Economic Base

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Regional Economic and Community Markets

Characterizing our economies -- conceptually

- Actors, organizations, institutions
- The spatial dimension – where economic activity takes place
- The consequences of economic change for people and communities
- Understanding when an economic region is growing and when it is not growing
Circular Flow Model:
From Pam Perlich - Utah

Injections, withdrawals and equilibrium
Consumption of domestically produced goods and services (C_d)

The circular flow of income

Factor payments

Consumption of domestically produced goods and services (C_d)

The circular flow of income
The circular flow of income

Factor payments
Consumption of domestically produced goods and services ($C_d$)
BANKS, etc
Net saving ($S$)

Investment ($I$)
Consumption of domestically produced goods and services ($C_d$)
BANKS, etc
Net saving ($S$)
The circular flow of income

Factor payments

Consumption of domestically produced goods and services (C_d)

BANKS, etc

GOV.

Investment (I)

Net saving (S)

Government expenditure (G)

Net taxes (T)
The circular flow of income

Factor payments

Consumption of domestically produced goods and services ($C_d$)

BANKS, etc

GOV.

ABROAD

Investment ($I$)

Government expenditure ($G$)

Net saving ($S$)

Net taxes ($T$)

Import expenditure ($M$)

Export expenditure ($X$)

Investment ($I$)

Government expenditure ($G$)

Net saving ($S$)

Net taxes ($T$)

Import expenditure ($M$)
Economic Base Model Collapses
All Spending into Regional and Non-Regional

Regional Purchases of regionally produced goods and services

Import expenditure (M)

Export expenditure (X)

INJECTION

OUTSIDE OF REGION

WITHDRAWAL

Factor payments

Regional Economy

Imported Goods

Exported Goods
Dave’s easy regional economics lesson

Economic Impact: Net change in production in an economy from some change in industrial activity – From Keynes

\[ Y = C + X - M + O \]

- \( Y \): Total Income
- \( C \): Consumption
- \( X \): Exports
- \( M \): Imports
- \( O \): Other, which is composed of:
  - Savings (S), Invest (I) govt. pmts (G), taxes (T), and
  - Savings = Investment: \( S = I \)
  - Govt. pmts = taxes: \( G = T \)

\[ Y = -M + C + X + O \]

Keys to enhancing a regional economy

Increase exports – Money comes in from external (exogenous) sources

Decrease imports in both industrial production and in household consumptions—Money that stays in an economy has a chance to “multiply” through

Increase savings, yielding local investment

Seek subsidies or government investment
Basic Community Economic Terms

Regional economy
– We normally analyze economies from the standpoint of a “central place.”
– A central place is a dominant regional trade center.
– We think of these places as the consolidation of goods and services production

Goods and Services

Introduction to industrial structure
– Farm and nonfarm
– Private and non-private
– Goods producing and service producing
– Manufacturing and nonmanufacturing
– Basic and nonbasic
– Export and local production
Where do we get economic data?

Bureau of Economic Analysis -- BEA

County Business Patterns (also at the zip code level)

Census of Industry (U.S. Department of Commerce)

Bureau of Labor Statistics – BLS

Input-Output modeling systems (high detail, but imputed)

The Basics of Economic Base Analysis

A very simplified but useful way of viewing a regional economy:

– Basic firms: industries that depend in whole or very significantly on external (exogenous) factors

– Nonbasic firms: industries that depend on local (endogenous) business conditions and community characteristics
Economic Base

All local activity is either basic or nonbasic. Hence

\[ \text{Employment} = \text{Basic} + \text{Nonbasic} \]

And all nonbasic employment is driven by changes in the basic sector. Hence we get a multiplier (M)

\[ M = \frac{E}{B} \]

or

\[ E = M \times B \]

How do we determine what is basic and nonbasic?

How do we determine basic industries?

- Direct measures: audit / survey of local firms and households:
  - Divide their sales between local and nonlocal
  - Households divide their purchases by local and nonlocal
- Very costly, accuracy is an issue
Indirect methods of base determination

Assumption or ad hoc: we just assume certain sectors produce for export

- Ag, mining, manufacturing.
- Tourism
- State and federal government institutions (prisons, colleges, military bases)

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**Economic Impact Example: Assumption**

