Lecture-02:
Measurement and Change in Regional Economic Activity: Regional Economic Growth

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ACKNOWLEDGEMENT

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Topics to be Covered by this Presentation

- Economic Growth and Development
- Factors of Economic Growth
- Units of Measure for Economic Growth
- Economic Base Model
  - Basic Questions
  - Objectives
  - Purpose of the Model
  - Origins of the Model
  - Keynesian Model
  - The circular flow of income
  - Basic & Non-basic
  - Export Base Estimation
  - Location Quotient Approach to Basic Sector Estimation
  - Location Quotient Approach
  - Shift-share analysis
  - Productivity Adjustment
  - Consumption Adjustment

Topics to be Covered by this Presentation

- Economic Base Model
  - National Export Adjustment
  - Cross-Hauling Adjustment
- Minimum Requirements Approach
- Export demand and cumulative growth model
- Other cumulative growth models
  - Growth pole
  - Localization economies

Economic Growth Vs. Development

- Economic Growth
  - Quantitative
  - More of the same
- Economic Development
  - Qualitative
  - Structure changes
    - Technological
    - Market Changes, etc.

Key Growth and Development Pressures

- Rapidly increasing population of the region
- Spreading urban areas and rural residential development
- Increasing demand for services such as landfills, water supply, etc.
- Land use change such as conversions of forests to dairy farms and the like.
- Increasing freight and passenger transport on roads
- Increasing demand for the region's energy resources and infrastructure
- Increasing development works, etc.

Growth and Development Pressures Are Addressed by

- **Growth Strategies**
  - Growth strategies usually determine where and when residential, industrial and commercial growth should occur. They are powerful ways of directing growth so that environmental problems are minimized.
- **Regional planning**
  - It is important for managing the way we use our natural and physical resources. In this way, it has an important role in addressing growth and development issues
- **Transport planning**
  - Regional growth and development can have adverse effects on transport systems. For example ribbon development along highways can result in the need for slower speed restrictions. Transport infrastructure, such as roads and public transport, is also needed to support new growth and development.
- **Many More (Long term plan, Action Plan, etc.)**

Growth Factors (Why Do Regions Grow?)

- Comparative advantage => some industries locate in an area and others do not
- Cost advantages
  - labor
  - materials
  - transportation
  - taxation / regulation
  - proximity to markets

Other Growth Factors

- Forward & backward linked industries
- Industry Clusters
- Quality of life
- Expectation of profit drives private capital investment decisions
- Institutional context
- Labor and capital mobility, etc.

Units of Measure for Economic Growth

- Production
  - Final goods and services
  - Income
  - Value added
- Employment
  - Full and part time job count
- Sales Revenues
  - Double counting problem: wholesale & retail

Employment Measures

- Most utilized in economic base estimation and projection
- Over time
  - productivity changes alter the ratio of labor to output
  - ratio of income to jobs changes
  - multiple job holding changes

Economic Base Model

Basic Questions

- Some regions have higher income levels and better job prospects than the others.Why should this be so?

- What factors determine the income level and job prospects of regions?

So then the next question is:

- Is it possible to construct general models that can be used to explain the determinants of income and employment in all types of regions regardless of vast differences between them?

- Two main routes have been taken , one based on the Keysnesian income-expenditure approach to modelling the national economy, and the other based on input-output analysis.

Objectives

- Illustrate basic concepts via Keynesian Circular Flow Model
- Define regional economic base model and terminology
- Review economic base estimation methods
- Identify some limitations of the model

Purpose of the Model

- Economic Base Models are used to understand regional economic growth and development.
- Analyses from these types of models are used to design, implement, and evaluate economic development policies.

Origins of the Model

- Urban and regional studies in sociology early in the century
- Geography and planning in the 1950s
- Economic trade and macro theory in the 1950s

Keynes Responds to Classicals

- John Maynard Keynes was trying to explain the causes, consequences, and potential policy correctives for the Great Depression
- Classical economists had suggested that markets would "self-correct"
  - Wages, prices, and interest rates would fall to such a low point that purchasing, hiring, and investing would begin again and the economy would take-off

Keynesian Critique of Classical Economists

- Even if interest rates fall to low levels, businesses will not invest because they do not want to expand capacity during a depression.
- They will not hire labor, no matter how low the wages, because there is no need to expand production during a depression.
- When people have low wages, they cannot buy products. This reinforces the downward spiral of spending and income in a depression.

KENESIAN MODEL

- The Keynesian approach to modelling the regional economy is virtually identical to the simplest open economy version of the keynesian income-expenditure model, the only difference being that all the expenditure variables refer to the regional or local economy instead of to nation. The model begins with the familiar income-expenditure identity:

Regional Income

$Y=C+I+G+X-M$

Y : Regional income
C : Regional consumption
I : Regional investment
G : Government expenditure
X : Regional exports
M : Regional imports

Autonomous Expenditure Spending that is considered necessary regardless of income level, such as government spending, basic living expenses and investing. In macroeconomic economic theory autonomous expenditures are said to not be impacted by changes in real wages.

Consumption Function:

$C= a + (MPC)*Y$

$Y = a + (MPC)*Y + I + G + (X-M)$

$Y - (MPC)*Y = a + I + G + (X-M)$

$Y*(1 - MPC) = a + I + G + (X-M)$

$a + I + G + (X-M) =$ Autonomous E

$Y =$ (Autonomous E)/(1-MPC)

$\Delta Y = \Delta$(Auto E)/(1-MPC)

1/(1-MCP) = Simple Multiplier

C is now endogenous, determined within the model; C is now a function of Y

Simple Multiplier is A measure of the change in aggregate production caused by changes in an autonomous expenditure

KENESIAN MODEL

- $I = I_0$, $G = G_0$, $X = X_0$

- $C = C_0 + cDY$
- $M = M_0 + mDY$
- Where DY is disposable income and given by
- $DY = Y - tY$
- Where t is the rate of income tax
- $Y = k\,(C_0 + I_0 + X_0 + M_0)$

zero subscript to identify variables that are exogenous, determined outside the model and treat by the model as constants.

Where,

$$k = \frac{1}{1-(c-m)(1-t)}$$

KENESIAN MODEL

- *k* is the Keynesian regional multiplier and is given by:

$$k=1/\ 1-(c-m)(1-t)$$

(c-m) =the marginal propensity to consume locally produced goods.

t= tax rate

KENESIAN MODEL

- The multiplier is clearly sensitive to changes in *c - m*, rising quite rapidly as it increases.
- Since the marginal propensity to consume locally produced goods *(c - m)* has a crucial effect on the magnitude of the regional multiplier.

