

## Section #9

### Outline

1. The World Top Incomes Database
2. Rowthorn and Ramaswamy (IMF)
  - (a) Review: Working with Panel Data
  - (b) Group Activity: Application to Policy
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### 1 The World Top Incomes Database

Inequality has become an important political and economic issue, as evidenced by social movements like Occupy Wall-Street, and Janet Yellen's comments in a speech made last week that "economic inequality has long been of interest within the Federal Reserve System." Saez and Piketty's (2003) article in the reader helped to ignite the public debate, and the data and authors have been quoted regularly in the media since its publication. The paper by Saez and Piketty that we will read in this class is just about the United States. You may be interested in comparing U.S. trends with trends in other countries. To this end, I will briefly introduce you to the World Top Incomes Database.

The World Top Incomes Database can be found at the following link:

<http://topincomes.parisschoolofeconomics.eu/#Database>:

1. After clicking on the above link, you will see menus that allow you to select countries, years, and variables. For instance, suppose we are interested in comparing trends between the U.S., Canada, and Sweden.

Select the U.S., Canada, and Sweden (on my mac, I hold down the command key). Select all available years, and select the top 10% share, which is the statistic that we also analyzed in the pre-section exercise this week. Click "Download."

2. Open the .xls file. "Series-layout A" is organized "long," and is the easiest format to read into Stata to run regressions (be sure to tell Stata you have panel data using the xtset command: `xtset Country Year`) . "Series-layout B" is organized wide, and is the easiest format for analyzing data in excel or other spread-sheet software. I find that the easiest way to analyze the data in excel visually is using a "Straight Marked Scatter," which is a connected scatter plot.

3. Describe the figure we just made. As a group, let's brainstorm some ideas behind the patterns we observe. What variables could we add to a regression to test these hypotheses?

## 2 Rowthorn and Ramaswamy (IMF)

1. Consider the cross-country evidence attached at the end of this packet. What are these graphs showing? What broad patterns do you observe?

Rowthorn and Ramaswamy seek to explain the rise of services at the expense of manufacturing in developed countries. There have been three standard explanations for the rise in services:

- Productivity growth faster for manufacturing than services (Baumol 1967).
- Income elasticity of demand greater for services than goods (Clark 1957)
- Trade patterns.
  - Key: Global “South” is developing, while the global “North” is developed.
  - Competition: Cheap labor in “South” used to produce goods
  - Imports substituted for domestic goods manufactures in “North”
  - Result 1: Decreased demand for manufacturing labor (esp. low-skill jobs) in North.
  - Result 2: Increased employment share in non-tradeables (construction, services)

2. So what do Rowthorn and Ramaswamy do to test these hypotheses?

### 2.1 Review: Working with Panel Data

1. What is the unit of observation in R&R’s regressions? Is the panel “balanced?” (Hint: Divide the number of observations by the number of countries). How many time observations do we have per country on average?

2. The following regression output replicates Equation 5 in Table 1.<sup>1</sup> Table 1 of R&R is titled “Pooled Estimates of Relative Productivity and Prices, 1963-94”. “Pooled” means that cross-sectional observations from multiple countries and time periods are included in the same model.

Equation 5 in Table 1 is a regression of log RELPROD (relative productivity in manufacturing) on log Y (per capita income), YEARS (years elapsed since 1963), and LCDIMP (imports of manufactures from

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<sup>1</sup>Note: I wasn’t able to perfectly replicate all their results. I will make the data and Stata files available on the course site so you can try yourself!

developing countries). The regression also includes country and time dummies (fixed effects).

Table 1: Replication of Table 1, Specification 5

	(1)
	logLRELPROD
log Y	-0.122** (0.0602)
YEARS	0.0143*** (0.00204)
LDCIMP	0.0379** (0.0158)
Constant	-25.51*** (3.626)
Observations	510
R <sup>2</sup>	0.901
Country FE	X
Year FE	X
Standard errors in parentheses	
* p < 0.1, ** p < 0.05, *** p < 0.01	

3. Describe what time fixed effects are. How are time fixed effects different from the variable YEARS?

4. What does this regression suggest about the effect of import-competition on manufacturing productivity?

5. The authors describe two expected effects from an increase in manufacturing productivity. Each pulls the manufacturing sector's share of output in a different direction. When the productivity of the manufacturing sector increases...

a. ... what happens to increase manufacturing's share of GDP?

b. ... what happens to decrease manufacturing's share of GDP?