<table>
<thead>
<tr>
<th>Basic Sectors</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>500</td>
</tr>
<tr>
<td>Mining</td>
<td>65</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>1800</td>
</tr>
<tr>
<td>Tourism: Hotels</td>
<td>250</td>
</tr>
<tr>
<td>Tourism: Casinos</td>
<td>350</td>
</tr>
<tr>
<td>Tourism: All Other</td>
<td>200</td>
</tr>
<tr>
<td>Military Base</td>
<td>2400</td>
</tr>
<tr>
<td>Prison</td>
<td>175</td>
</tr>
<tr>
<td><strong>Total Basic Jobs</strong></td>
<td>5740</td>
</tr>
<tr>
<td>All Other Nonbasic</td>
<td></td>
</tr>
<tr>
<td><strong>Total Jobs</strong></td>
<td>9540</td>
</tr>
</tbody>
</table>

Base (or Basic) Multiplier (M) = Total / Basic

Base (or Basic) Multiplier (M) = 9540/5740 or M = 1.66
Basic Multiplier

We get a multiplier of 1.66

For every basic job, the whole economy (with the basic job) has 1.66 jobs

The interpretation is that for every change in basic jobs the nonbasic economy changes by 66/100th jobs,

If a basic firm added 100 jobs, then the whole economy would grow by 166 jobs

Base Multiplier Cont’d

There is no multiplier to be applied to nonbasic job changes – instead we assume that nonbasic jobs are adjusting to local conditions

This multiplier is applied to all basic sectors, regardless of job levels, income levels, or their respective linkages to the local economy
We can do better

We improve this approach by using relational measures to determine the extent to which local industrial activity is producing in excess of local demand.

Now we don’t begin with an *a priori* list of “export” industries. Instead we use a statistic to determine which industries are producing for external demand.

Industrial Specialization

We measure industrial specialization by calculating, in as much industrial detail as possible, industrial location quotients.

\[
LQ = \frac{\text{Percent of local jobs in an industry}}{\text{Percent of national jobs in that Industry}}
\]
Location Quotient

Calculation:
If Iowa has 10 percent of its employment in industry $i$ jobs and the U.S. average is 2.5 percent, then

$LQ_i = \frac{10}{2.5} = 4.0$

Interpretation

$LQ_i = 4.0$ means we have 4 times as many jobs as the national average; hence, we are specialized and producing for export.

If $LQ < 1.0$, we are not self-sufficient in an industry.

If $LQ > 1.0$ (especially if over 1.25), then we are producing for export.
Calculating Export Jobs

If the LQ is greater than 1.0, we are producing in excess of local demand. We calculate the number of jobs producing for local versus export demand using this formula:

\[
\text{Export jobs} = (1 - 1/LQ) \times \text{Jobs in Industry } i
\]

Export Jobs

If LQ = 4 and there are 1,000 jobs in industry i, then

\[
(1 - 1/4) \times 1,000 =
\]

\[
.75 \times 1,000 = 750 \text{ export (basic) jobs}
\]

Thus, 250 jobs are producing for local needs.
Example

Economic Impact Example: Location Quotient with Export Adjustment

<table>
<thead>
<tr>
<th>Basic Sectors</th>
<th>Actual</th>
<th>LQ</th>
<th>Basic</th>
<th>% Basic</th>
<th>Nonbasic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>500</td>
<td>10.0</td>
<td>450</td>
<td>90.0%</td>
<td>50</td>
</tr>
<tr>
<td>Mining</td>
<td>65</td>
<td>2.0</td>
<td>33</td>
<td>50.0%</td>
<td>33</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>1800</td>
<td>2.9</td>
<td>1179</td>
<td>65.5%</td>
<td>621</td>
</tr>
<tr>
<td>Tourism: Hotels</td>
<td>250</td>
<td>20.0</td>
<td>238</td>
<td>95.0%</td>
<td>13</td>
</tr>
<tr>
<td>Tourism: Casinos</td>
<td>350</td>
<td>20.0</td>
<td>333</td>
<td>96.0%</td>
<td>18</td>
</tr>
<tr>
<td>Tourism: All Other</td>
<td>200</td>
<td>20.0</td>
<td>190</td>
<td>95.0%</td>
<td>10</td>
</tr>
<tr>
<td>Military Base</td>
<td>2400</td>
<td>50.0</td>
<td>2352</td>
<td>98.0%</td>
<td>48</td>
</tr>
<tr>
<td>Prison</td>
<td>175</td>
<td>3.0</td>
<td>117</td>
<td>66.7%</td>
<td>58</td>
</tr>
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<td><strong>Total Basic Jobs</strong></td>
<td><strong>4890</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Total Nonbasic Jobs in the basic industries</strong></td>
<td>850</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>All Other Nonbasic</strong></td>
<td>3,800</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Total Jobs</strong></td>
<td>9540</td>
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Base (or Basic) Multiplier (M) = 9540/4890 or M = 1.95

