

4.4 Economic Assessment

ICHARM



United Nations
Educational, Scientific and
Cultural Organization

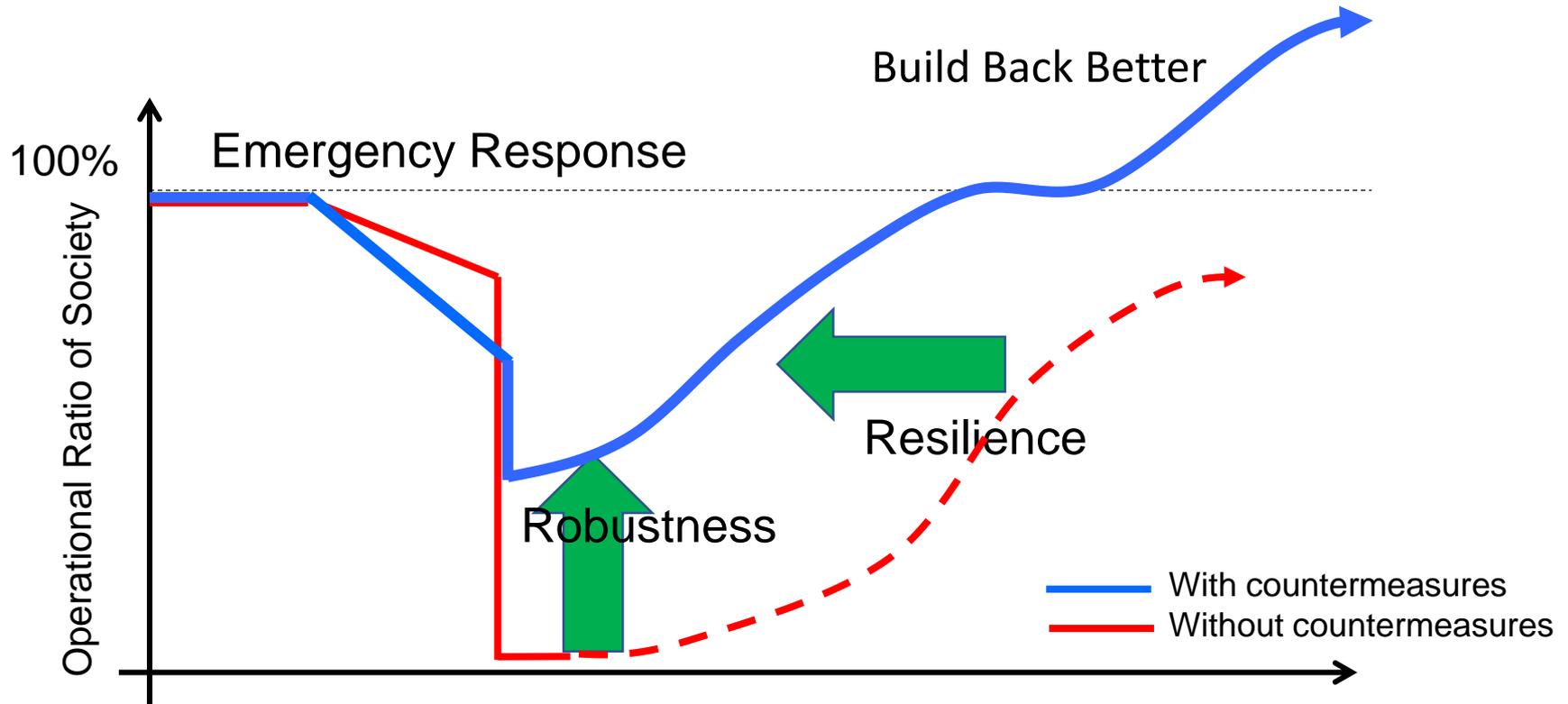


• International Centre for
• Water Hazard and Risk Management
• under the auspices of UNESCO