KENESIAN MODEL

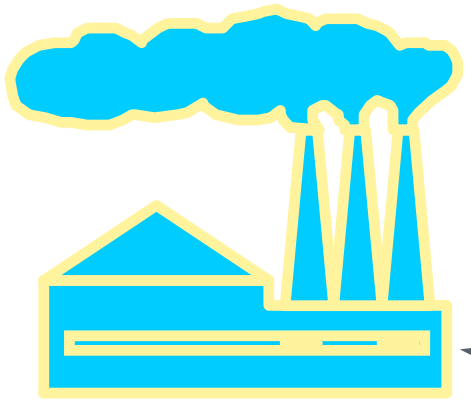
- This model says that the regional income can be magnified by the Keynesian regional multiplier.
- To obtain higher regional income, we wish to have a bigger multiplier.
- The strategical implications from this model are to **lower the income tax** rate and **promote the propensity to consume** locally produced goods.
- This model justifies the demand-side policies by showing that promoting the demand, consumption of locally produced goods in this case, can boost the regional economy.

KENESIAN MODEL

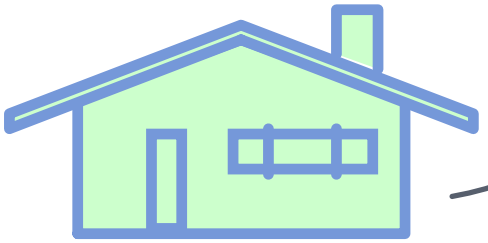
- These are the sorts of questions that regional economic models are designed to address.
- Regional models vary tremendously in detail and complexity.
- They range from very aggregative, demand-driven explanations based upon simplistic interpreations of the Keynesian macro model to more sophisticated approaches which allow for the supply side to respond to changes in capital and labour markets.

Injections, withdrawals and equilibrium

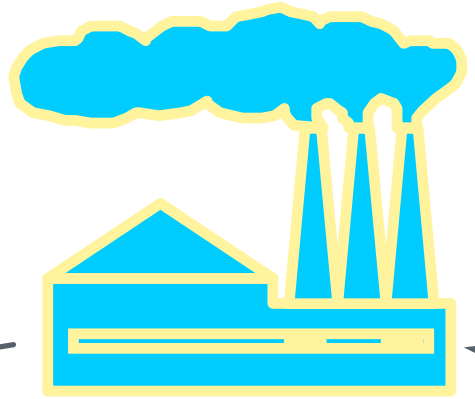
The circular flow of income



Consumption of domestically produced goods and services (C_d)

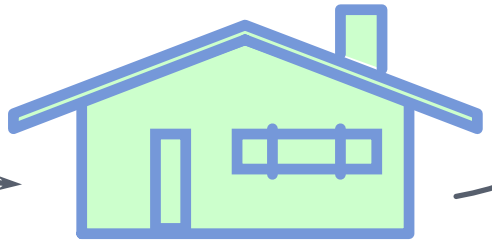


The circular flow of income

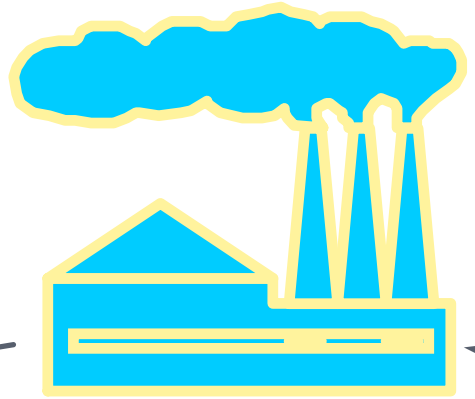


Consumption of domestically produced goods and services (C_d)

Factor Payments (Factors for production)



The circular flow of income

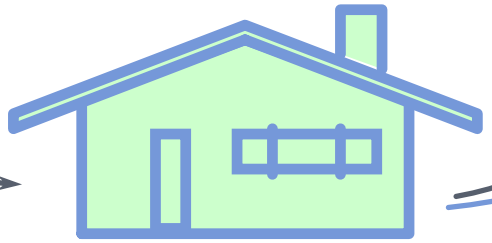


Factor payments

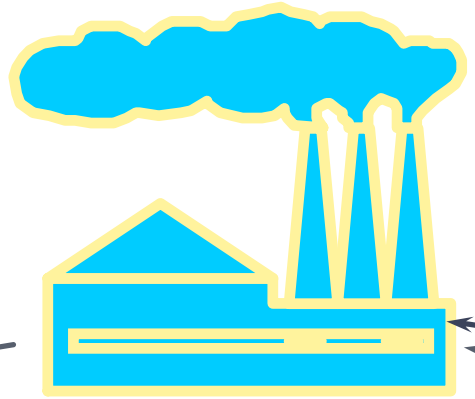
Consumption of domestically produced goods and services (C_d)

BANKS, etc

Net saving (S)



The circular flow of income



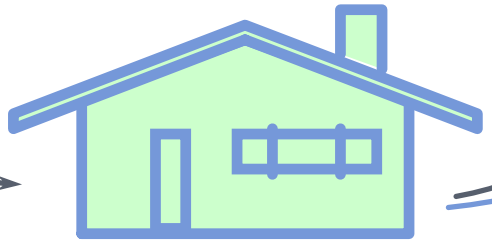
Investment (I)

Factor payments

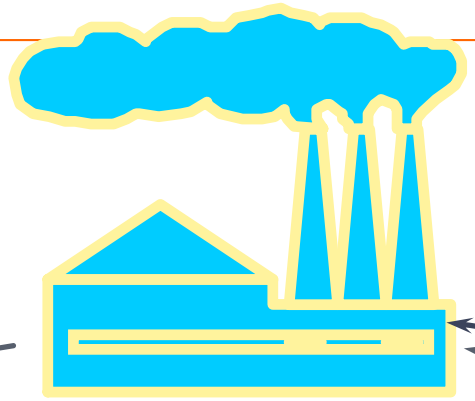
Consumption of domestically produced goods and services (C_d)

BANKS, etc

Net saving (S)



The circular flow of income



Investment (I)

Factor payments

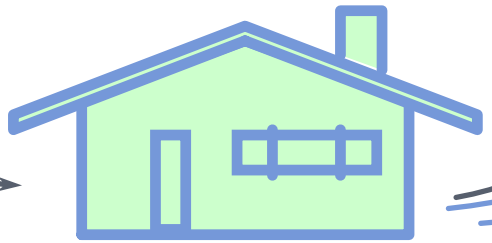
Consumption of domestically produced goods and services (C_d)

BANKS, etc

GOV.

Net saving (S)

Net taxes (T)



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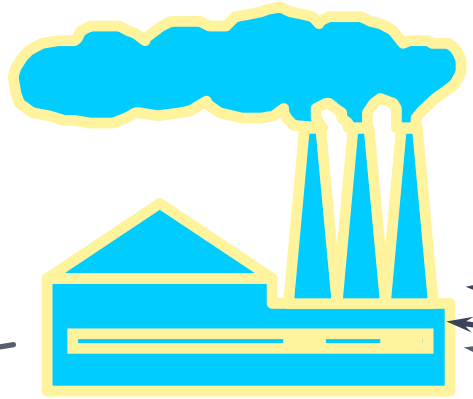


Investment (I)

Government expenditure (*G*)

Factor payments

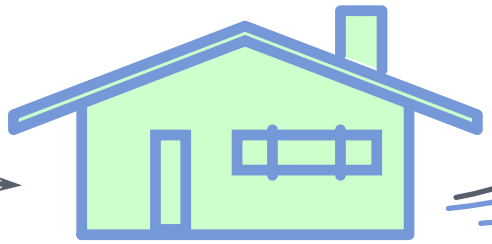
Consumption of domestically produced goods and services (C_d)

BANKS, etc

GOV.

