ECON 6470   Economic Growth and Development Midterm version 5 w/figures   Spring 2016

Version 5 has no changes in questions but does add two notes, one a footnote to M-2 and a Figure relevant to M-3. Again the text of each question is unchanged.   Turn in each essay separately using this word template (only the question/sections you are answering). Please turn your answer to question M-1-V4 Friday April 1st latest on Blackboard; turn in your answer for M2-V4 Saturday April 2nd and your answer for M3-V4 Monday April 4th latest. Please check frequently for updates (this is version 4). Sections in italics are optional for anyone, Masters or PhD. Please use the same format for other assignments, answers in a separate font, single spaced, right after each question mark ? or phrase. Number Figures, copied from lecture notes or internet is fine, but use jpg format and include the source for all Figures and Tables in WBI VC format (no vertical lines) using quotes where possible (with citations and page numbers). Include a list of references at the end of each question, if you cite any. Cite using author. date, page format where possible. Formatting reminders: never include a Figure or Table without a unique number, a source and w/o referring to it in the text; avoid vertical lines in Tables, use large fonts, colors but avoid dark shading, make lines and numbers you want to focus distinct with color fonts or little frames or circles; do use quotes and equations or other people's Figures, always clearly sourced by author date and publisher, including web pages (a url is not a source). Use author, date format for references at end.

M-1-V4. **Growth and convergence in a Global Economy:** "Convergence" in per capita income across regions or countries occurs when and if poor countries grow faster than rich ones. Globally and nationally this is what development economics is about: how can poor economies "catch up" with richer economies. The answer to this question has become more import as the income gap between rich and poor nations has grown from 10 (high) to 50 … absurdly high. **(a)** Conditional convergence is a robust and widely accepted result of growth empirics (see Sala-i-Martin's or Barro and Sala-i-Martin, 2006 (Bsim) Introduction). Use old lecture notes and/or evidence presented Acemoglu Chapter 1 ; Sachs and Warner (1996) Fischer (2003) or Dollar (2001) or BSIM Chapter 11 to list three different examples of absolute and conditional convergence (six in total). *Clearly number your growth rate and initial income figures. Why is finding absolute convergence for a more geographical region (the world, States or provinces within a country, or continental Europe) different than finding convergence among OECD countries for example?* b) Briefly mention why conditional vs. absolute convergence have different implications ofr development policy? Given the results of all of the above authors Levine and Renelt 1992 for example, or Barro, 1997, what seems to be the minimum necessary precondition for absolute convergence? (hint: the augmented Solow model or Lucas, 1988). Is conditional convergence strong evidence for Solow-Swan exogenous growth as Sali-i-Martin claims in "15 years of growth theory?   Hint: can we have both conditional convergence and endogenous growth? **PhD students** Use one of the Inada conditions and the CES model to illustrate the fundamental difference between endogenous and exogenous growth models (see BSIM chapter 1, page 68*). D) Use Figures C-2 and C-3 below or here to distinguish between β (beta) and σ (sigma) convergence, which implies the other? Galton's Fallacy makes it necessary to check both beta and sigma convergence, explain clearly and briefly? *The difference between Masters and PhD students? Answer: Masters actually have to read/listen to Piketty[1]… Masters students: Piketty takes absolute convergence as a given, using the reversal of fortune and post WWII Europe as examples, provide some quotes demonstrating his view. Does he think foreign aid will be necessary to achieve convergence? Please use brief quotes with page numbers… PhD students: include the formal definition of both types of convergence, review Danny Quah's 1993 divergence big time argument. Was he wrong? How do we know or not know? MA Students only: show sigma vs. beta convergence for your case study country or countries in a figure if possible. Explain briefly why Figures B-1 and S-2 here also illustrate beta and sigma convergence? E) EC PhD students: use and econometrics package (Eviews, Stata, what else?) and the Jones Appendix C data set 2nd or 3rd edition to determine what is necessary to obtain conditional convergence circa 1960. Use the Solow-Swan growth rate diagram levels diagram (as in Sachs, et al. 2004) and two Inada conditions to i) explain why the Solow-Swan model implies absolute convergence; and ii) to rule out poverty traps and iii) to rule out endogenous growth (and create a steady state income level).*