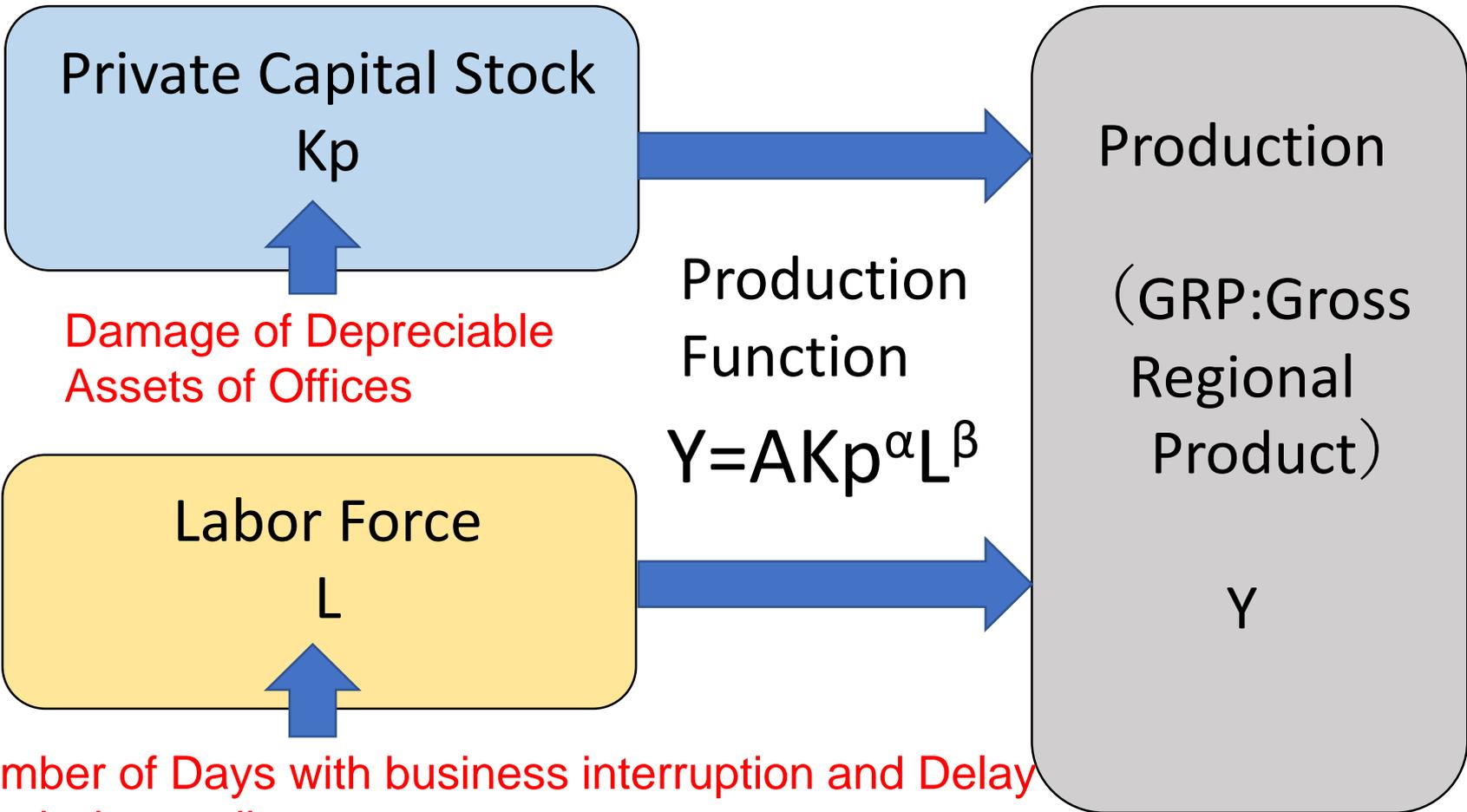


Public Works Research Institute
National Research and Development
Agency, Japan

Flood Impact on Society



Gross Regional Product



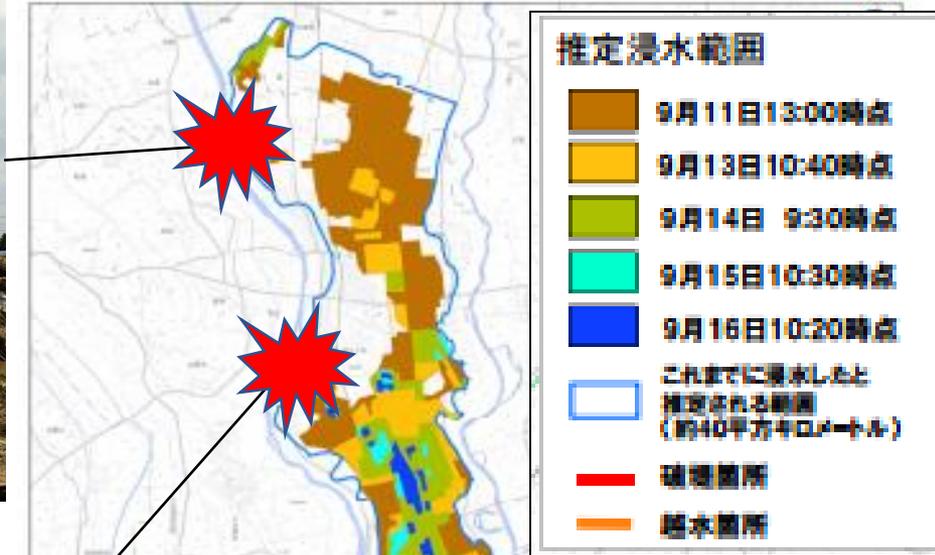
$$\Delta Y = Y_{\text{after}} - Y_{\text{before}} = (AK_{\text{after}}^{\alpha} L_{\text{after}}^{\beta}) - (AK_{\text{before}}^{\alpha} L_{\text{before}}^{\beta})$$

Kinu River Flood Disaster in Sep, 2015

AM6:00 Over Topping at Wakamiyado



平成27年9月関東・東北豪雨に係る茨城県常総地区の推定浸水範囲の変化
月11日13:00時点、13日10:40時点、14日9:30時点、15日10:30時点、16日10:20時点



PM12:50 Levee Breach at Misaka



Total Inundated area: 40km²
(1/3 of Joso City)



Kinu River Flood Disaster in Sep, 2015

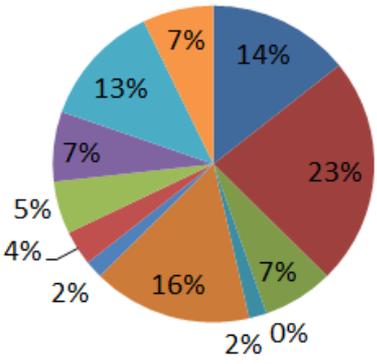


Resilience of Business Sector in Joso City

