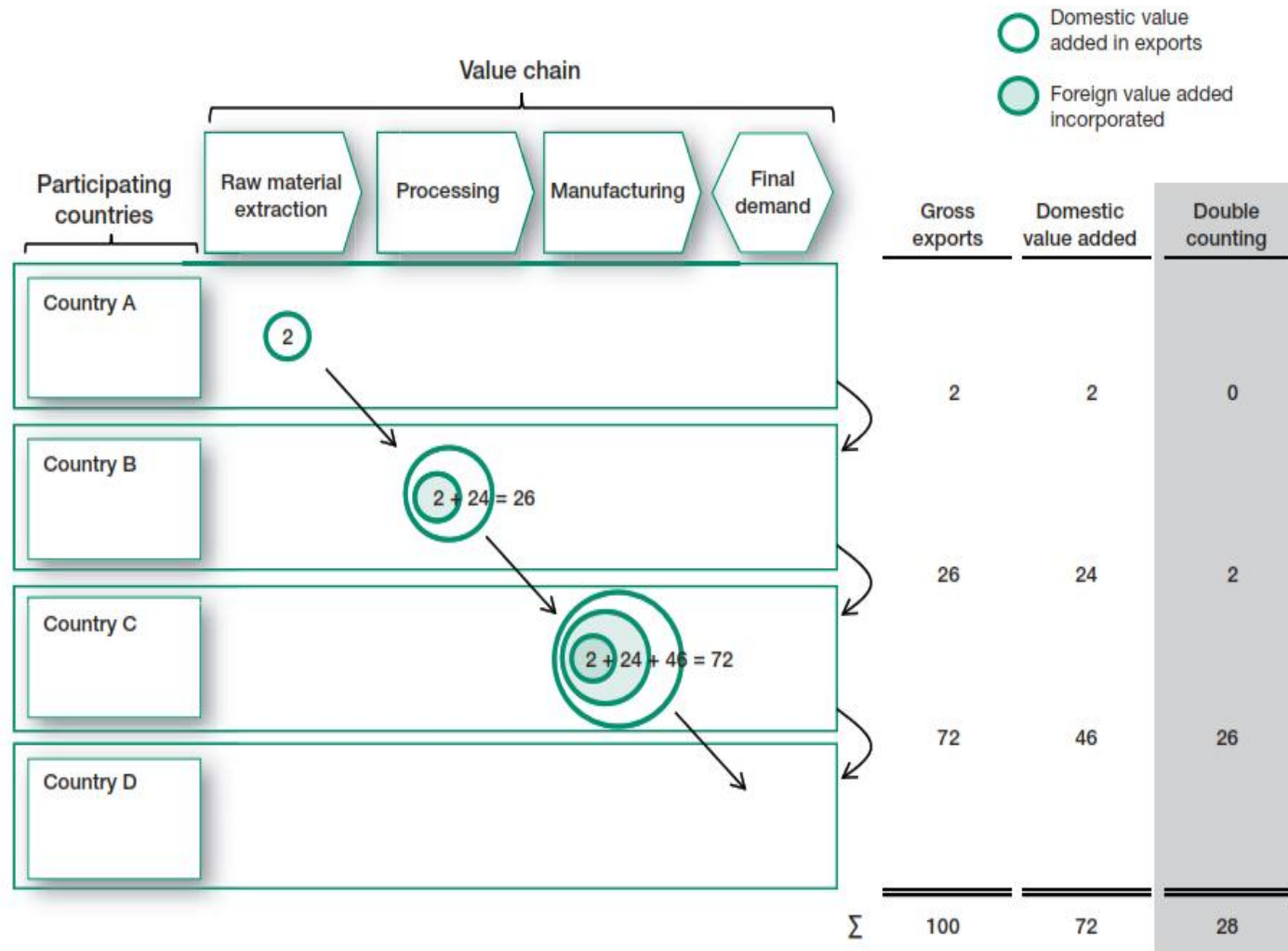


Main Concept of Trade in Value-Added (TiVA)

Nattapong Puttanapong, Ph.D.

Main Concept of Trade In Value Added: TiVA

The Cross-Country Production Chain



Main Concept of Trade In Value Added: TiVA

Flows Represented in Matrix Format

	Country 1				Country 2			
	Final Demand	Labor input	Imported input	Output	Imported input	Labor input	Output	Final Demand
Stage 1 in		\$1						
Stage 1 out				\$1				
Stage 2 in					\$1	\$1		
Stage 2 out							\$2	
Stage 3 in		\$1	\$2					
Stage 3 out				\$3				
Stage 4 in					\$3	\$1		
Stage 4 out							\$4	
Stage 5 in		\$1	\$4					
Stage 5 out				\$5				
	\$2							\$3
Total	\$2	\$3	\$6	\$9	\$4	\$2	\$6	\$3

Source : Wang et al 2013)