M-2-v4 Credit, inequality and growth: The potentially growth reducing impacts of inequality can in principle be mitigated by credit or redistribution: poor nations/households can in principle borrow from rich nations house/households. However, credit markets have been disappointing, and inherently inefficient since
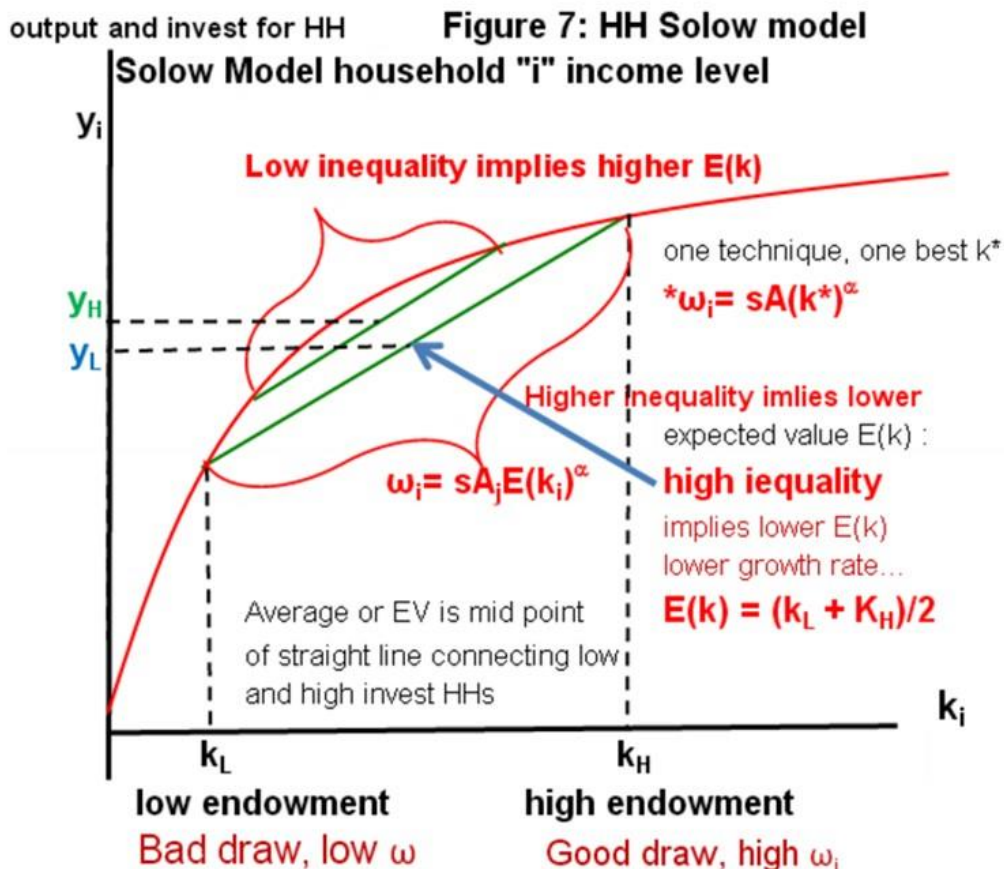
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[1] This is actually not true, Capital is too long, Piketty says so in the Boston AEA web cast… use reviews of Capital and the first chapter and Piketty's own presentations and summary here the Kindle version is very handy, I am sure capital is also online as a pdf someplace… no need to feel sorry for Piketty, his both editions of his book are still quite expensive on Amazon… though there are used copies now…