Application of LQ derived multipliers

In the previous example, M = 1.95

One way to apply that multiplier, then, is to say if we lost 100 manufacturing jobs, the total economy would lose 195 jobs

Or 100 X 1.95 = 195 jobs

But that would over-estimate the loss because as we just determined, not all of those manufacturing jobs were producing for export production
Scenario

- We are going to lose 300 manufacturing jobs
- Using the multiplier that we calculated in the previous example plus the location quotient that we determined for our manufacturing sector we are going to
  - Calculate the total expected job loss
  - Recalculate the total economy and the basic economy
  - Recalculate the regional multiplier

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Total Basic Jobs: 4890

Total Nonbasic Jobs in the basic industries: 850

All Other Nonbasic: 3,800

Total Jobs: 9540

Base (or Basic) Multiplier (M) = 9540/4890 or M = 1.95
Items needed for the analysis

Job loss = 300 manufacturing jobs
Multiplier (M) = 1.95
LQ for the industry = 2.9
Total basic jobs = 4,890
Total jobs = 9,540
Total job loss = Multiplier X Basic jobs + Other lost jobs

We have to first apportion the manufacturing jobs between basic and non basic jobs – that was the whole point of using the LQ approach

So

With a manufacturing LQ of 2.9, we use this formula: basic jobs\textsubscript{i} = (1 – 1/LQ) X employment\textsubscript{i}

Therefore,

(1-1/2.9) X 300 = .655 X 300 ≈ 197 jobs for export

Therefore, 300 – 197 ≈ 103 jobs that are non basic

The impact, then, is

Total job loss ≈ 103 + 1.95 X 197
≈ 487 jobs
And

We can recalculate the region’s characteristics:

Net total jobs  = 9,540 – 487 = 9,053

New basic jobs  = 4,890 – 197 = 4,693

New basic multiplier  = 9,053 / 4,693  
                           = 1.93
Calculating LQs in a spreadsheet

• For your first assignment, you are going to replicate an example like the one we just completed
• You are also going to use a spreadsheet to calculate the location quotients using three or four bases for determining the location quotients.
• Which leads me to a point that I haven’t mentioned yet – there’s more than one way to determine a location quotient

Location Quotient Variations

Using employment or jobs as the basis – this is the most common. But LQs can also be calculated using:

– Population – the ratio of jobs locally in an industry to its population compared to the same national ratio.
– Total personal income
– Earnings (the money made from working)
– TPI adjusted for transfer payments
Minimum Shares or Minimum Requirements

• Many argue that it may not be appropriate to compare your economy to the average of the nation – your climate, composition, your average circumstances might be much different than the national averages.
• As an alternative, there is the minimum requirements or minimum shares approach

Minimum Shares

• Begins with a set of communities with economies similar to yours -- 15 to 50.
• E.g., a set of small metropolitan areas or micropolitan trade center counties.
• We compare ourselves similarly to the previous Location Quotient method, but with one major difference:
  – Export employment in any industry is the amount that is in excess of the minimum share of employment among our set of cities or counties, and
  – the LQ is based on the group totals, not the national totals.
So what does that mean?

• It means that for every industry in an economy, any employment that is above the minimum share found in that industry in our group is producing for export sales.
• There is a *de facto* assumption that the minimum percentage (or share) is all that is needed for self-sufficiency and the remainder is producing for export.

Minimum Shares

• There is a handout that can be used to follow along in the next example.
• The basic formula is this:

\[
B = \left(\frac{e_i}{e_t} - \frac{e_{im}}{e_{tm}}\right) \times e_t \quad \text{where}
\]

- \(B\) = basic jobs
- \(e\) = employment
- \(i\) = industry jobs
- \(t\) = total jobs
- \(m\) = city with minimum share
Minimum Shares Example:

• See spreadsheet

Summary

• Assumption or attribution (ad hoc) – easiest but least accurate
• LQ – works best with a high amount of industrial detail – generally more used
• Minimum shares – a well done minimum shares approach might have advantages over the others, but is somewhat cumbersome and potentially prone to “cherry” picking. Should be able to justify your region of comparison
Assignment 1

A LQ determined job impact calculation based on a scenario and information that I give you.

Complete a spreadsheet where you actually calculate all of the location quotients, determine the export (or basic) jobs, and determine the multipliers associated with each method.

PLUS! You will calculate, using your spreadsheet the economic impact of some Iowa industry that I will shut down.