

# GLOBALISATION AND CONVERGENCE<sup>1</sup>

Steve Dowrick

Australian National University

J. Bradford DeLong

University of California at Berkeley and NBER

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### **Abstract**

We reach four tentative conclusions about the relationship of “globalisation” and “convergence.” (1) The first era of globalization--the coming of the era in which staples could be profitably traded across oceans before World War I--was essential in spreading “convergence” beyond the narrow North Atlantic. But outside this charmed circle there was structural change and economic integration but not “convergence.” (2) In the interwar era of globalisation retreat, the "convergence club" expanded to include pieces of coastal Africa, much of Latin America, and the Stalin-ruled Soviet Union. (3) The post-World War II era brought an expansion in the size of the "convergence club" as the OECD and the East Asian economies joined the club, and now India and China—2/5 of the world’s population—may have joined as well. But (4) the post-WWII era also saw the first large-scale departures from the “convergence club”: the stagnation of late-Communist and post-Communist economies, the disappointment of post-World War II growth in much of Latin America, and the extreme disappointment of African post-colonial economic performance.

If correct, these conclusions raise three huge questions: Why the limited extent of convergence under the first globalised economy before 1914? Why did the “convergence club” grow in the interwar period when globalisation was in retreat? Why the change in the shape of the "convergence club" after World War II?

## I. Introduction

We see “globalisation” everywhere. The nineteenth century saw falls in the costs of transporting goods across oceans that made large-scale intercontinental trade in staples rather than just curiosities and luxuries possible for the first time in human history (see O’Rourke and Williamson, 1998; Findlay and O’Rourke, 2001). It also saw mass flows of capital and mass migration on an extraordinary scale (see Lewis, 1978). The second half of the twentieth century has seen a further advance in international economic integration. It is hard to argue today that there is any dimension—trade, communication, intellectual property, ideas, capital flows, the scope of entrepreneurial control—save that of mass migration along which we today are less “globalised” than our predecessors at the end of World War I.

By contrast, we do not see “convergence” everywhere. We certainly see “convergence” at some times and in some places. We see it in the sample of OECD economies after World War II (see Dowrick and Nguyen, 1989). We see it in East Asia after 1960 (see World Bank, 1994). We believe we see the rapid growth in real incomes and productivity levels, the rapid adoption and adaptation of industrial-core technologies, and the shifts in economic structure that are the hallmarks of the process of “convergence” to world leading-edge economies in China and in India today (see Sachs, ed., 2000). During the interwar period, there were signs that economies as diverse as Soviet Russia, colonial Ghana, and Argentina were closing the gap that separated them from the world's industrial core. But these examples of successful convergence have been much more the exception than the rule. Looking at the world as a whole, what “convergence” there has been has been limited in geography and in time. The rule has been, instead, "Divergence, Bigtime" (see Pritchett, 1997).

It was William Baumol and Edward Wolff (1988) who set out the idea that it would be fruitful to analyze the pattern of world economic growth in terms of membership in a “convergence club.” Their insight was that it would be fruitful to distinguish between those economies in which the forces that economists would expect to be generating convergence were strong enough to overwhelm counterpressures, and those economies in which economists’ expectations were not coming to pass. Robert Lucas (2000) showed that such a framework with the assumption of a once-and-for-all switch for an economy’s joining the “convergence club” could account in a stylized fashion for much of the global experience of the past two centuries.

In this paper we seek to push Baumol and Wolff’s insight as far as we can. We do not believe that we can put forward a convincing causal analysis of why economies join (and leave) the “convergence club.” We restrict ourselves much more to description—description of geographic patterns, and description of correlations between measures of “globalisation” and the power of forces making for “convergence.”

Our conclusions are four tentative theses about the extent of convergence, and about the relationship of convergence to globalisation:

- The first era of globalization--the knitting together of the world economy into a single unit in which staples could be profitably traded across oceans in the years before World War I--was essential in spreading the possibility of convergence beyond the narrow North Atlantic. Successful economic growth and industrial development in what Arthur Lewis (1978) called the temperate economies of European settlement was possible only because of this degree of economic integration (see O’Rourke and

Williamson, 1998).

