



Lecture 9

AAE 374 Fall 2008

- Discuss Cotton Reaction Papers
- Road Map for Growth of Nations
- Getting Started on Capital Accumulation and Growth
- Growth and Convergence: First Look



Discussion of Cotton Reaction Paper

- Should the US completely eliminate its cotton subsidies?
- Do you think that the US will eliminate its cotton subsidies?
- Discussion of Cotton Lobby Arguments



Lobbying, Advertising and PR

- **Advertising:** About \$35 Billion in 2007 (TNS Media Intelligence)
- **Public relations** is the practice of managing the flow of information between an organization and its publics.
 - About \$6 Billion/Year
 - Edward Bernay's Classic *Propaganda*



Economic Literacy

- Because of these factors, a “take home” point from this class is economic literacy and ability to evaluate quantitative arguments (i.e. Excel in PS)
- Harry Truman and recent events



A Bt Cotton Example

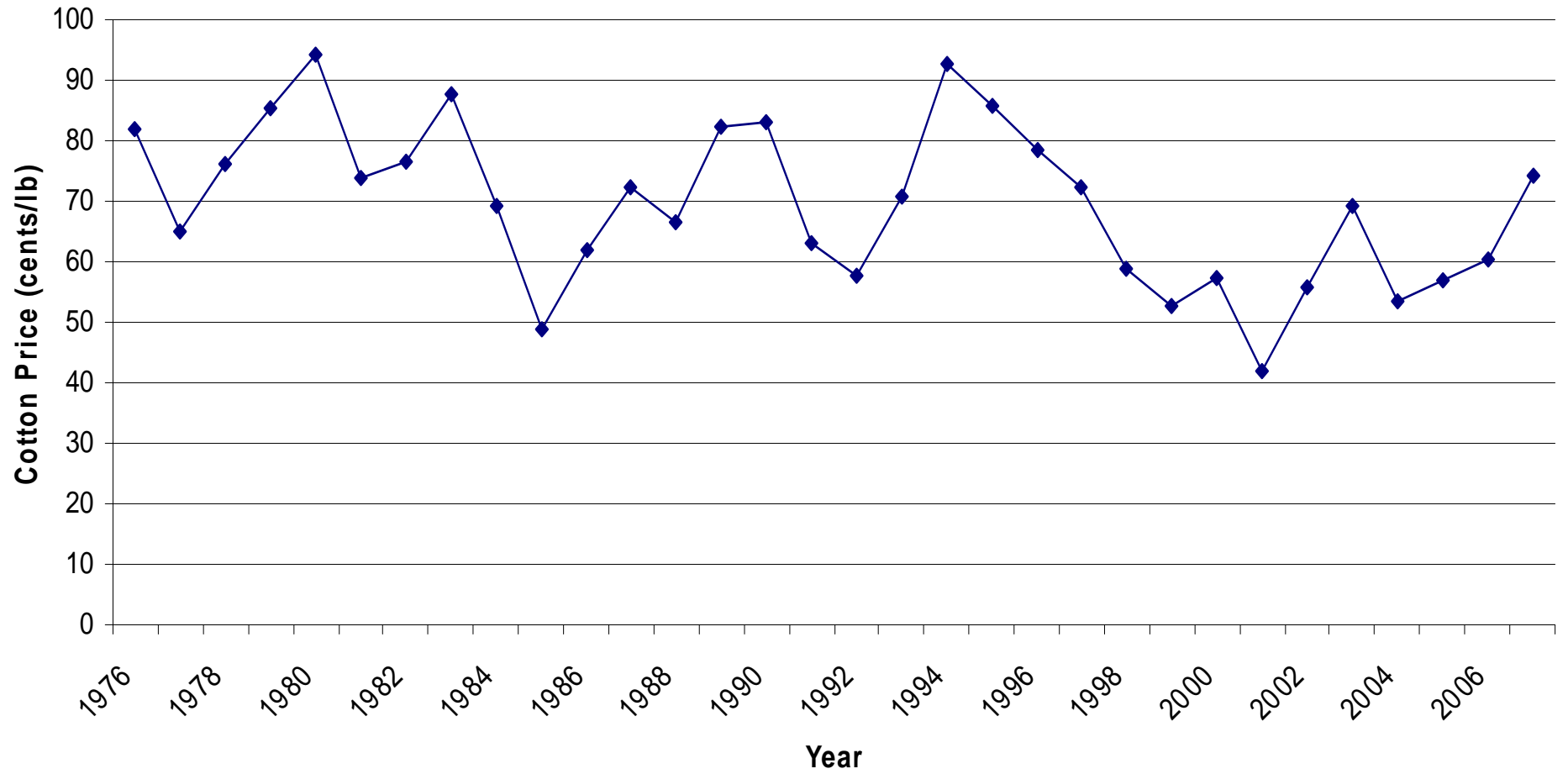
- *The soil of my land gives me a lot of golden cotton*
- *Vikram Bt*
- *the size of the cotton ball becomes huge from Vikram Bt*
- *it becomes easier to harvest the cotton and the total cost is also less*
- *the soil of my land gives every farmer higher profits*
- *Bt cotton!*
- *(To Link)*



MYTH: U.S. Support to Cotton Farmers Results in Low Cotton Prices

- *REALITY: Cotton prices are not low. In fact, U.S. and world cotton prices have risen substantially since the inception of the 2002 farm bill.*
- Okay, let's whip out Excel...