Net saving (S)

Net taxes (T)



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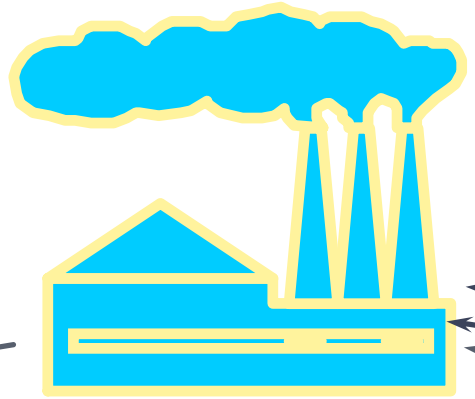


Investment (I)

Government expenditure (*G*)

Factor payments

Consumption of domestically produced goods and services (C_d)

BANKS, etc

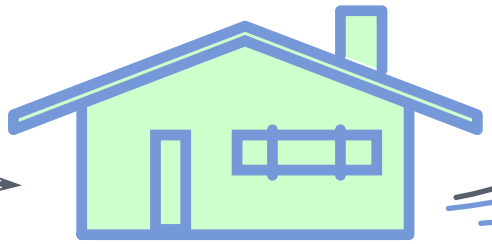
GOV.

ABROAD

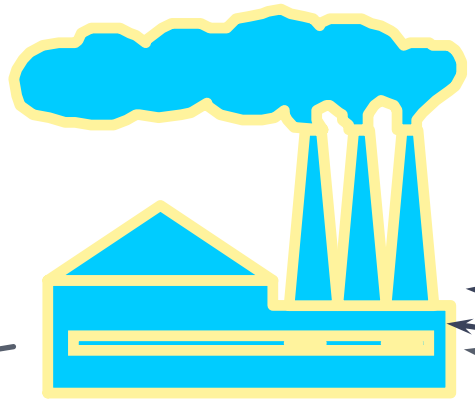
Net saving (S)

Net taxes (T)

Import expenditure (M)



The circular flow of income



Export expenditure (X)

Investment (I)

Government expenditure (*G*)

Factor payments

Consumption of domestically produced goods and services (C_d)

BANKS, etc

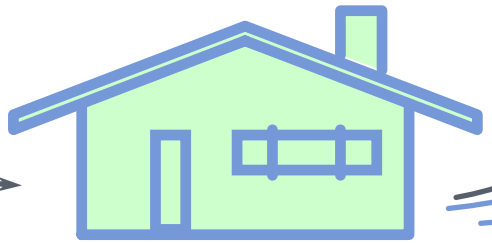
GOV.

ABROAD

Net saving (S)

Net taxes (T)

Import expenditure (M)



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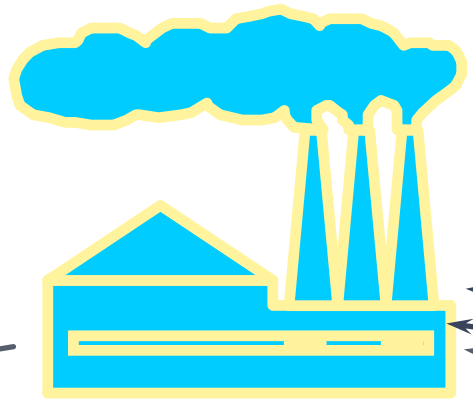


Export expenditure (X)

Investment (I)

Government expenditure (*G*)

Factor payments

Consumption of domestically produced goods and services (C_d)

BANKS, etc

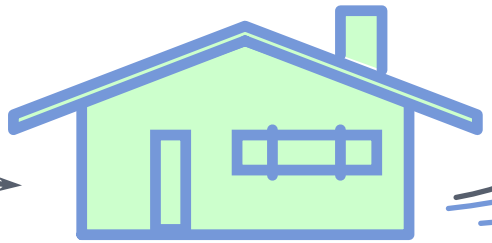
GOV.

ABROAD

Net saving (S)

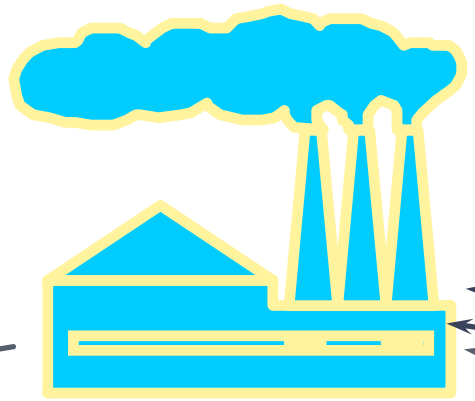
Net taxes (T)

Import expenditure (M)



WITHDRAWALS

The circular flow of income



INJECTIONS

Export expenditure (X)

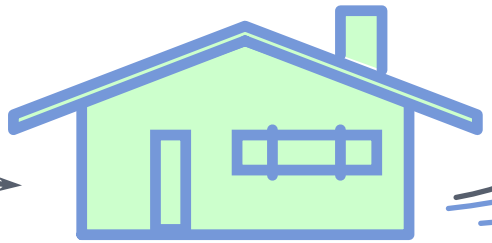
Investment (I)

Government expenditure (*G*)

Factor payments

Consumption of domestically produced goods and services (C_d)

BANKS, etc | **GOV.** | **ABROAD**



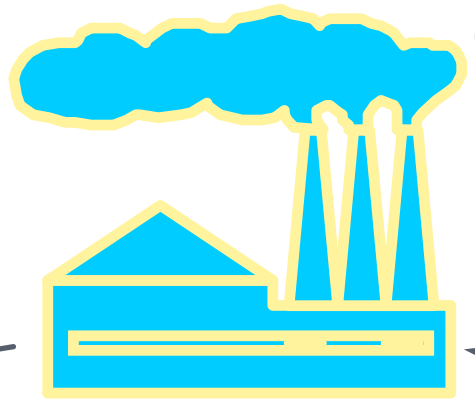
Net saving (S)

Net taxes (T)

Import expenditure (M)

WITHDRAWALS

Economic Base Model Collapses All Spending into Regional and Non-Regional



INJECTION

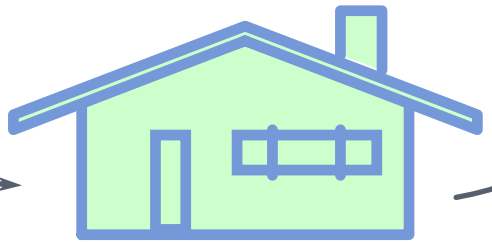
Export expenditure (X)