they involve a promise of future payment leading to incentive problems (moral hazard and adverse selection). The good news is that redistribution via transfers/taxes seems be less problematic than thought (witness falling inequality with higher growth in Latin America). (a) Use the Solow model diagram for two households to demonstrate and provide an intuitive explanation of why transfers to the poor increase both the *growth rate* and the *level of income* in the model with imperfect credit markets as presented in see also Garcia Peñalosa Aghion, Chapter 1 of Aghion and Williamson, 1999. Anticipate (explain) the empirical evidence on inequality and redistribution presented in Ostry et al. 2014 with reference to Barro (2008), Aghion et al., 1999 and other articles reviewed in the lecture notes   Why is redistribution redundant with perfect credit markets? Why don't credit markets work well in developing countries, including Nogales Mexico? *Relate this to the Debt Overhang (lecture notes) and see part D of F-4 below. B)* PhD students only present a model using equations to explain why credit markets are imperfect, and why debt relief can help developing countries, see Aghion and Williamson, 1999 or the debt overhang notes above. C) Masters students only: Find a growth incidence curve that illustrates your countries experience with inequality, keep this inequality data a growth incidence curve, or a Gini coefficient for your case study. *You can find inequality data in povcalnet.org.* D) *Optional: In honor of the Sen lecture, present some evidence regarding Gender bias in your country. For this you can use the WDR, 2012 gender, Gender Stats Edstats or Barro and Lee (education is one of main indicators of mass participation in economic progress, unfortunately coverage and indicators are uneven, let me know if you help with this one, send me an email with your key countries). The 2013 GFDR (not 2014) suggests an expansion of private credit as share of GDP reduces inequality (see Figure 1.1 page 20).   Is there any evidence of this in your case study countries? Private credit data in the WDI or World Bank Global Development Finance data base.*

M-3-v4 *Trade, FDI and Growth:* See the updated Trade and Growth Lecture notes and the fixed Open Economies handout. Even skeptics of trade's ability to increase economic growth such as Rodrik admit that export processing zones and a weak RER has been "levers for growth" for many countries, including China and Vietnam. A) Despite a strong correlation it has been surprisingly difficult to demonstrate a causal link between trade and growth.[2] Briefly, why might trade stimulate growth (hint: demand side poverty traps). Masters students briefly describe a model in which trade reduces or increases growth (we discussed several models in class, including the classic Sachs and Warner paper, as updated by *while PhD students write down equations for two growth* models one in which higher tariffs raise growth and one in which higher tariffs increase growth, providing an intuitive explanation of both outcomes (see Rodriguez & Rodrik 2000 (R&R) or Sachs and Gallup, 1999 or Basu and McLeod, 1992 or Mileva and McLeod 2011). What is the difference between tariffs and a weak RER? In your view does the success of Asian exporters validate low inequality and industrial policy? Recall the consensus view of integration presented by Rodrik in Growth Strategies. How did Asian economies capture the best of free trade and self discovery (industrial policy). *B) Briefly summarize this 2nd & 3rd round evidence in response to such as Warner, 2003 R&R's (2001) argument that trade does not increase growth.* (C) **Masters students only:** Use the MIT Observatory of Economic complexity (or the WDI or PWT 8.1) plot trade/export growth for your case study country. *(D) Optional: PhD students only: do what you can with the Challenge question in the Growth in Open Economies handout. (E) Optional anyone if you have time: did an increase in trade or openness to FDI boost growth in your country or countries? If possible plot the net barter terms of trade from the WDI online and/or the real exchange rate from the WDI-IMF REER series or the USDA ERS Macro database). Has your country used the RER as a lever for growth longer term? Should it or can it? Explain.*

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[2] Meaning how and why trade can be a "policy lever for growth" (or not) sometimes. Why does reducing barriers to trade increase growth and lead to convergence in some models, while in other models reducing trade barriers reduces growth. Why? Link your discussion to one of the models reviewed in class (R&R, 2000 or Sachs and Gallup or Basu and McLeod, the handout version, or McLeod and Mileva, 2011). For example, Sachs and Warner (1995) test four barriers to trade. Sachs and Gallup (2001) and Frankel & Romer, 1999 look at distance as a barrier to trade. Later Warner uses tariffs only. Basu and McLeod (1992) add a tariff to an endogenous growth model. McLeod and Mileva, 2011 at focus on the real exchange rate as barrier to trade... Describe a trade and growth model where barriers to trade reduce growth and one where it increases LR growth. Give an intuitive description or a model discussing/showing why barriers to trade increase or reduce growth in each case.