World Cotton Prices, NCC




(Source: Data from National Cotton Council Website: cotton.org)



MYTH: The U.S. Spends Billions of Dollars on Cotton Support

- *REALITY: Reported spending levels for U.S. cotton are outdated. Recent and projected levels of spending for the program components found objectionable by WTO dispute panels are as follows:*

Year	Estimated & Projected Spending (Million \$)
2007	\$573
2008	\$95
2009	\$81
2010	\$150



Google is an amazing tool to cross check

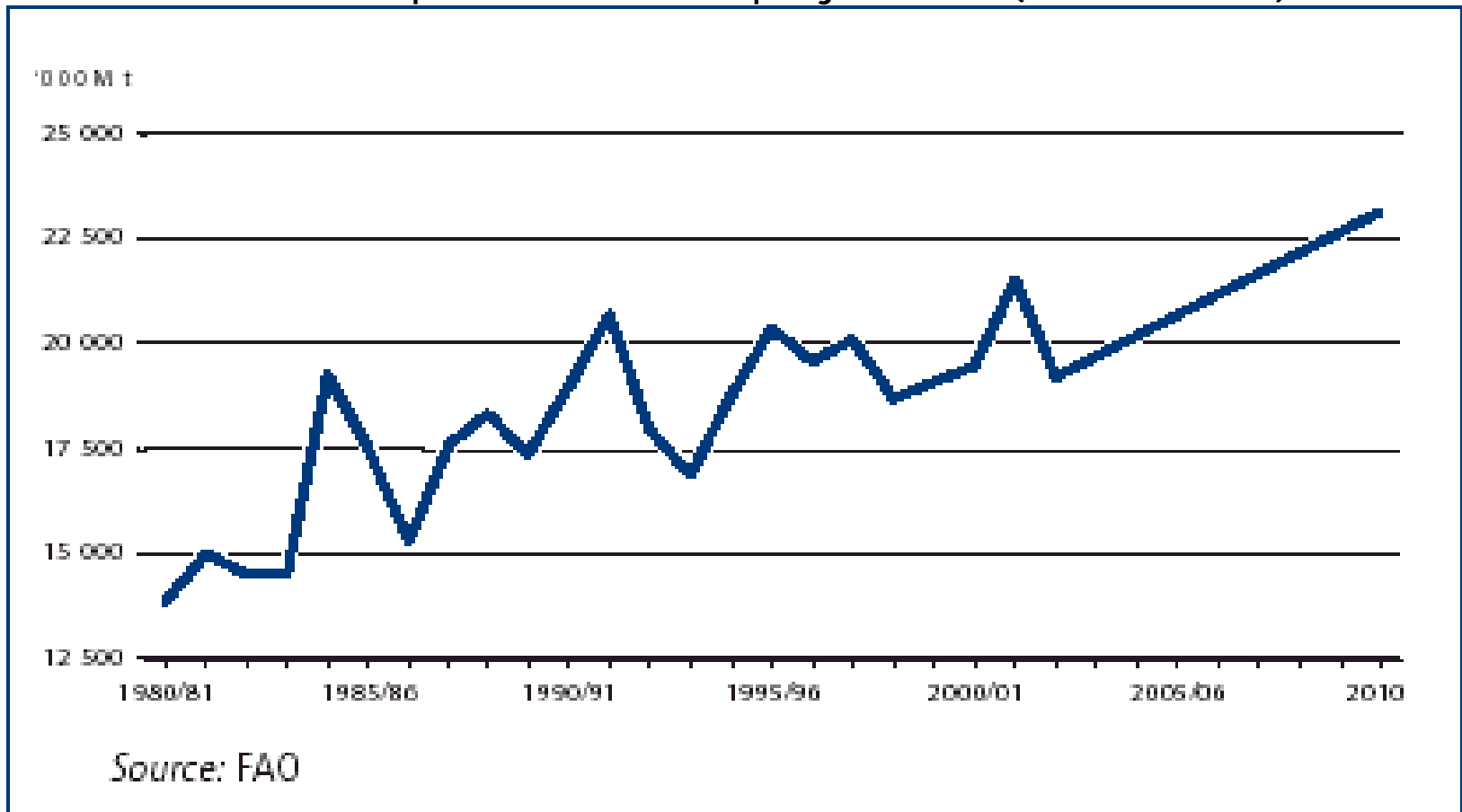
- “U.S. cotton subsidies reached \$3.31 billion in 2002, the last year included in Brazil's case, and then declined to \$2.89 billion in 2003 and an estimated \$1.66 billion for 2004, according to U.S. Farm Service Agency data.” (*U.S. appeals ruling against cotton subsidies, Washington Times, 10/19/04*)
- Still about \$3 Billion a year (*Brazil to Seek Sanctions Over U.S. Cotton Subsidies, NYT, 06/04/08*)



