46	Legal and accounting services	Rental and leasing services	Motor vehicles & assembly	Vehicles and transport equipment
47	Architectural and engineering services	Legal services	Other manufacturing	Paper, publishing, furniture
48	Scientific research and development services	Computer systems design and related services	Electricity, water supply and waste management	Electricity generation
49	Advertising and market research services	Miscellaneous professional	Construction	Electricity distribution
50	Other professional services	Management of companies	Trade	Construction
51	Rental and leasing services	Administrative and support services	Accommodation and food services	Wholesale & retail trade
52	Employment services	Waste management and remediation services	Transport road, water, air and rail etc.	Hotels & restaurants
53	Travel agency and related services	Educational services	Telecommunications	Transport, cargo-handling & storage
54	Security and investigation services	Ambulatory health care services	Motion pictures and music production	Telecommunication services
55	Public administration and defence services	Hospitals and nursing facilities	Publishing	Financial sectors
56	Education services	Social assistance	Post	Business services
57	Human health services	Performing arts and related activities	Broadcasting	<b>Real estate</b>
58	Social work services	Recreation industries	Arts, entertainment and recreation	Ownership of Dwellings
59	Arts and entertainment services	Accommodation	Financial institutions, insurance etc.	Public services other than health & education
60	Sporting services	Food services and drinking places	<b>Real estate</b>	Public and private education services
61	Services furnished by membership organisations	Other services, except government	Professional, scientific and technical services	Public and private health and social work services
62	Repair services of computers and personal and household goods	Federal general government	Administrative & support services	Services of domestic staff
63	Other personal services	Federal government enterprises	Public administration	All other services
64	Services of households as employers	State and local general government	Education	
65		State and local government enterprises	Human health and social services	
66			Other services	

# Results

## Dispersion Analysis

### Key Sectors - Leontief IO model

		Forward Linkages		
		Strong	Intermediate	Weak
Strong	Italy	5,6,8,9,11,13,14,15,16,17,19,24,27,31,34,47,49,51	7,12,18,26	20,21,22,23,25,28,32,33,37,48,53
	USA	7,10,11,15,19,22,24,25,41,42	1,26,32	8,9,12,14,16,17,18,20,23,29,30,31,37,44 <sub>FIN</sub> ,65
	Nigeria	16, 38, 42, 44, 46, 47, 49, 52, 53, 57, 59 <sub>FIN</sub>	24, 40, 48	2, 11, 13, 23, 27, 30, 31, 32, 33, 34, 37, 39, 41, 43, 45, 50, 51, 55, 58, 63, 64, 65
	Pakistan	29,30,34,36,38,39,42,45,46,47,48,49	23, 25, 44, 50	9, 21, 22, 24, 26, 27, 31, 32, 33, 35, 40, 41, 43, 52, 59
Intermediate	Italy	4,10,29,43	1	30,42
	USA	13,39,61	N/A	5,21,33,38,40,52,55,57,58,59,60,62
	Nigeria	35, 61, 66	4, 26	1, 25, 36, 54, 62
	Pakistan	53	N/A	28, 54, 61
Weak	Italy	36,39,40,41 <sub>FIN</sub> ,44 <sub>RE</sub> ,46,54	38,50	2,3,35,45,52,55,56,57,58,59,60,61,62,63,64
	USA	3,6,27,43,45 <sub>RE</sub> ,46,49,50,51	35,47	2,4,28,34,36,48,53,54,56,63,64
	Nigeria	60 <sub>RE</sub>	15, 28	3, 5, 6, 7, 8, 9, 10, 12, 14, 17, 18, 19, 20, 21, 22, 29, 56
	Pakistan	1, 4, 5, 12, 17, 18, 37, 51, 55 <sub>FIN</sub> , 56	2, 63	6, 7, 8, 10, 11, 13, 14, 15, 16, 19, 20, 57 <sub>RE</sub> , 58, 60, 62