Why inequality reduces $E(k_i) = y$

Figure 7: HH Solow model

output and invest for HH

Solow Model household "i" income level

y_i

Low inequality implies higher E(k)

one technique, one best k*

*$\omega_i = sA(k^*)^\alpha$

y_H
y_L

Higher inequality imlies lower expected value E(k) :

$\omega_i = sA_i E(k_i)^\alpha$

high iequality

implies lower E(k) lower growth rate...

$E(k) = (k_L + K_H)/2$

Average or EV is mid point of straight line connecting low and high invest HHs

k_i

k_L
low endowment
Bad draw, low ω

k_H
high endowment
Good draw, high ω_i

Note on Question M2-v4 part a: Figure 7 maps Aghion and Williamson's presentation of the Benabou model for random distributed wealth for households i = 1,..n into a standard Solow diagram. The figure illustrates a society with just two households, a rich one and a poor one, a good draw and a bad one. The expected value of the capital stock is E(k) then falls the greater the dispersion is. The idea is just to explain intuitively why this happens (Masters) or to link the above illustrative diagram back to the equations of A&W paper (PhD students). If π is the probability of a bad draw (poverty, corresponding to k_L in Figure 7) then $E(k) = \pi k_L + (1- \pi)k_H$ the average weighted by the probabilities which sum for one. Figure 7 is labeled incorrectly the points on the curve and below it should be sy_L and sy_H (corresponding to $sA(k^*)^\alpha$)