Regional Purchases of regionally produced goods and services

Factor payments

OUTSIDE OF REGION

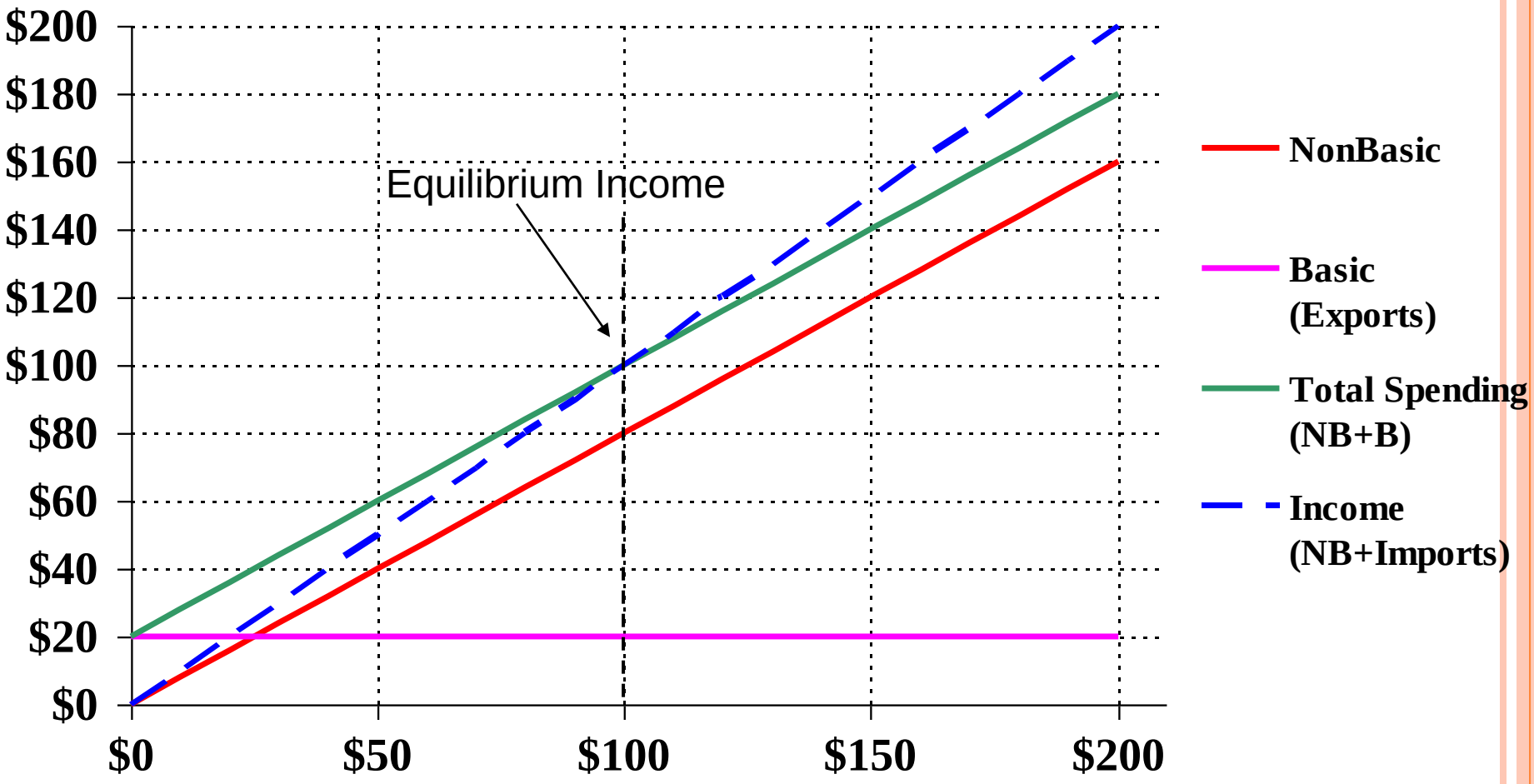
Import expenditure (M)



WITHDRAWAL

Keynesian Cross Model

Export Base Model Adapted from Keynesian Cross



Export Base Multiplier = $100/$20 = 5 or 1/m or 0.2

Definitions or identities:

Total expenditures ≡ domestic production + exports (inflows)

(1) $E \equiv D + X$

Income ≡ Domestic expenditures +Imports

(2) $Y \equiv D + M$, or $D \equiv Y - M$

Behavioral or technical assumptions:

Imports = a linear function of income

(3) $M = mY$ ($m<1$, the marginal propensity to import)

Exports = an exogenously (outside-region) determined value

(4) $X = X'$

Equilibrium condition:

Income = Total expenditures

(5a) $Y = E$

or

Drains = Additions

(5b) $M = X$

Solution by substitution:

$Y = Y - M + X$	Substitute (1) and (2) into (5a)
$Y = Y - mY + X'$	Substitute (3), and (4)
$Y - Y + mY = X'$	Gather the Y, or income, terms
$mY = X'$	Factor out Y
$Y = (1/m)*X'$	Isolate Y through division

The export-base multiplier is:

$dY/dX = 1/m$

Basic & Non-basic

- Basic is production for export outside the region
- Non-Basic is production of goods and services for consumption inside the region
  - Population Dependent or Residentiary
- Total Economy = Basic + Non-Basic

Export Multiplier

- An injection (export sales) increases income in the area by an amount greater than the sale.
- This export multiplier is computed (in the simple model) as 1/(Marginal Propensity to Import)
  - Imports = MPI times Income
- Change in Exports times Multiplier = Total Change in Income
- Multiplier is larger in a region that is more fully developed (higher non-basic to basic ratio)

Export - Led Growth

- Growth of the Export (Basic) sector drives the economic growth of the region
- Non-Basic Economic Activity is population dependent
- Growth of Exports => Growth of Non-Basic (or Residentiary) Economic Activity
- Economic Growth => Population Growth

Defining Basic Industries

- Agriculture
- Mining
- Tourism
- Federal Government
- Manufacturing (Partly)

Non-Basic Industries

- Examples: Retail, Commercial, Banking Necessities
- As a region grows, it is able to support more non-basic employment
- As a region grows, the ratio of non-basic employment to basic employment increases

Complications

- Goods & services sold to visitors
- Traditional basic purchases that are actually dependent on the level of regional activity (purchases by business travelers, etc.)

Basic Multiplier

- (Total Employment) / (Basic Employment)
- Total = Basic + Non-Basic
- Larger, more integrated and developed areas have much larger basic multipliers

Use of Multiplier

- Estimates and projections of the base multiplier allow analysts to calculate impacts.
- For example - if the basic multiplier for an area is two, this means that for every new job in the basic sector there will be an additional job created in the non-basic sector.

Export Base Estimation

- Industries are not necessarily 100% basic or non-basic.
- The share of basic in an industry may change over time.
- Industries evolve over time.
- Structural change is difficult to model.

Direct & Indirect Basic

- Direct Basic + Indirect Basic = Total Basic
- Direct Basic → exported out of the region
- Indirect Basic →sell to direct basic firms
- Direct Non-Basic + Indirect Non-Basic = Total Non-Basic (same logic)

Assumption Approach to Basic Sector Estimation

- An industry may be assigned to basic or non-basic by assumption
- Mining is often assigned 100% to basic
- Local public schools are often assigned 100% to non-basic
- Most industries are both

Location Quotient Approach to Basic Sector Estimation

- Location Quotient = (Share of Subject Area's Employment in Industry i) / (Share of Reference Region's Employment in Industry i)
- LQ>1 => Specialization
- LQ>1 is not always basic (e.g., construction, local public school, etc.)