-Case study in Joso City after the Kanto-Tohoku Heavy Rainfall in September 2015-

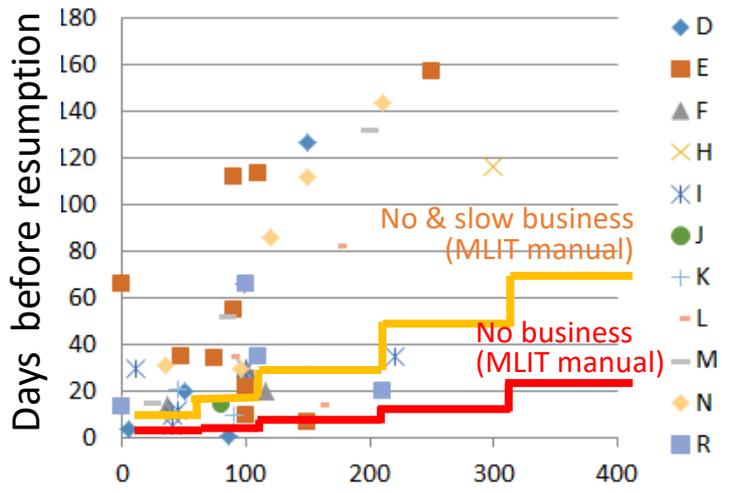
Heavy rainfall in September 2015 hit the Kinu River basin, causing the river to overflow and breach dikes in Joso City, Ibaraki Prefecture, Japan. Roughly 60% of the businesses in eastern Joso City were affected due to wide-area inundation. ICHARM conducted an interview survey for the local businesses affected by the flood to understand the resilience of the business sector.

Types of businesses



- Construction
- Manufacturing
- Utilities
- Telecommunications
- Transportation
- Wholesale & retail
- Finance
- Real estate
- Technical services
- Hotels & restaurants
- Life-related services
- Other services