Consider the following regression output, which replicates Specifications 8 and 10 in the paper.

Table 2: Replication of Specifications 8 and 10

	(1)	(2)
	log OUTSHARE	log EMPSHARE
log Y	5.406*** (0.495)	9.723*** (0.531)
(log Y) <sup>2</sup>	-0.283*** (0.0279)	-0.510*** (0.0299)
log RELPRICE	-0.629*** (0.0310)	
TRADEBAL	0.0172*** (0.00142)	0.00909*** (0.00154)
LDCIMP	-0.000317 (0.0107)	-0.0408*** (0.0115)
FIXCAP	0.0107*** (0.00163)	0.00217 (0.00171)
Constant	-18.01*** (2.200)	-42.98*** (2.381)
Observations	510	510
R <sup>2</sup>	0.874	0.932
Country FE	X	X
Year FE	X	X

Standard errors in parentheses

\* p &lt; 0.1, \*\* p &lt; 0.05, \*\*\* p &lt; 0.01

6. What are the dependent and independent variables used in each regression? Which variables address the theories of industrialization discussed in question 5, and at the beginning of this section?

7. In their appendix, the authors show that based on the assumptions of their model that: 1) the income elasticity of demand for services is greater than one, and 2) the income elasticity of demand for manufacturing is greater than one for low levels of income and eventually becomes less than 1, then the manufacturing share of GDP and output share of manufacturing will be a quadratic function of income. How can we calculate this turning point via a regression analysis?

Consider the specification in Column 10 of Table 4, reproduced in column 2 above. The dependent variable

is  $\log(\text{EMPSHARE})$ . The turn-over point is calculated as follows:

$$\frac{\partial \log(\text{EMPSHARE})}{\partial \log(\text{Income})} = 9.72 - 2 \times 0.510 \cdot \log Y \quad (1)$$

$$0 = 9.72 - 2 \times 0.510 \cdot \log Y^* \quad (2)$$

$$\implies \log Y^* = \frac{9.72}{2 \times 0.510} \quad (3)$$

$$\implies Y^* = \exp\left(\frac{9.72}{2 \times 0.510}\right) \quad (4)$$

$$\implies Y^* = \$13,846 \quad (5)$$

$$(6)$$

Line 1 is the derivative of the regression specification with respect to log income. To find the turn-over point, we simply set the LHS derivative equal to zero (Line 2), and solve for  $Y^*$ .

8. Now it's your turn. Based on the results in column 1, what do you expect a graph of the manufacturing share of **output** against per capita income to look like, holding other variables fixed? Sketch such a graph below, labeling the axes. In what region of the graph is the United States? How about Greece?



## 2.2 Group Activity: Application to Policy

1. Senator Rob Portman (Republican of Ohio, a major manufacturing state), invites you for a conversation over a non-alcoholic beer. America's liberal trade policies with low-wage countries, he complains, are killing American jobs! If it weren't for imports from countries such as China, this country wouldn't be experiencing such high unemployment among manufacturing workers.

Drawing on regression analysis from Rowthorn & Ramaswamy, how would you respond?

### **2.3 Group Activity: Baumol's "Cost Disease"**

2. Consider the following fact: labor productivity in the performing arts has remained static over time – it still takes the same number of workers the same amount of time to perform Hamlet today as it did in Shakespeare's day; a symphony performing Beethoven will use violins and other "technologies" very similar to those used when the symphony was first composed. At the same time, other industries, such as manufacturing, now use much more advanced technology than three hundred years ago. In a two-sector model in which one sector has large productivity increases (such as manufacturing) and another sector (such as the performing arts) does not, Baumol and Bowen (1966) show that wage increases in the productive sector are transmitted to the stagnant sector, causing a widening gap between revenues and costs, since firms in the stagnant sector cannot cover wage increases with improved labor productivity. Baumol and Bowen argue that this predicts that costs of live performances should rise over time.

In your groups, try to apply this model to other types of services with little technological progress, such as cleaning or gardening services. Does this model explain the stylized facts in the service industries you've selected? Why or why not?