M-4 Poverty traps: a) Outline two demand side and two supply-side poverty traps. Illustrate these poverty traps and explain each poverty trap graphically. Does the evidence on savings and growth in Asia suggest Asia was in a poverty trap? If yes, which one? Is there evidence African countries were in a poverty trap 1980 to 2000? Why does this matter for Africa's growth prospects right now. B) Banerjee and Duflo (2012) and Barro and Sali-i-Martin (2004) argue there are no poverty traps, summarize their arguments/evidence (one not both). Cite some evidence from the steady state calculations from Jones Chapter 3 that Haiti and Madagascar are in a poverty trap (see the [Jones spreadsheet](#)). Show this using a standard levels poverty trap diagram from Sachs et. al. 2004 or the lecture notes. What is Collier's plan for [Haiti's recovery](#)? Is his plan consistent with the ["weak institutions" levers for growth](#) cited by Johnson et al. 2006? C) Poverty traps and endogenous growth models appear to strikingly different implications for development policy (and the future of the World Economy). Why from a policy point of view this difference may be less relevant than it first appears (hint: conditional convergence, hybrid models; growth levers).
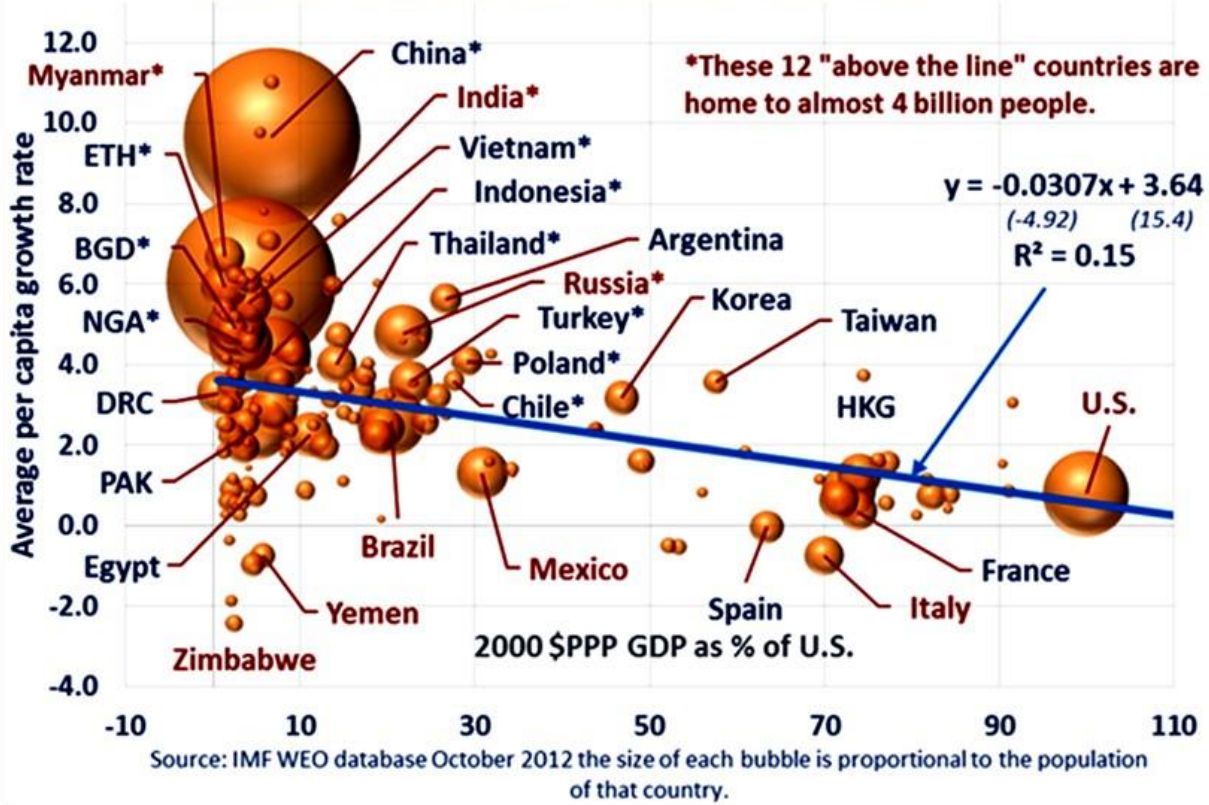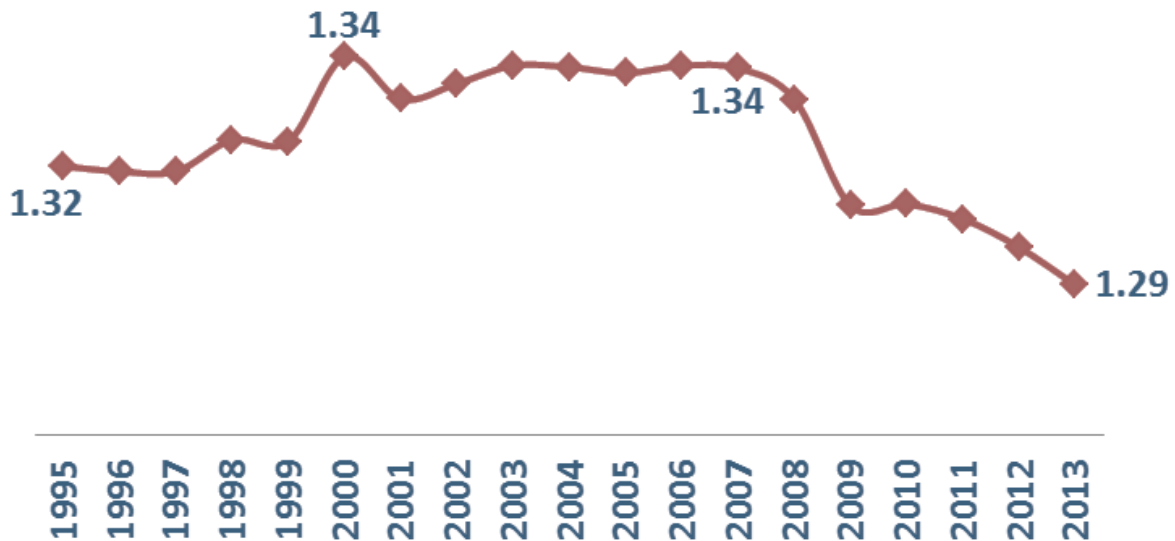
Figure C-2 Convergence, "big-time" 2000-2013

Average per capita growth rate

*These 12 "above the line" countries are home to almost 4 billion people.