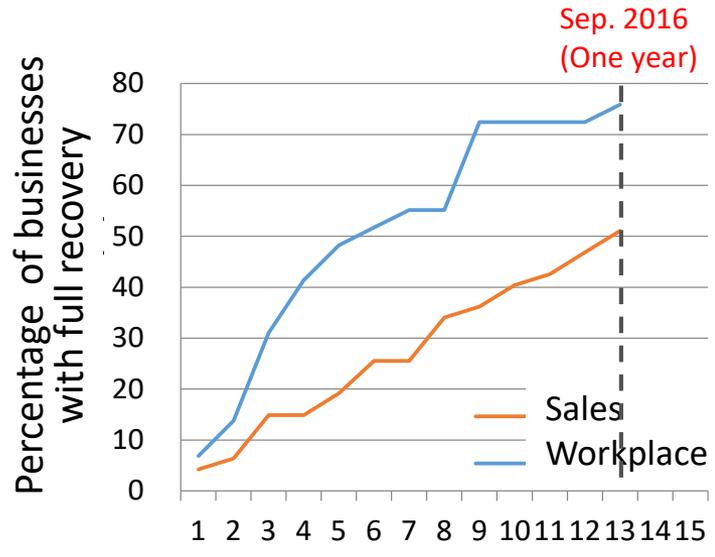
Relationship between inundation height and business disruption



Inundation height above first floor (cm)

Actual business disruption was severer than estimation based on an MLIT manual. Some