- However, outside the charmed circle made up of the western European economies plus the temperate economies of European settlement, the first 1870-1914 era of globalisation did not bring convergence. It brought much structural change and economic integration--the rubber plant to Malaya, the tea plant to Ceylon, the coffee bean to Brazil. It brought large scale migration--workers from China to Java, from India to South Africa, from Japan to Peru. But the relative gap in income and productivity and the gap in industrial structure vis-à-vis the industrial core of the world economy continued to widen.
- During the interwar era of globalisation retreat, there were signs that the world's "convergence club" was significantly expanding. Pieces of coastal Africa, much of Latin America, and the Stalin-ruled Soviet Union appeared to be closing the relative gap that separated their economies from those of the world's industrial core.
- The post-World War II period has brought an expansion in the size but also a shift in the location of the world's "convergence club." First, the OECD economies --as they were defined in the 1980s--have effectively completed the process of convergence. Second, there is the East Asian miracle which has seen the fastest-growing economies anywhere, anytime. Third, successful-post-1980 development in China and India have put countries that together amount for 2/5 of the world's population "solidly on the escalator to modernity," in Lawrence Summers's phrase. However, these episodes of successful economic growth and convergence have been counterbalanced by many economies' loss of their membership in the world's convergence club. Consider the

stagnation of late-Communist and post-Communist economies, the disappointment of post-World War II growth in much of Latin America, especially in the southern cone, and the extreme disappointment of Africa post-colonial economic performance.

If correct, these theses seem to immediately raise three large questions. First, why the limited extent of convergence under the first globalised economy in the decades before 1914? The integrating world economy was powerful enough to move tens of millions of people across oceans and shape crop and livestock patterns in Java, central Brazil, and Ceylon as well as on the pampas and in the outback. Yet it was not strong enough to induce convergence outside the narrow charmed circle. Second, why did the area subject to convergence enlarge in the interwar period when by and large the forces of globalisation have been in retreat? Third, what were the forces behind the change in the shape of the "convergence club" after World War II? However, the narratives and analyses we provide do not provide convincing answers to these questions.

## **II. Joining and Leaving the Convergence Club**

### Economists' Expectations

Some thirty years ago geo-politicians and commentators spoke often of the countries of the globe as divided into three "worlds": First, Second, and Third. To be of the "Third World" was to try to play off the United States against the Soviet Union (and hopefully receive large amounts of aid from both). To be of the "Third World" was to stress the differences between one's own polity and economy and that of the industrial core

grouped around the North Atlantic. To be of the “Third World” was to be—relatively—poor.

Today the Communist “Second World” is gone, but the term “Third World” is still useful. It underscores the differences—the sharp economic divergence in living standards and productivity levels in the world today. To use the more common “developed” and “developing” nomenclature for groups of countries is to suggest that differences are narrowing, that countries are “converging”. However, this is not the case—at least not for most of the post-World War II period. Those economies that were relatively rich at the start of the twentieth century have by and large seen their material wealth and prosperity explode. Those nations and economies that were relatively poor have grown richer too, but for the most part much more slowly. And the relative gulf between rich and poor economies has grown steadily.

That the pattern of economic growth over the twentieth century is one of striking *divergence* is surprising to economists, for economists expect *convergence*. World trade, migration, and flows of capital should all work to take resources and consumption goods from where they are cheap to where they are dear. As they travel with increasing speed and increasing volume as transportation and communication costs fall, these commodity and factor-of-production flows should erode the differences in productivity and living standards between continents and between national economies.

Moreover, most of the edge in standards of living and productivity levels held by the industrial core is no one’s private property, but instead the common intellectual and scientific heritage of humankind. Here every poor economy has an excellent opportunity

to catch up with the rich by adopting and adapting from this open storehouse of modern machine technology. Yet economists' expectations have, throughout the past century, been disappointed whether the expectations were those of John Stuart Mill expecting the spread of democracy, literacy, and markets to develop the world, or Karl Marx expecting the British millowners' building of a network of railroads across India to backfire and have long-run consequences the millowners had never envisioned.

We can view this particular glass either as half empty or as half full. It is half empty in that we live today in the most unequal (at least in terms of the divergence in the relative lifetime income prospects of children born into different economies) world ever seen. It is half full in that most of the world has already made the transition to sustained economic growth. Most people today live in economies that, while far poorer than the leading-edge post-industrial nations of the world's economic core, have successfully climbed onto the escalator of modern economic growth.

### The Idea of the "Convergence Club"

Why have economists been disappointed in their expectation that economic forces-- international trade, international migration, international investment, and technology transfer--will gradually smooth out the enormous gaps in productivity levels, real incomes, and living standards around the world?

Back in 1988, William Baumol and Edward Wolff (1988) proposed that we begin thinking about this problem by examining the membership over time of the "convergence club," which they defined as that set of economies where the forces of technology

transfer, increased international trade and investment, and the spread of education *were* powerful enough to drive productivity levels and industrial structures to (or at least toward) those of the industrial core. Baumol and Wolff believed that examining how it is that economies enter and fall out of this "convergence club" should reveal clues to what are the particular economic, political, and institutional blockages that keep convergence the exception in the world today, and not the rule.<sup>2</sup>

Steve Dowrick and Duc-Tho Nguyen were the first to powerfully argue that the countries that belonged to the OECD--the Organisation for Economic Cooperation and Development--had converged over the course of the post-World War II period (see Dowrick and Nguyen, 1989). Convergence *could* work powerfully if circumstances and institutions were sufficiently favorable. In the case of the OECD after World War II, the set of countries that converged by and large shared a common social-democratic political setup, a common mixed-economy market-oriented economic setup, and a commitment to cutting back on protectionist barriers and to an open world economy.<sup>3</sup> But the set of OECD economies were not the only ones that belonged to the world's convergence club in the post-World War II period. Before we can begin to answer Baumol and Wolff's question and analyse the relationship of globalisation and convergence, we need to map the size of the world's "convergence club."