$y = -0.0307x + 3.64$
(-4.92)   (15.4)
$R^2 = 0.15$

Myanmar*   China*
ETH*   India*
            Vietnam*
BGD*   Indonesia*
NGA*   Thailand*   Argentina
            Russia*
            Turkey*   Korea
            Poland*   Taiwan
DRC   Chile*   HKG   U.S.
PAK
Egypt   France
Brazil   Mexico
Yemen   Spain   Italy
Zimbabwe

2000 $PPP GDP as % of U.S.

-10   10   30   50   70   90   110

Source: IMF WEO database October 2012 the size of each bubble is proportional to the population of that country.

Figure C-3: Standard deviation of log per capita income: $PPP 2005 per capita GDP current prices

1.34

1.34

1.32

1.29

1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013

Source: October 2012 IMF WEO Database

Here is the official APA citation of the Ostry and Berg paper as reported by google scholar, it is not perfect, I added the city and the url. Never use just a url as a reference, even though I used to do this, even though most Urls go bad with tiem, adding it at the end is a nice gesture, to encourage others to read what you have read. Please use this format for your references. There is an 2024 version of this paper with a 3rd author (see above, who does all the work…) please look of for it on google scholar if it is not available above....

Ostry, J. D., & Berg, A. (2011). Inequality and unsustainable growth: two sides of the same coin? (Working Paper No. 11/08). International Monetary Fund, Washington DC. http://www.imf.org/external/pubs/ft/sdn/2011/sdn1108.pdf *Pressed for time? See also,Berg, A. G., & Ostry, J. D. (2011). Inequality and efficiency. Finance & Development, 48(3), 12-15.* http://www.imf.org/external/pubs/ft/fandd/2011/09/berg.htm

Table 2. Characteristics of Growth Spells

Region	Frequency and duration					Average growth before, and After[1]			
	No. of countries	No. of spells	Mean duration (years)	% spells lasting at least		Average growth			3 y
				10 years	16 years	Before	During	After	Before
Complete spells									
Advanced countries[2]	37	2	13.0	100.0	0.0	3.3	6.0	1.2	2.6
Emerging Asia	22	3	18.0	33.3	33.3	-0.7	9.1	1.4	1.4
Latin America	18	5	14.4	60.0	40.0	1.1	4.8	0.2	1.3
Sub-Saharan Africa	43	3	8.3	0.0	0.0	-2.7	9.9	-4.0	-10.6
Other developing[3]	20	7	10.7	42.9	14.3	-1.6	5.0	-0.9	-1.4
Total (including incomplete spells)									
Advanced countries[2]	37	11	24.4	100.0	63.6	0.7	5.7	n.a.	-0.1
Emerging Asia	22	16	24.2	87.5	56.2	-0.3	5.8	n.a.	0.4
Latin America	18	7	15.7	71.4	42.9	0.4	4.4	n.a.	0.1
Sub-Saharan Africa	43	18	13.6	66.7	22.2	-4.0	6.3	n.a.	-7.7
Other developing[3]	20	12	13.5	66.7	33.3	-2.1	5.0	n.a.	-2.8

Source: Berg, Ostry, and Zettelmeyer (2008) and authors' calculations.
Note: A growth spell is a period between a growth upbreak and a growth downbreak, as long as per capita real growth 2 percent during the spell and falls to below 2 percent after the downbreak. Breaks are at least eight years apart.
[1]Real per capita GDP growth, in percentage points.
[2]Includes Hong Kong SAR, Japan, Korea, Singapore, and Taiwan Province of China.
[3]Caribbean countries, Cyprus, Middle East, North Africa, and Turkey.

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