Basic Estimate: Location Quotient Approach

$$b_i = [(e_i / E_i) - (e_t / E_t)] \times E_i$$

b_i : basic employment in local area industry i

e_i : total employment in local industry i

E_i : national employment in industry i

e_t : total local employment

E_t : total national employment

Location Quotient Approach

$$b_i = [(e_i / E_i) - (e_t / E_t)] \times E_i$$

Local Share of Industry i's production

Assumption: Local Consumption Share of Industry i's production

LQ Approach Example

	Employment in Industry i	Total Employment	Industry Share of Area
Local Area	10	100	10%
Local Area Share of Base Area	2%	1%	N/A
Base Area	500	10,000	5%

$$b_i = [(e_i / E_i) - (e_t / E_t)] \times E_i$$

$$5 = [(2\%) - (1\%)] \times 500$$

LQ Calculation

	Employment in Industry i	Total Employment	Industry Share of Area
Local Area	10	100	10%
Local Area Share of Base Area	2%	1%	N/A
Base Area	500	10,000	5%

$$LQ_i = [(e_i / e_t) \ / \ (E_i / E_t)]$$

$$2 = [(10\%) \ / \ (5\%)]$$

Location Quotient Approach Logic

If $(e_i / E_i) = (e_t / E_t)$ → Self-sufficient → LQ = 1

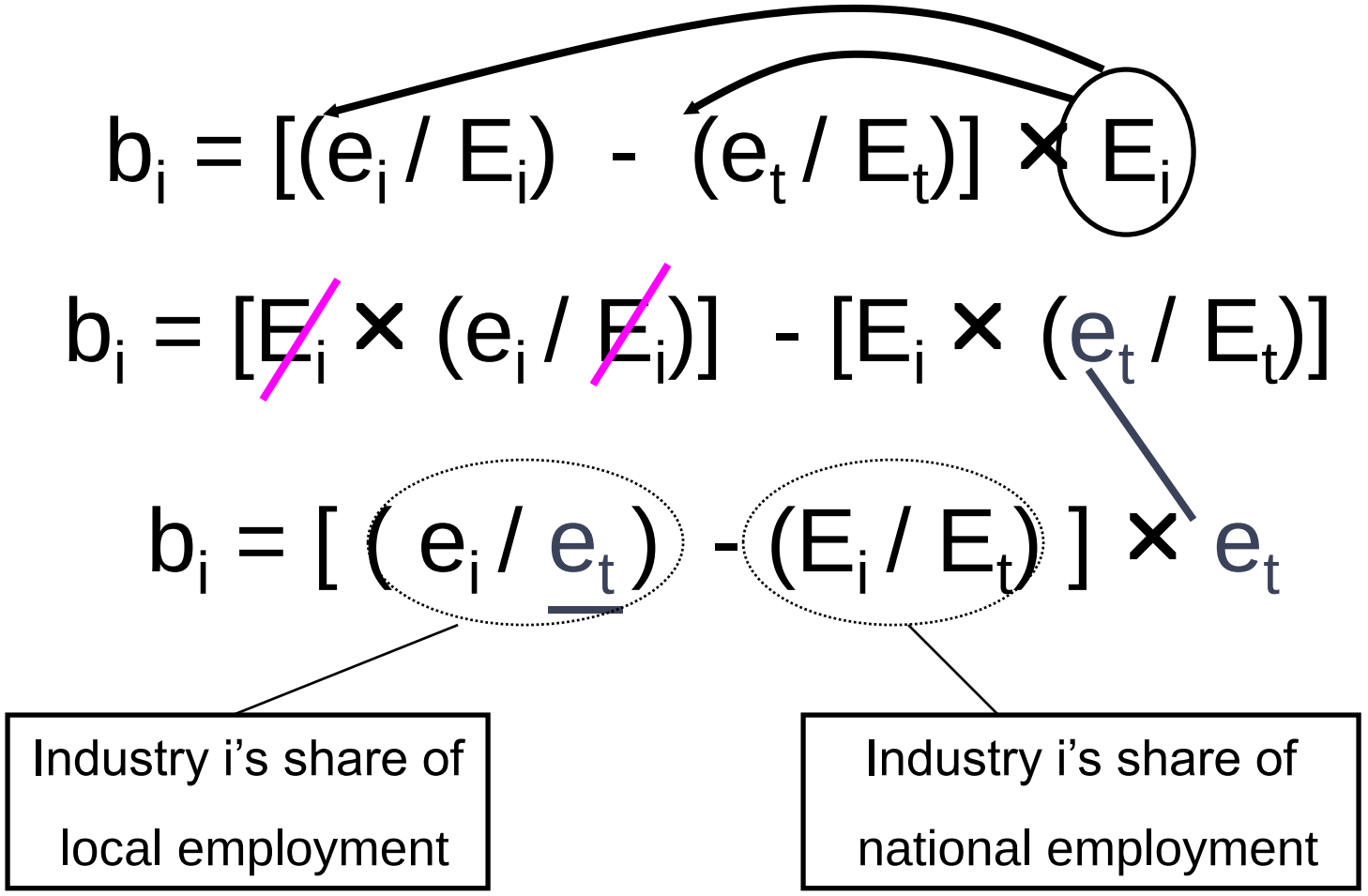
If $(e_i / E_i) < (e_t / E_t)$ → Imports

→ LQ < 1

If $(e_i / E_i) > (e_t / E_t)$ => Exports

→ LQ > 1

Location Quotient Equation



Derivation of the LQ Formula

1) $e_i = b_i + n_i$

Local non-basic employment in industry i

Local basic employment in industry i

2) $b_i = e_i - n_i$

3) $n_i = (E_i / E_t) \times e_t$

Share of industry i in national employment

Derivation (cont.)

4) $b_i = e_i - [(E_i / E_t) \times e_t]$

Divide by E_i and rearrange terms

5) $b_i = [(e_i / E_i) - (e_t / E_t)] \times E_i$

Another way to estimate basic employment in industry i:

$$b_i = [1 - (1 / LQ_i)] \times e_i$$

What is Shift-Share Analysis?

Basic Questions.

- Is the local economy growing or declining?
- Is this the best use of public funds?
- What industries should be targeted?
- How does our community compare with other communities?

- One way to account for a region's competitiveness

- Provides a picture of how well a region's mix of industries is performing

-Also, shows how well individual industries are doing

- Can be used to analyze individual industries or the whole economy

What is Shift-Share Analysis?

- Breaks down regional employment growth into three components:
  - National share (NS)
  - Industry mix (IM)
  - Regional shift (RS)

$$SS = NS + IM + RS$$

SS → Shift-Share

NS → National Share

IM → Industry Mix

RS → Regional Shift

NS → $_{i}local^{t-1} \bullet US^{t} / US^{t-1}$

IM → $(_{i}local^{t-1} \bullet {}_{i}US^{t} / {}_{i}US^{t-1})$ - NS

RS → $_{i}local^{t-1} \bullet ({}_{i}local^{t} / {}_{i}local^{t-1} - {}_{i}US^{t} / {}_{i}US^{t-1})$

What do the subscripts and superscripts and alphabets mean?