Main Concept of Trade In Value Added: TiVA

International IO Table

Input			Output		Intermediate use					Final use		Total output
					Country 1			Country 2		Country 1	Country 2	
					Sector 1	Sector 2	Sector 3	Sector 1	Sector 2			
Intermediate input	Country 1	Sector 1					1					1
		Sector 2						3				3
		Sector 3								2	3	5
	Country 2	Sector 1		2								2
		Sector 2				4						4
Value-added				1	1	1	1	1				
Total Input				1	3	5	2	4				

Main Concept of Trade In Value Added: TiVA

Multi-Country Input-Output Table

	Intermediate Use		Final Demand		Total Output
	Country1	Country2	Country 1	Country 2	
Country1	$a_{11}X_1$	$a_{12}X_2$	Y_{11}	Y_{12}	X_1
Country 2	$a_{21}X_1$	$a_{22}X_2$	Y_{21}	Y_{22}	X_2
Value Added	V_1	V_2			
Total Input	X_1	X_2			

Tracing Value-Added and Double Counting in Gross Exports

AMERICAN ECONOMIC REVIEW, VOL. 104, NO. 2, FEBRUARY 2014 (pp. 459-94)



Robert B. Koopman

Chief Economist and Director of the Economic Research and Statistics Division,
World Trade Organization (WTO)



Zhi Wang

Lead International Economist at Research Division,
U.S. International Trade Commission



Shang-Jin Wei


Chief Economist,
Asian Development Bank

	EU Industry	USA Industry	CHN Industry	JPN Industry	KOR Industry	TWN Industry	TH Industry	ROW Industry	
EU Industry	EU's intermediate use of domestic output	Intermediate used by USA (imported from EU)	Intermediate used by CHN (imported from EU)	Intermediate used by JPN (imported from EU)	Intermediate used by KOR (imported from EU)	Intermediate used by TWN (imported from EU)	IMPORT	Intermediate used by ROW (imported from EU)	Final Demand of EU
USA Industry	Intermediate used by EU (imported from USA)	USA's intermediate use of domestic output	Intermediate used by CHN (imported from USA)	Intermediate used by JPN (imported from USA)	Intermediate used by KOR (imported from USA)	Intermediate used by TWN (imported from USA)		Intermediate used by ROW (imported from USA)	Final Demand of USA
CHN Industry	Intermediate used by EU (imported from CHN)	Intermediate used by USA (imported from CHN)	CHN's intermediate use of domestic output	Intermediate used by JPN (imported from CHN)	Intermediate used by KOR (imported from CHN)	Intermediate used by TWN (imported from CHN)		Intermediate used by ROW (imported from CHN)	Final Demand of CHN
JPN Industry	Intermediate used by EU (imported from JPN)	Intermediate used by USA (imported from JPN)	Intermediate used by CHN (imported from JPN)	JPN's intermediate use of domestic output	Intermediate used by KOR (imported from JPN)	Intermediate used by TWN (imported from JPN)		Intermediate used by ROW (imported from JPN)	Final Demand of JPN
KOR Industry	Intermediate used by EU (imported from KOR)	Intermediate used by USA (imported from KOR)	Intermediate used by CHN (imported from KOR)	Intermediate used by JPN (imported from KOR)	KOR's intermediate use of domestic output	Intermediate used by TWN (imported from KOR)		Intermediate used by ROW (imported from KOR)	Final Demand of KOR
USA Industry	Intermediate used by EU (imported from TWN)	Intermediate used by USA (imported from TWN)	Intermediate used by CHN (imported from TWN)	Intermediate used by JPN (imported from TWN)	Intermediate used by KOR (imported from TWN)	TWN's intermediate use of domestic output		Intermediate used by ROW (imported from TWN)	Final Demand of TWN
TH Industry	EXPORT							TH's intermediate use of domestic output	EXPORT
ROW Industry	Intermediate used by EU (imported from ROW)	Intermediate used by USA (imported from ROW)	Intermediate used by CHN (imported from ROW)	Intermediate used by JPN (imported from ROW)	Intermediate used by KOR (imported from ROW)	Intermediate used by TWN (imported from ROW)	ROW's Intermediate use of domestic output	Final Demand of ROW	
	Value-Added of EU	Value-Added of USA	Value-Added of CHN	Value-Added of JPN	Value-Added of KOR	Value-Added of TWN	Value-Added of TH	Value-Added of ROW	

Main Concept of Trade In Value Added: TiVA

	Intermediate Use		Final Demand		Total Output
	Country1	Country2	Country 1	Country 2	
Country1	$a_{11}X_1$	$a_{12}X_2$	Y_{11}	Y_{12}	X_1
Country 2	$a_{21}X_1$	$a_{22}X_2$	Y_{21}	Y_{22}	X_2
Value Added	V_1	V_2			
Total Input	X_1	X_2			

Intermediate use in 1 Intermediate use in 2 Final use in 1
 $x_1 = a_{11}x_1 + a_{12}x_2 + y_{11} + y_{12}$ Final use in 2
 $x_2 = a_{21}x_1 + a_{22}x_2 + y_{21} + y_{22}$



$$\begin{pmatrix} x_1 \\ x_2 \end{pmatrix} = \begin{pmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \end{pmatrix} + \begin{pmatrix} y_{11} + y_{12} \\ y_{21} + y_{22} \end{pmatrix}$$