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Revisiting convergence: A research note ☆

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ABSTRACT

A number of recent studies show that income inequality is declining between countries. In this research note, I question the significance of this trend by examining the role of initial conditions in producing convergence. An important (but neglected) property of inequality dynamics is the tendency for extreme distributions to become more moderate. When income disparities are large, the subsequent trend is biased toward convergence. Conversely, when initial conditions approach parity, divergence becomes the more likely long-term outcome. I apply this principle to trends in GDP PC across 127 countries during the 1980–2010 period. Using counterfactual analysis, I manipulate the initial level of inequality in GDP PC while holding constant each country's observed growth rate during the sample period. I find that the growth dynamics of GDP PC produce either convergence or divergence based simply on the initial distribution of income. The point of transition occurs at a moderate level of inequality, whether using population weights (Gini = .365) or not (Gini = .377). I conclude that the recent convergence observed in GDP PC is primarily a function of large income gaps between countries and would not have materialized at more moderate levels of initial inequality. By contrast, an examination of the pre-1950 period reveals divergent growth patterns that are not sensitive to initial conditions.

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1. Introduction

Recent studies show that income inequality is declining between countries (Clark, 2011; Firebaugh, 1999, 2003; Firebaugh and Goesling, 2004; Goesling, 2001; Hung and Kucinskas, 2011; Sala-i-Martin, 2006). However, the trend is often sensitive to a number of methodological decisions, such as the use of population weights, the inclusion of China in samples, and/or the way in which incomes are converted (Firebaugh, 1999; Korzeniewicz and Moran, 1997; Milanovic, 2005). Recent convergence is also characterized as negligible (Korzeniewicz and Moran, 2009), especially when compared to the more dramatic rise in between-country inequality during the past two centuries (Bourguignon and Morrisson, 2002). Finally, other work suggests that recent trends have resulted in very little structural mobility and that the development hierarchy has remained stable across time (Babones, 2012).

In this research note, I introduce an additional critique to the convergence literature, examining whether the large income gaps that exist between countries are responsible for producing income convergence over the last several decades. An important (but neglected) property of inequality dynamics is the tendency for extreme income distributions to bias the subsequent trend. While high levels of inequality tend to generate convergence in the long-term, initial conditions marked by greater parity will more likely yield divergent growth. At one extreme, stratified distributions are relatively difficult to maintain

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Table 1
Hypothetical trends in GDP PC over 30-year period.

	GDP PC (T_1)	Annual growth rate (%)	GDP PC (T_2)
High inequality scenario			
Country A	$1000	8.0	$3400
Country B	$1500	2.0	$2400
Country C	$2000	3.0	$3800
Country D	$10,000	10.0	$40,000
Country E	$30,000	4.0	$66,000
Gini	.598		.567
Moderate inequality scenario			
Country A	$2500	8.0	$8500
Country B	$4000	2.0	$6400
Country C	$6000	3.0	$11,400
Country D	$10,000	10.0	$40,000
Country E	$20,000	4.0	$44,000
Gini	.386		.387
Low inequality scenario			
Country A	$5000	8.0	$17,000
Country B	$7500	2.0	$12,000
Country C	$10,000	3.0	$19,000
Country D	$12,500	10.0	$50,000
Country E	$15,000	4.0	$33,000
Gini	.200		.281

unless growth opportunities are monopolized. At the other extreme, when nations are practically equal to one another, even very small differences in growth rates are likely to produce divergence regardless of which nations are growing most quickly.

To briefly illustrate the phenomenon, consider the three inequality scenarios depicted in Table 1. Each scenario consists of five countries, all experiencing different annual growth rates in gross domestic product per capita (GDP PC) over a 30-year period. Across the three scenarios, the growth rate for each country remains constant, as does their ordinal ranking at T_1 (i.e., country A is always the poorest country, country E is always the wealthiest, etc.). Notice, however, that whether these five countries are converging with one another depends completely on the initial distribution of income. The growth dynamics are a constant, but they produce convergence in the high inequality scenario (the Gini declines from .598 to .567), divergence in the low inequality scenario (the Gini increases from .200 to .281), and a flat trend in the moderate inequality scenario (the Gini increases slightly from .386 to .387).

Of course, we can also envision a set of growth rates that will always produce convergence across these three scenarios (e.g., annual growth rates that are inversely proportional to initial GDP PC). The question is whether the cross-national convergence observed in GDP PC in recent decades represents such a case. Is convergence simply a product of high initial inequality, or is the trend robust to initial conditions? In this note, I examine whether the growth dynamics that occurred during the 1980–2010 period would have produced convergence regardless of initial conditions (we may refer to this as "strong convergence"), or if convergence is conditional on how income is initially distributed (we may refer to this as "weak convergence"). In order to answer this question, I conduct a series of counterfactuals, using national income data across 127 countries between 1980 and 2010. I find that (a) convergence is, in fact, sensitive to how income is initially distributed, (b) this result persists whether or not I weight countries by their population size, and (c) the same pattern holds for the earlier 1950–1980 period, as well. By contrast, when I consider prior historical periods in which countries are *diverging* from one another (1820–1870, 1870–1913, and 1913–1950), the observed trends are not sensitive to initial conditions. Thus, I conclude that historical trends in GDP PC are best characterized by "strong divergence" during the pre-WWII era, followed by "weak convergence" afterward.

2. The impact of inequality on convergence

I first examine the impact of inequality on cross-national convergence in GDP PC during the 1980–2010 period. The data are based on purchasing power parity and are available for 127 countries. I then present results when weighting countries by their population size. GDP PC and population data both come from the World Bank's (2013) *World Development Indicators*. Next, I replicate my analysis for earlier historical periods: 1820–1870 (47 countries), 1870–1913 (63 countries), 1913–1950 (63 countries), and 1950–2008 (137 countries). GDP PC data for these periods come from the Maddison Project (http://www.ggdc.net/maddison/maddison-project/home.htm), which features the most up-to-date version of Angus Maddison's pioneering efforts in collecting historical cross-national data on population size and GDP (see Appendix A for a list of countries appearing in each sample).

I rely on the Gini coefficient when reporting estimates of income inequality, one of the few "strongly Lorenz-consistent" inequality measures that adheres to the six Lorenz properties of reflexivity, transitivity, anonymity, income homogeneity,

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