businesses experienced disruption due to suspension of water supply even with low inundation.

Trends of recovery of sales and workplace

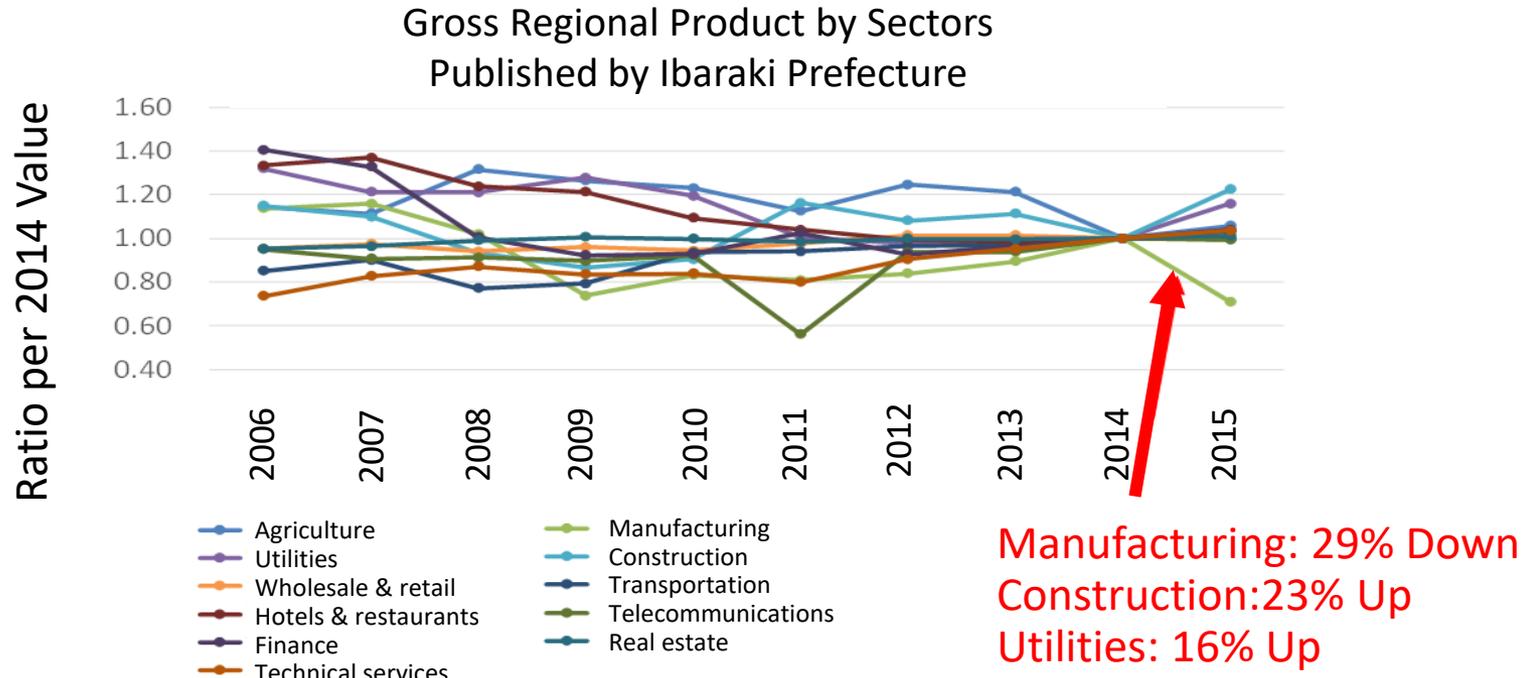
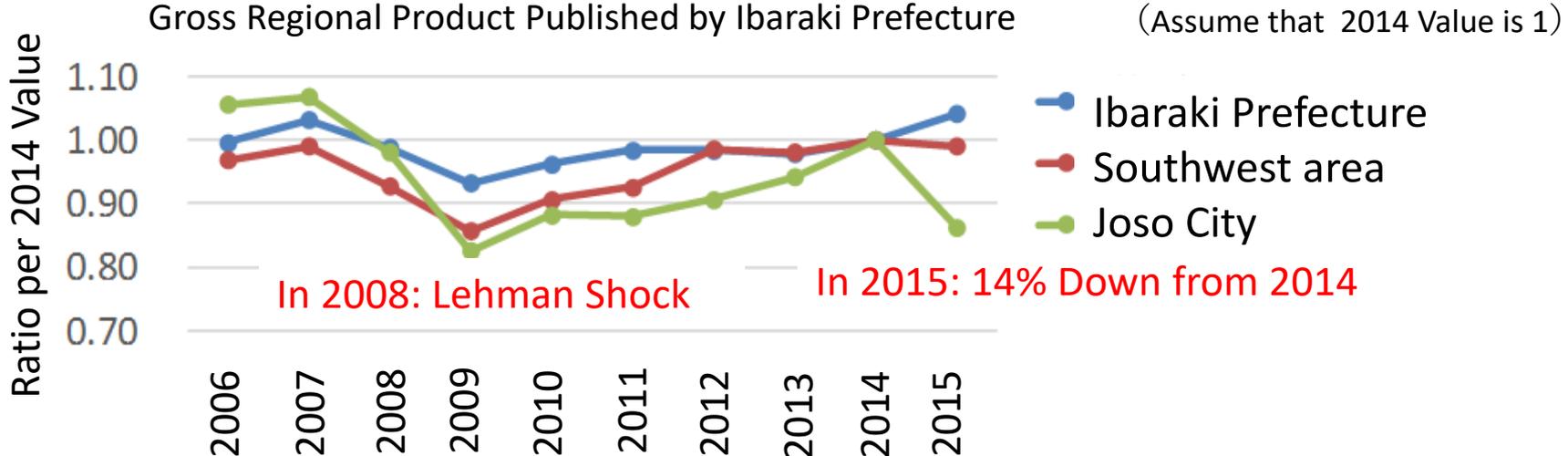