$_{i}local^{t-1}$ → number of local jobs in an industry (i) at the beginning of the analysis period (t-1)

$_{i}local^{t}$ → number of local jobs in an industry (i) at the end of the analysis period (t)

US^{t-1} → total number of jobs in the nation at the beginning of the analysis period (t-1)

US^{t} → total number of jobs in the nation at the end of the analysis period (t)

$_{i}US^{t-1}$ → number of jobs, nationwide, in industry (i) at the beginning of the analysis period (t-1)

$_{i}US^{t}$ → number of jobs, nationwide, in industry (i) at the end of the analysis period (t)

What is Shift-Share Analysis?

- National Share (NS) Component
  - Share of regional job growth attributable to growth of the national economy
  - "If the regional industry grew at the industry's national growth rate, what would be the result?"

$$NS_{ir}^{t} = E_{ir}^{t-1} \times \left(\frac{E_{US}^{t}}{E_{US}^{t-1}} - 1 \right)$$

Where:
t = current time period
t-1 = one year ago
i = specific industry
r = specific region

What is Shift-Share Analysis?

- Industry Mix (IM) Component
  - How much growth can be attributed to the region's mix of industries?
  - Also estimates how many jobs were created/not created in each industry due to differences in industry and total national growth rates

$$IM_{ir}^{t} = E_{ir}^{t-1} \times \left[\left(\frac{E_{iUS}^{t}}{E_{iUS}^{t-1}} \right) - \left(\frac{E_{US}^{t}}{E_{US}^{t-1}} \right) \right]$$

Where:

t = current time period t-1 = one year ago

i = specific industry r = specific region

What is Shift-Share Analysis?

- Regional Shift (RS) Component
  - How many jobs are created/not created as a result of the region's competitiveness?
  - Perhaps the most important component
  - Identifies the region's leading and lagging industries

$$RS_{ir}^{t} = E_{ir}^{t-1} \times \left[\left(\frac{E_{ir}^{t}}{E_{ir}^{t-1}} \right) - \left(\frac{E_{iUS}^{t}}{E_{iUS}^{t-1}} \right) \right]$$

Where:

t = current time period t-1 = one year ago

i = specific industry r = specific region

A Shift-Share Example

- We'll use 1993 and 1998 with total employment divided into six sectors.
- Rule of thumb is to use two time periods 5 or fewer years apart.
- Analysis can be quite different for different time periods.

A Shift-Share Example

- National total employment and by major industry sector, 1993 – 1998.

United States			Change in	Percent
	1993	1998	Jobs	Change
Total Employment	141,996,000	160,199,000	18,203,000	
Farm	3,130,000	3,127,000	-3,000	
Manufacturing	18,712,000	19,569,000	857,000	
Retail	23,467,000	26,710,000	3,243,000	
Finance and Real Estate	10,502,000	12,230,000	1,728,000	
Service	41,811,000	49,898,000	8,087,000	
All other	44,375,000	48,665,000	4,290,000	

A Shift-Share Example

- Calculate the percentage change in U.S. total employment and by industry sector.

United States			Change in	Percent
	1993	1998	Jobs	Change
Total Employment	141,996,000	160,199,000	18,203,000	12.8%
Farm	3,130,000	3,127,000	-3,000	-0.1%
Manufacturing	18,712,000	19,569,000	857,000	4.6%
Retail	23,467,000	26,710,000	3,243,000	13.8%
Finance and Real Estate	10,502,000	12,230,000	1,728,000	16.5%
Service	41,811,000	49,898,000	8,087,000	19.3%
All other	44,375,000	48,665,000	4,290,000	9.7%

A Shift-Share Example

- County total employment and by major industry sector, 1993 – 1998.

A County			Change in	Percent
	1993	1998	Jobs	Change
Total Employment	253,463	283,417	29,954	
Farm	7,951	7,977	26	
Manufacturing	58,516	61,229	2,713	
Retail	44,752	50,339	5,587	
Finance and Real Estate	16,193	18,547	2,354	
Service	62,518	75,441	12,923	
All other	63,533	69,884	6,351	

A Shift-Share Example

- Calculate the percentage change in the county's total employment and by industry sector.

A County			Change in	Percent
	1993	1998	Jobs	Change
Total Employment	253,463	283,417	29,954	11.8%
Farm	7,951	7,977	26	0.3%
Manufacturing	58,516	61,229	2,713	4.6%
Retail	44,752	50,339	5,587	12.5%
Finance and Real Estate	16,193	18,547	2,354	14.5%
Service	62,518	75,441	12,923	20.7%
All other	63,533	69,884	6,351	10.0%

A Shift-Share Example

- Calculating the NS component.

	1993	U.S.	National
Industry	**County Emp**	**Growth Rate**	**Growth Share**
Farm	7,951		
Manufacturing	58,516		
Retail	44,752		
Finance and Real Estate	16,193		
Service	62,518		
All other	63,533		
County National Growth Share =			

A Shift-Share Example

- Calculating the NS component.

	1993	U.S.	National
Industry	**County Emp**	**Growth Rate**	**Growth Share**
Farm	7,951	12.8%	
Manufacturing	58,516	12.8%	
Retail	44,752	12.8%	
Finance and Real Estate	16,193	12.8%	
Service	62,518	12.8%	
All other	63,533	12.8%	
County National Growth Share =			

A Shift-Share Example

- If the county's industries grew at the overall national rate of growth new job growth would have been 32,492 between 1993 and 1998.

	1993	U.S.	National
Industry	**County Emp**	**Growth Rate**	**Growth Share**
Farm	7,951	12.8%	1,019
Manufacturing	58,516	12.8%	7,501
Retail	44,752	12.8%	5,737
Finance and Real Estate	16,193	12.8%	2,076
Service	62,518	12.8%	8,014
All other	63,533	12.8%	8,145
County National Growth Share =			32,492

Ex: 7,951 * ((160,199,000/141,996,000)-1) = 1,019

A Shift-Share Example

- Calculating the IM component.

		Industry's		
	1993	National	U.S.	Industry Mix
Industry	**County Emp**	**Growth Rate**	**Growth Rate**	**Share**
Farm	7,951			
Manufacturing	58,516			
Retail	44,752			
Finance and Real Estate	16,193			
Service	62,518			
All other	63,533			
County Industry Mix Share =				

A Shift-Share Example

- Calculating the IM component.

		Industry's		
	1993	National	U.S.	Industry Mix
Industry	**County Emp**	**Growth Rate**	**Growth Rate**	**Share**
Farm	7,951	-0.1%		
Manufacturing	58,516	4.6%		
Retail	44,752	13.8%		
Finance and Real Estate	16,193	16.5%		
Service	62,518	19.3%		
All other	63,533	9.7%		
County Industry Mix Share =				

A Shift-Share Example

- Calculating the IM component.