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<sup>2</sup> There is in this notion of a "convergence club" an implicit (and largely valid) critique of one-size-fits-all cookie-cutter growth regressions that search for one common law of motion to apply to the whole world, as is found in, for example, DeLong (1988).

<sup>3</sup> Or so DeLong and Eichengreen (1994) argued.

### Mapping the "Convergence Club"

The task, therefore, is to examine the evolution of the world's convergence club over time by taking snapshots of its membership during four different eras over the past two centuries: 1820-1870, 1870-1913, 1913-1950, and 1950-2000. Moreover, it is important to be somewhat sophisticated in how we define "convergence." When growth macroeconomists use the word "convergence," they tend to think of a reduction in the variance of the distribution of output per worker levels (or total factor productivity levels, or real wage levels) across countries, or possibly of an erosion over time of initial edges or deficits in relative productivity vis-a-vis other national economies. But for a historically-oriented economist, "convergence" means something somewhat different. It means the assimilation of countries outside of northwest Europe of the institutions, technologies, and productivity levels currently in use in northwest Europe and in the rest of the industrial core. What you are converging to is thus a moving target.

Moreover, it is as much a structural and organizational target as a target indicated by levels of GDP per worker. The World Bank reports that Saudi Arabia and the Persian Gulf Emirates certainly have levels of GDP per worker and standards of living equivalent to those of Western Europe. Yet we would not want to claim that they have "converged" to the industrial core. Before World War II there were periods of as long as a generation during which Argentinian or Australian productivity levels were falling relative to those of the industrial core, either because of declining terms of trade or because of prolonged drought (see Butlin, 1970). However, throughout such periods the Argentinian and Australian economies were building up their industrial sectors and raising their economies' educational levels. In economic structure they were thus *converging* to the industrial core, even if they were losing relative ground in terms of standards of living

and value of output per worker (see Diaz-Alejandro, 1970).

So our definition of which economies are in the convergence club over a time period is not merely: "Did GDP per capita as a proportion of the North Atlantic level rise over the time period in question?" It looks at the extent of industrial development and structural change as well.

#### The Convergence Club, 1820-1870

By 1820 the British industrial revolution was in full swing. The steam engine was nearly a century old. The automated textile mill was no longer a novelty. The long-distance railroad was on the horizon. As the pace of structural change and industrial development accelerated in Britain, its technologies began to diffuse elsewhere, to the continent of Europe and overseas to North America.

As Sidney Pollard (1981) put it, the process of diffusion:

... found no insuperable obstacles in [spreading to continental Europe].... The regions of Europe differed, however, very greatly in their preparedness.... There was... an 'inner' Europe... closest ... to the social and economic structure... in Britain. Surrounding that core... other areas... less prepared.... Moreover, this conquest did not proceed indefinitely outward.... [T]here came a line where the process stopped, sometimes for generations, and, in some cases, until today. Beyond it... only scattered outposts, too weak to affect much the surrounding

country... (see Pollard, 1981, pp. 45-46).

As time passed, the process of diffusion gathered force and the size of the "convergence club grew.

In the beginning the convergence club was very small. Between 1820 and 1870 it is, as Pollard (1981) notes, limited to Britain itself, Belgium, and the northeastern United States. Industrialization had begun to spread elsewhere, to Canada, to the rest of the United States, to the Netherlands, to Germany, to Switzerland, to what is now Austria, to what is now the Czech Republic, and to France. However, all of these economies found themselves further from Britain in industrial structure in 1870 than they had been back in 1820.<sup>4</sup>

Note that here the focus on industrial structure rather than economy-wide productivity or labor-productivity makes the biggest difference. The labor-scarce U.S. west and Canada certainly have higher real wages than Britain by the end of this period, as do labor-scarce Australia and New Zealand. The Netherlands was in all probability more prosperous in overall terms than Britain in 1820, and even in 1870 the productivity and living standard gap was relatively small.<sup>5</sup> But on an industrial-structure and an industrial-technology