No. of months after Sep. 2015

Only half of the businesses achieved 100% sales recovery a year after the disaster. Local economy is still in the middle of recovery.

Resilience of Business Sector in Joso City

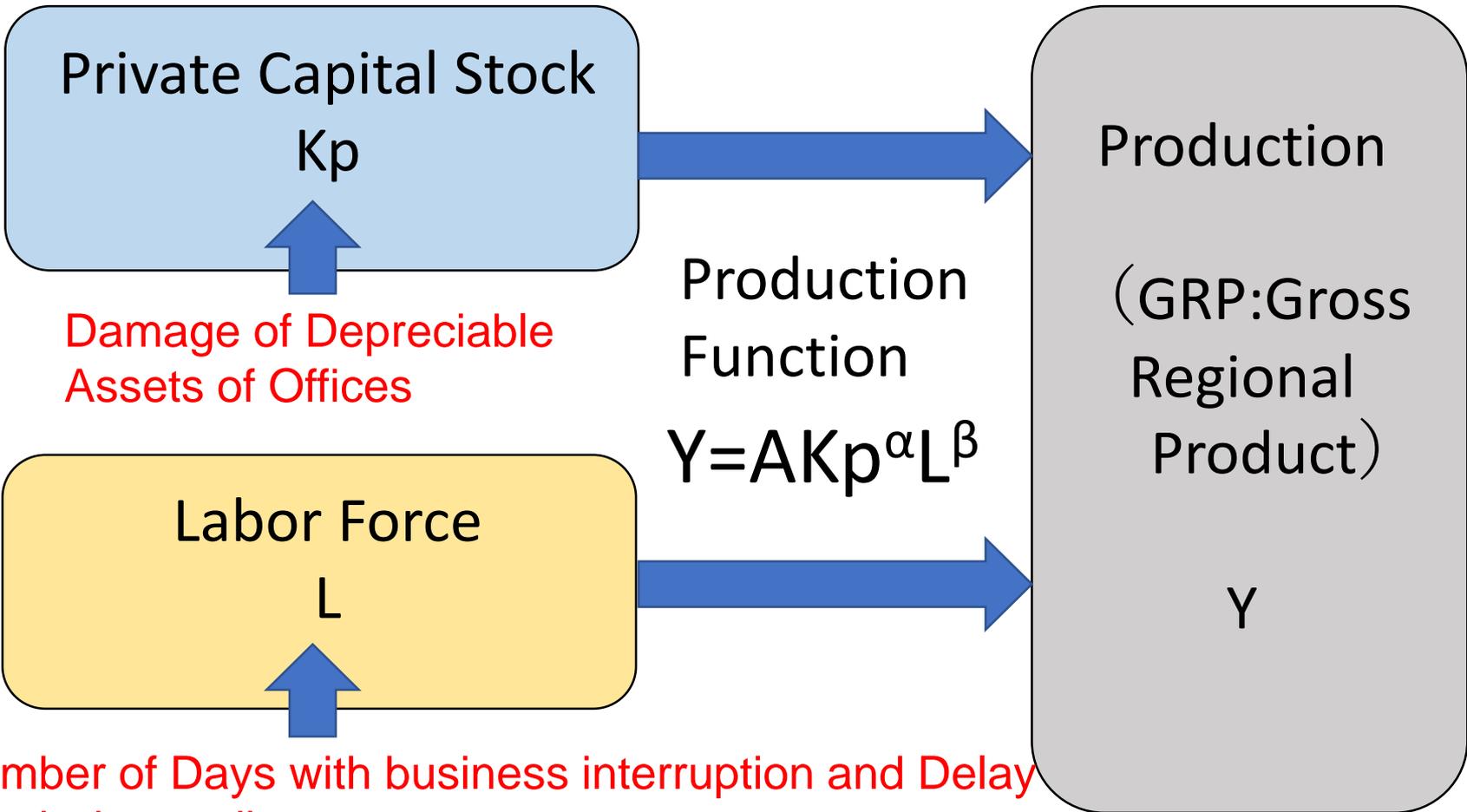
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Data from Davao

	A	B	C	D	E
31					
32	REGIONAL ACCOUNTS OF THE PHILIPPINES				
33	Unit: In Thousand Pesos				
34	Table 1.15B. REGION XI. DAVAO REGION				
35	GROSS REGIONAL DOMESTIC PRODUCT BY INDUSTRIAL ORIGIN				
36	2015-2017				
37	AT CONSTANT 2000 PRICES				
38					
39	INDUSTRY/YEAR	2015	2016	2017	
40	I. AGRICULTURE, HUNTING, FORESTRY & FISHING	41,264,886	40,713,379	41,388,193	
41	a. Agriculture and Forestry	39,115,893	38,576,610	39,328,372	
42	b. Fishing	2,148,993	2,136,769	2,059,821	
43					
44	II. INDUSTRY SECTOR	104,787,106	121,595,269	144,805,905	
45	a. Mining and Quarrying	2,821,310	3,265,500	3,858,450	
46	b. Manufacturing	69,467,667	77,314,234	86,094,276	
47	c. Construction	28,771,687	35,667,994	49,300,468	
48	d. Electricity, Gas and Power Supply	3,726,442	5,347,540	5,552,711	
49					
50	III. SERVICE SECTOR	158,360,144	171,096,486	183,602,979	
51	a. Transportation, Storage & Communication	23,964,836	25,465,621	27,283,135	
52	b. Trade and Repair of Motor Vehicles,				
53	Motorcycles, Personal and Household Goods	59,190,467	63,863,231	69,452,055	
54	c. Financial Intermediation	15,667,558	17,315,130	18,387,234	
55	d. Real Estate, Renting & Business Activities	23,929,567	25,568,224	27,297,125	
56	e. Public Administration & Defense;	28,061,862	30,962,820	32,816,738	
57	Compulsory Social Security				
58	f. Other Services	28,061,862	30,962,820	32,816,738	
59					
60	GROSS DOMESTIC PRODUCT	304,412,137	333,405,134	369,797,076	
61	<i>Source: Philippine Statistics Authority</i>				

Gross Regional Product



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