		Industry's		
	1993	National	U.S.	Industry Mix
Industry	**County Emp**	**Growth Rate**	**Growth Rate**	**Share**
Farm	7,951	-0.1%	12.8%	
Manufacturing	58,516	4.6%	12.8%	
Retail	44,752	13.8%	12.8%	
Finance and Real Estate	16,193	16.5%	12.8%	
Service	62,518	19.3%	12.8%	
All other	63,533	9.7%	12.8%	
County Industry Mix Share =				

A Shift-Share Example

- The industrial mix component of –2,737 means that the county has nearly 2,800 fewer jobs than it would have had if its structure were identical to the nation's.

Industry	1993 County Emp	Industry's National Growth Rate	U.S. Growth Rate	Industry Mix Share
Farm	7,951	-0.1%	12.8%	-1,027
Manufacturing	58,516	4.6%	12.8%	-4,821
Retail	44,752	13.8%	12.8%	448
Finance and Real Estate	16,193	16.5%	12.8%	589
Service	62,518	19.3%	12.8%	4,078
All other	63,533	9.7%	12.8%	-2,002
County Industry Mix Share =				-2,737

Ex: 7,951 * ((3,127/3,130)-1) – ((160,199/141,996)-1)) = -1,027

A Shift-Share Example

- Calculating the RS component.

		County's	Industry's	
	1993	Industry	National	Regional
Industry	**County Emp**	**Growth Rate**	**Growth Rate**	**Shift**
Farm	7,951			
Manufacturing	58,516			
Retail	44,752			
Finance and Real Estate	16,193			
Service	62,518			
All other	63,533			
County Local Share =				

A Shift-Share Example

- Calculating the RS component.

Industry	1993 County Emp	County's Industry Growth Rate	Industry's National Growth Rate	Regional Shift
Farm	7,951	0.3%		
Manufacturing	58,516	4.6%		
Retail	44,752	12.5%		
Finance and Real Estate	16,193	14.5%		
Service	62,518	20.7%		
All other	63,533	10.0%		
County Local Share =				

A Shift-Share Example

- Calculating the RS component.

		County's	Industry's	
	1993	Industry	National	Regional
Industry	**County Emp**	**Growth Rate**	**Growth Rate**	**Shift**
Farm	7,951	0.3%	-0.1%	
Manufacturing	58,516	4.6%	4.6%	
Retail	44,752	12.5%	13.8%	
Finance and Real Estate	16,193	14.5%	16.5%	
Service	62,518	20.7%	19.3%	
All other	63,533	10.0%	9.7%	
County Local Share =				

A Shift-Share Example

- The regional shift component shows that 199 new jobs in the county are attributable to its relative competitive position. This is primarily due to its high-growth of service employment.

Industry	1993 County Emp	County's Industry Growth Rate	Industry's National Growth Rate	Regional Shift
Farm	7,951	0.3%	-0.1%	34
Manufacturing	58,516	4.6%	4.6%	33
Retail	44,752	12.5%	13.8%	-597
Finance and Real Estate	16,193	14.5%	16.5%	-310
Service	62,518	20.7%	19.3%	831
All other	63,533	10.0%	9.7%	209
County Local Share =				199

Ex: 7,951 * (((7,977/7,951)-1) - ((3,127/3,130)-1)) = 34

Productivity Adjustment

- If local industry is more productive, less labor is required to produce each unit of output.
- If the local industry is more productive than that of the nation, the location quotient understates the degree of specialization in the industry.

Consumption Adjustment

- If local area consumes a greater amount of the output of the industry per employee of the industry, the location quotient approach over states the exports.
- Method 1: Population ratio replaces total employment ratio.
- Method 2: Personal income ratio replaces the total employment ratio.

National Export Adjustment

- This location quotient approach assumes a closed economy - no national exports of products.
- If the nation is a net exporter in industry I:
  - the method overstates the local area's consumption of the product of industry i and
  - the method understates the local area's basic employment in the industry

Cross-Hauling Adjustment

- The location quotient approach assumes no importing of products from a basic industry.
- Cross-hauling (the importing of products for local consumption in an export industry) leads to:
  - an overstatement of the local area's consumption of the product of industry i and
  - an underestimate of the local area's basic employment in the industry

Minimum Requirements Approach

- Developed by Ullman and Dacey in 1960
- Makes comparisons between similarly sized (population) areas
- Accounts for differences in the sizes of regions
  - Recall - smaller regions have a smaller share of non-basic employment

Minimum Requirements Approach

- The minimum requirements technique compares local conditions with those of a sample of similarly sized regions for each industry.
- It assumes that the minimum shares region has just enough employment to satisfy local demand for that industry's goods and services.
- It follows that all other regions will have some basic sector employment because their share in that industry is greater than that in the "minimum shares region".

Reference Region for Minimum Requirements

- Collect data for similarly sized (population) areas.
- From among these, identify the the area that has the smallest share of industry i in its total employment.
- This is the *minimum share region.*

Location Quotient Approach vs. Minimum Requirements Approach

Location Quotient Approach

$$b_i = [(e_i / e_t) - (E_i / E_t)] \times e_t$$

Minimum Requirements Approach

$$b_i = [(e_i / e_t) - (em_i / em_t)] \times e_t$$

Share of industry i in minimum share area

MR Approach Assumes that the Minimum Requirements Area has No Exports

If $(e_i / e_t) = (em_i / em_t) \rightarrow$ Self-sufficient

If $(e_i / e_t) > (em_i / em_t) \rightarrow$ Exports

If $(e_i / e_t) < (em_i / em_t) \rightarrow$ Imports

The Key Steps of Minimum Requirements

- Identify several similarly sized region for comparison;
- Identify a "minimum shares region" for each industry to determine the necessary level of non-basic employment for each industry for these regions;
- Calculate basic sector employment from this minimum share.

Minimum Requirements Example

	Employment				Share			
MAJOR INDUSTRIAL SECTORS	***EAST***	***West***	***South***	***North***	***EAST***	***West***	***South***	***North***
Agriculture, forest & fishing	7,847	4,074	8,180	2,526	0.0093	0.0043	0.0100	0.0032
Mining	697	1,259	449	139	0.0008	0.0013	0.0006	0.0002
Construction	55,146	28,994	42,000	34,885	0.0656	0.0308	0.0515	0.0443
Manufacturing	179,691	179,362	117,830	113,441	0.2138	0.1904	0.1444	0.1441
Transportation and utilities	61,430	57,856	34,675	71,652	0.0731	0.0614	0.0425	0.0910
Wholesale trade	67,643	78,606	46,391	72,719	0.0805	0.0834	0.0568	0.0924
Retail trade	153,268	157,176	187,673	138,622	0.1824	0.1668	0.2300	0.1761
Finance, insurance, and real estate	72,523	68,927	66,320	85,452	0.0863	0.0732	0.0813	0.1086
Services	239,308	365,064	311,783	266,781	0.2848	0.3875	0.3821	0.3390
Non-classifiable establishments	2,744	759	748	805	0.0033	0.0008	0.0009	0.0010
Total area employment	840297	942078	816049	787021	1.0000	1.0000	1.0000	1.0000