MYTH: U.S. Support to Cotton Farmers Has Driven Up U.S. Production and Exports at the Expense of Foreign Competitors

- *REALITY: The U.S. share of world cotton production has remained relatively stable over the long term and even **decreased** in recent years, despite the alleged increase in U.S. support. The increase in U.S. cotton **exports** has been in response to a decline in U.S. mill use.*

World cotton production and projections (Metric Tons)



- We would have to conclude that although US production is increasing this is independent of subsidies.
- In 2007, as pressure mounted to remove US Cotton subsidies, "...cotton acreage nationwide dropped 28 percent, hitting an 18-year low at 11.1 million acres, according to the [USDA]" (Associated Press, 11/9/07)

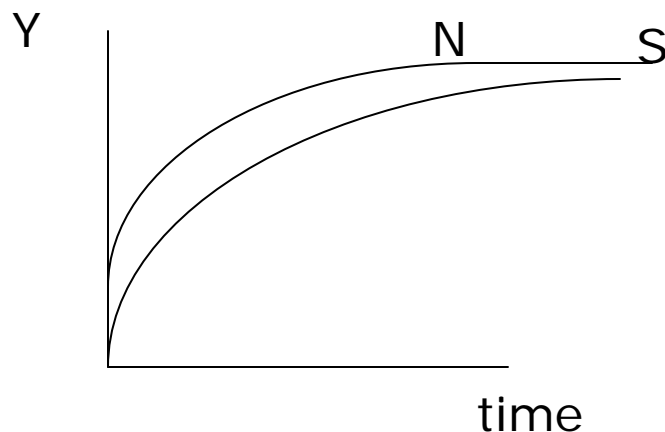


Introduction and Roadmap to Growth of Nations

- **Formal Models and Tummy Aches**
 - **Build from simple mathematical models to more complicated ones to capture the dynamics of economic growth**
 - Weil is your main guide; Easterly is your travel critic.
 - Looking to see predictions for growth of rich and poor countries.
- **Road Map**
 - **Harrod-Domar Model (today)**
 - only physical capital holdings matter,
 - growth is proportional to savings/inv.
 - growth but no convergence

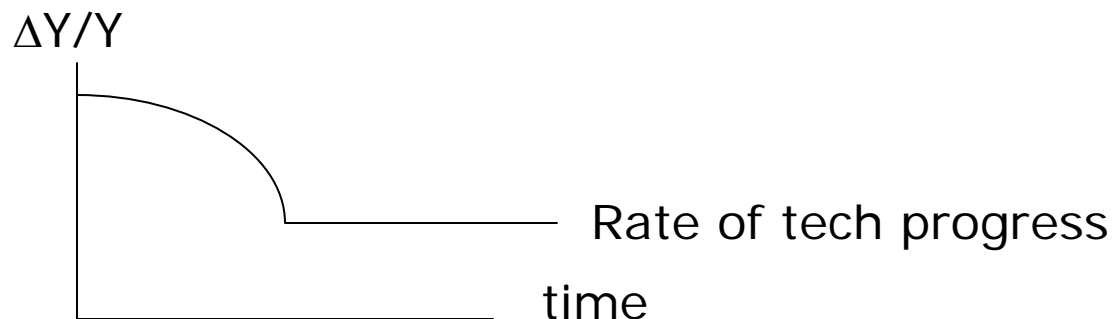
Road Map Continued

- Simple Solow Model (Oct 6)
 - Add labor to capital accumulation and growth
 - Assume diminishing returns.
 - Assume no technological progress
 - Economy achieves steady state with no growth.
 - Rich and poor (N and S) converge



Road Map Continued

- Solow Model with human capital (Oct 8)
 - Add Education/health as factors of production.
 - Find conditional convergence (not unconditional convergence)
 - No growth in the Steady State
- Solow Model with exogenous technological progress (October 8-10)
 - Random or “exogenous” (dropped into the model with no underlying cause)
 - Find convergence and positive growth.