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## Dispersion Analysis

### Key Sectors – Multisectoral Extended Model

		Forward Linkages		
		Strong	Intermediate	Weak
Strong	Italy	1,4,16,19,27,31,36, <b>41</b> <sub>FIN</sub> , <b>44</b> <sub>RE</sub> ,45,46	34,39	2,3,7,9,23,28,29,30,32,35,37,38,40,4 3,47,48,49,50,60,61,62,63
	USA	19, 25, 27, 28, 42, 51, 54, 55, 60, 61, 62, 64	15, 50, 53	7, 8, 9, 10, 11, 12, 14, 16, 17, 18, 20, 21, 22, 23, 26, 29, 32, 36, <b>44</b> <sub>FIN</sub> , 48, 52, 56, 57, 58, 59, 63
	Nigeria	24, 27, 35, 46, 47, 4, 52, 53, <b>59</b> <sub>FIN</sub> , <b>60</b> <sub>RE</sub> , 61, 64, 66	28,57	2, 11, 25, 26, 29, 30, 31, 32, 33, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 50, 51, 54, 55, 58, 62, 65
	Pakistan	12, 13, 17, 21, 23, 28, 37, 39, 42, 45, 46, 48, 49, 52, 58	47	14, 18, 19, 20, 22, 29, 31, 33, 35, 36, 38, 40, 41, 43, 44, 54, <b>55</b> <sub>FIN</sub>
Intermediate	Italy	5,6,11,12,15,17,20,22,24,55,56, 57	14	8,13,18,21,25,26,33,42,51,52,53,54, 58,64
	USA	3, 6, 24, 39, 41, 43, 49	1, 46	2, 4, 5, 13, 30, 31, 33, 34, 35, 37, 38, 40, 47, 65
	Nigeria	63	N/A	13, 23, 56
	Pakistan	24, 27, 50, 51, 53	30	2, 3, 9, 15, 16, 25, 26, 32, 34
Weak	Italy	10		59
	USA	<b>45</b> <sub>RE</sub>	N/A	N/A
	Nigeria	7, 17	N/A	1, 3, 4, 5, 6, 8, 9, 10, 12, 14, 15, 16, 18, 19, 20, 21, 22, 34, 48
	Pakistan	1, 56, 59	5	4,6, 7, 8, 10, 11, <b>57</b> <sub>RE</sub> , 60, 61, 62, 63

### Backward Linkages

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# Results

## The indices and rankings of real estate and financial sectors

### Forward dispersion

	I-O Model		Extended Model	
	Index value	Ranking	Index value	Ranking
Italy_Real_Estate	1.57	8	1.6	12
Italy_Financial	1.7	7	1.69	11
USA_Real_Estate	1.84	5	6.38	1
USA_Financial	0.56	59	0.47	36
Nig_Real_Estate	3.09	2	3.45	6
Nig_Financial	1.14	14	3.6	5
Pak_Real_Estate	0.57	51	0.03	63
Pak_Financial	1.2	16	0.7	34

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## The indices and rankings of real estate and financial sectors

	I-O Model		Extended Model	
	Index value	Ranking	Index value	Ranking
Italy_Real_Estate	0.63	59	1.16	3
Italy_Financial	0.72	56	1.02	19
USA_Real_Estate	0.78	62	0.88	65
USA_Financial	1.07	21	1.00	40
Nig_Real_Estate	0.69	59	1.10	28
Nig_Financial	1.03	35	1.12	24
Pak_Real_Estate	0.62	54	0.74	61
Pak_Financial	0.73	44	1.00	33

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# Conclusion

- This study identifies if the real estate sector and finance sector are connected with other sectors of the economy.
- The study includes four economies from four continents: Italy from Europe, USA from North America, Nigeria from Africa and Pakistan from Asia.
- The comparison of four economies presents a better picture of income-expenditure phenomenon into the structures of production of different regions and economies.
- The study calibrated Leontief IO model and extended multisectoral model to study the dispersion analysis with exogenous and endogenous income-expenditure phenomenon.
- The results of dispersion analysis confirm that with exogenous income-expenditure, none of the four economies presents real estate sector and financial sector as key economic sectors except Nigeria which has a financial sector as a key sector.
- On the other hand, with induced income-expenditure ,the real estate and financial sectors have become the key sectors of Italy and Nigeria.

# Thank You