$$Share = \frac{E_{ir}^{t}}{E_{r}^{t}}$$

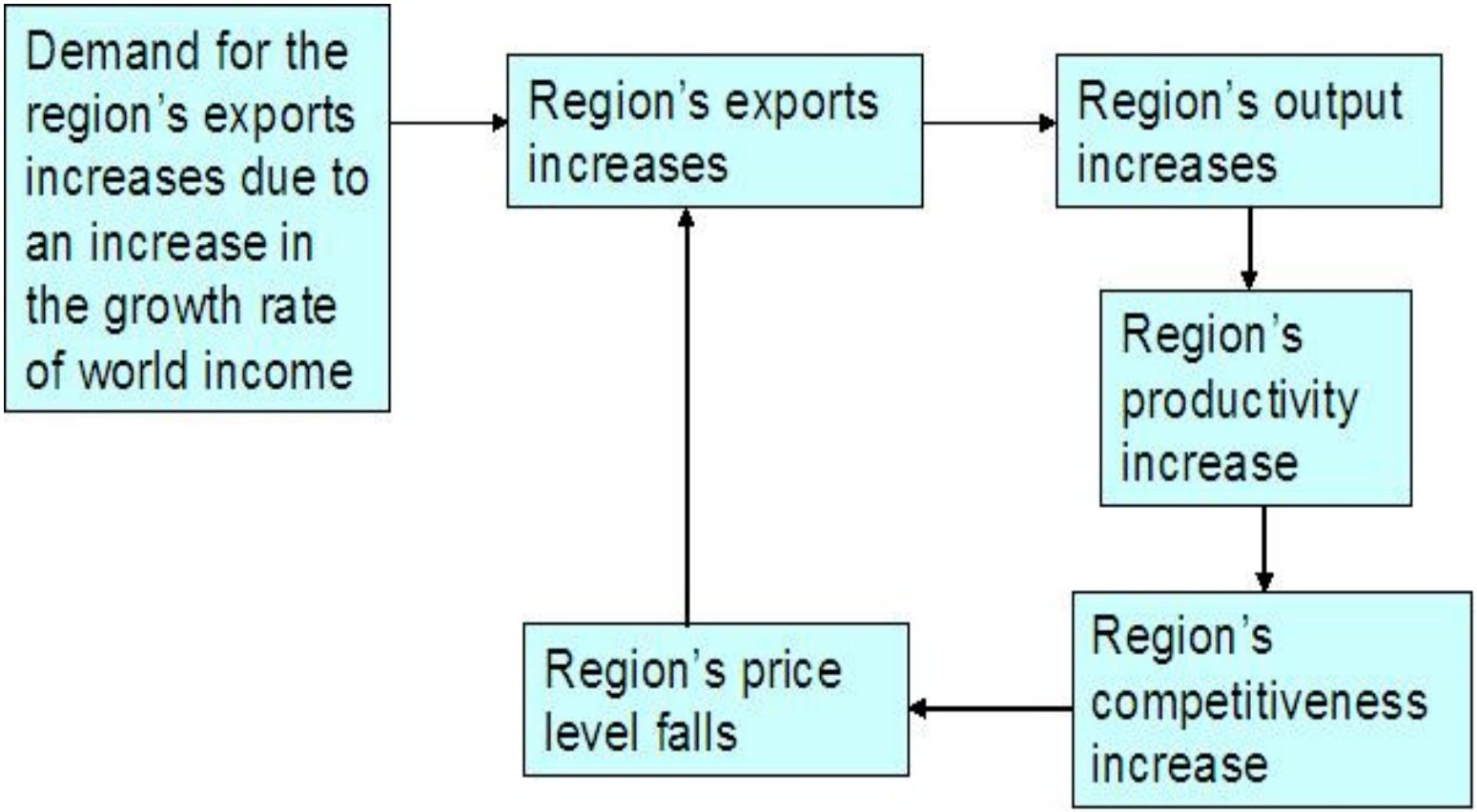
Minimum Requirements Example

MAJOR INDUSTRIAL SECTORS	***East's share***	***Min Req.***	***East***	***East Total***	***Basic Employment***	***Basic Multiplier***
Agriculture, forest & fishing	0.0093	0.0032	7,847	840,297	**5150**	**1.52**
Mining	0.0008	0.0002	697	840,297	**549**	**1.27**
Construction	0.0656	0.0308	55,146	840,297	**29284**	**1.88**
Manufacturing	0.2138	0.1441	179,691	840,297	**58571**	**3.07**
Transportation and utilities	0.0731	0.0425	61,430	840,297	**25725**	**2.39**
Wholesale trade	0.0805	0.0568	67,643	840,297	**19874**	**3.40**
Retail trade	0.1824	0.1668	153,268	840,297	**13073**	**11.72**
Finance, insurance, and real estate	0.0863	0.0732	72,523	840,297	**11043**	**6.57**
Services	0.2848	0.2848	239,308	840,297	**0**	**0.00**
Non-classifiable establishments	0.0033	0.0008	2,744	840,297	**2067**	**1.33**
Total area employment	1.0000	1.0000	840297	840,297	**165336**	**5.1**

Summary

- According to the Economic Base Model, a region's growth is determined by the growth of the export (basic) sectors.
- Approaches to estimating the basic content in each industry include
  - assumption
  - location quotient
  - minimum requirements

Export demand and cumulative growth model



- This model says that if the world income grows, the region's exports will increase which will lead to the region's output to increase. The region will be more productive in production. Thus, the region's competitiveness will increase which will decrease the region's price and increase the exports. Another round of productivity increase and competitiveness increase begin.

Other cumulative growth models

- Growth pole: Perroux (1950), Myrdal (1957), and Hirschman (1958) The theory says that if an indstry is subject to significant internal economies of scale, the firms grow quickly and will gain a competitive advantage over rivals and growth will be cumulative.

- Localization economies: Localization economies result from the geographical concentration of plants in the same industry at the locality. Located close to each other, the firms with input-output ties can enjoy benefits, such as the low costs of transportation, quick exchange of information, ideas and knowledge, and the spillover effects of cross-fertilization. Clustering allows individual plants to specialize more than they would if firms are wildly apart. The increase in specialization will increase the productivity and competitiveness of the industry.

What We have Covered….

- Economic Growth and Development
- Factors of Economic Growth
- Units of Measure for Economic Growth
- Economic Base Model
  - Basic Questions
  - Objectives
  - Purpose of the Model
  - Origins of the Model
  - Keynesian Model
  - The circular flow of income
  - Basic & Non-basic
  - Export Base Estimation
  - Location Quotient Approach to Basic Sector Estimation
  - Location Quotient Approach
  - Shift-share analysis
  - Productivity Adjustment
  - Consumption Adjustment

What We have Covered….

- Economic Base Model
  - National Export Adjustment
  - Cross-Hauling Adjustment
- Minimum Requirements Approach
- Export demand and cumulative growth model
- Other cumulative growth models
  - Growth pole
  - Localization economies

What We Learnt

- Understanding of the regional growth, factors and its measurement through using different economic base model.

Thanking You

So That's
Regional Growth Analysis

What Next?

Lecture 3:

Measurement and Change in Regional Economic Activity: Regional Accounts, Interregional Theory of Income and Trade