Road Map Concluded

- Endogenous Technological Change
 - Technological change is related to public and private choices (of course it is)
 - No simple predictions about convergence
 - Catching up policies for poor countries can help.
 - Innovation by rich countries can push them ahead.
 - Does technological change become “routinized”?
- History, Institutions, and Policy Matter
 - Great for cross-country/regional comparisons.



Capital Accumulation and Growth: A First Look

- ***Capital versus Consumption Goods***

- Consumed goods (food, clothing, etc.)
- Capital goods (seeds, machines, factories, infrastructure, labs, offices).

- ***Main Difference?***

- Capital goods are used in subsequent periods as a basis for production.
- Why are they viewed as important to growth?
- What do they embody?
- How do they affect learning?



Key Growth Model Features

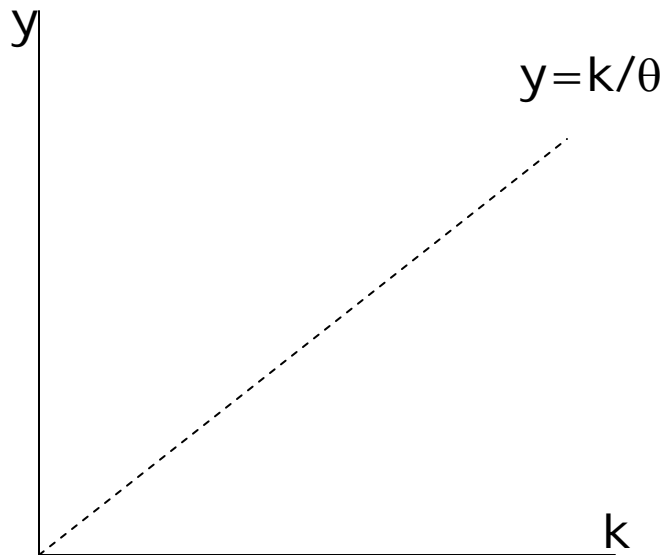
- 1 Good economy: Corn, consumption and capital good in 1 (eat it, save it as seed).
- Savings = Investment; $S = I$
- Does it always?
 - Why not?
 - Ask John Maynard Keynes.
 - Ask Wall Street.
- We will assume $S = I$, but it may not in poor countries: examples
 - Food/Seeds (deterioration)
 - Money under the mattress
 - Livestock (may be ok)



Harrod-Domar: Constant Capital-Output Ratio Technology

- Capital is the only factor in the economy.
- Labor is “slack”, always available to work capital but not explicitly modeled.
- Capital productivity measured by θ : which is the amount of machines needed per unit output. K/Y
- $Y(t) = (1/\theta(t))K(t)$, where we assume that $\theta(t)=\theta$ for all t . Constant
- Can rewrite as: $y=(1/\theta)k$, where lower case values are per-capita.
- Interpret this as saying something about living standards:
 - More capital per capita, more income.
 - More productive capital (lower θ), more income.

Graphic Representation of HD Model



Note the constant return to capital assumption. This will change in later models.

Per-Capita Capital Stock, k	Per-Capita Income, y ($y = k/\theta = 2k$)	Marginal Returns to Capital ($\approx \Delta y / \Delta k$)
0	0	
4	8	2
5	10	**2**
10	20	2



Savings, Investment and Growth in a Harrod-Domar Model

Macroeconomic Balance (Stress time notation)

$$(1) \quad S(t) = I(t)$$

Capital Accumulation

$$(2) \quad K(t+1) = (1-\delta)K(t) + I(t)$$

Savings Rate

$$(3) \quad s(t) = S(t)/Y(t) = s$$

s is a constant
but could also be time dependent.



Harrod-Domar Model Continued

- Technology and the Capital-Output Ratio

- (4) $Y(t) = K(t)/\theta$ or $K(t) = \theta Y(t)$

- Assembling the model

- (5) $K(t+1) = (1-\delta)K(t) + S(t)$, combines 1 and 2 above

- (6) $\theta Y(t+1) = (1-\delta)\theta Y(t) + sY(t)$;

- $\theta Y(t+1) - \theta Y(t) = -\delta\theta Y(t) + sY(t)$

- $\theta(Y(t+1) - Y(t)) = (s - \delta\theta)Y(t)$

- (7) $Y(t+1) - Y(t)/Y(t) = (s/\theta) - \delta$

- (8) $g = s/\theta - \delta$;

Growth is a positive function of savings, negative function of capital output ratio and depreciation.

Lower capital-output ratio means higher growth.

Harrod-Domar Growth Model cont.



Since we assumed that s , θ and, δ are all time invariant (not sensitive to time), then growth is constant.

What does this mean for convergence?

No convergence unless poor countries
Have a higher s , lower θ or δ .