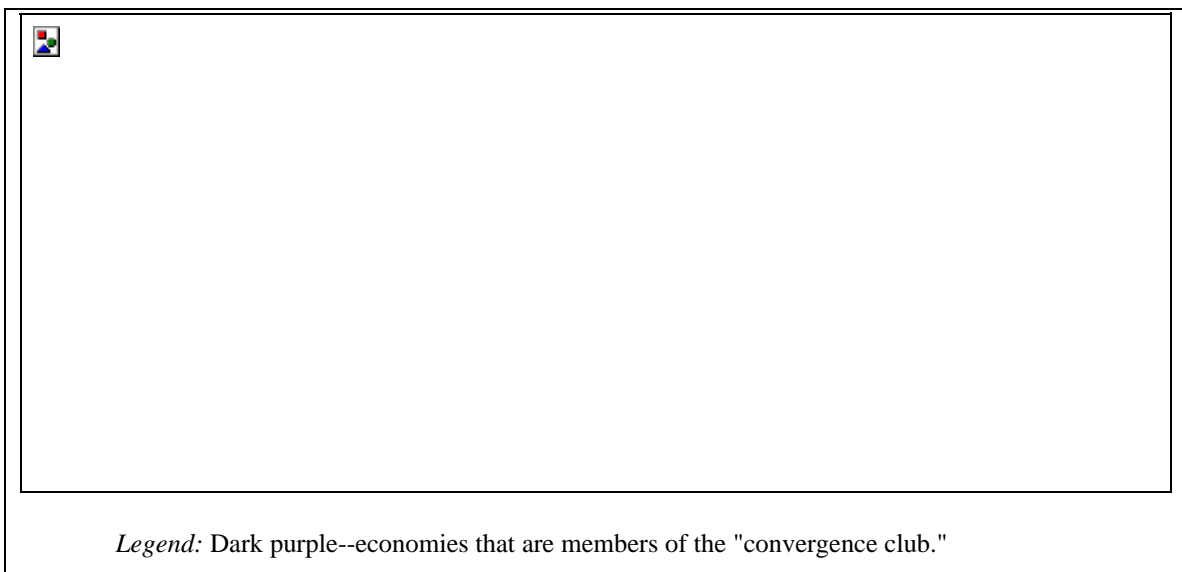
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<sup>4</sup> See Pollard (1991), Maddison (1994), Landes (1969).

<sup>5</sup> Indeed, the most parsimonious hypothesis explaining the slow industrialization of the Netherlands in the mid-nineteenth century is that Dutch workers had more productive and profitable things to do than work in the dark satanic mills and forges of the early industrial revolution; you can get coal to Amsterdam almost as

definition of convergence, the primary product-producing economies, even the richest ones like Canada, do not belong in the convergence club before 1870. They are rich primary sector-based economies. They are not industrializing economies. And the Netherlands, also, is not yet an industrializing economy: it is still a rich mercantile economy. To the extent that one takes industrialization as the key measure of “modernity” or “development” in the mid- and late-nineteenth century, the mid-nineteenth century convergence club was very small indeed.<sup>6</sup>

**Figure 1: The World's "Convergence Club" ca. 1850**




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cheaply as to Brussels, but real wages were much lower in the second than in the first, hence that is where the mills were located. See Mokyr (1976).

<sup>6</sup> It is, of course, debateable whether one should focus so exclusively on machines, factories, and manufacturing, and give the development of those sectors priority over wealth as defined by output per worker.

### The Convergence Club, 1870-1914

Between 1870 and 1914 the "convergence club" expands considerably. What Arthur Lewis called the countries of temperate European settlement--Canada, the western United States, Australia, and New Zealand, plus Argentina, Chile, Uruguay, and perhaps South Africa--clearly belong to the convergence club (see Lewis, 1978). They are rich, and are experiencing (for the most part) rapid income growth. But they are also making use of industrial technology, building up their materials processing and factor sectors, and becoming industrial economies. Australia started the period as the sheep-raising equivalent of OPEC of the late-nineteenth century, but by the beginning of World War I it was clearly well on the way to being a successfully industrializing economy. Argentina before World War I had a large and rapidly growing portion of its labor force employed in railroads and in food processing. By 1913 Buenos Aires ranked in the top twenty world cities in terms of telephones per capita.

The successful spread of the convergence club to include the economies of temperate European settlement is an achievement of the first, 1870-1914, era of globalization. The coming of the steamship and the telegraph made the transoceanic shipment of staple commodities economically feasible for the first time in human history. However, ocean transport was not so cheap as to make it economically efficient to do all materials and food processing in the industrial core of northwest Europe and the northeast United States. Buenos Aires, Melbourne, Santiago, Toronto, and San Francisco became manufacturing as well as trade and distribution centers. And the ease of transport and communication brought about by this first late nineteenth-century global economy made

the technology transfer to enable this "rich peripheral" industrialization feasible.

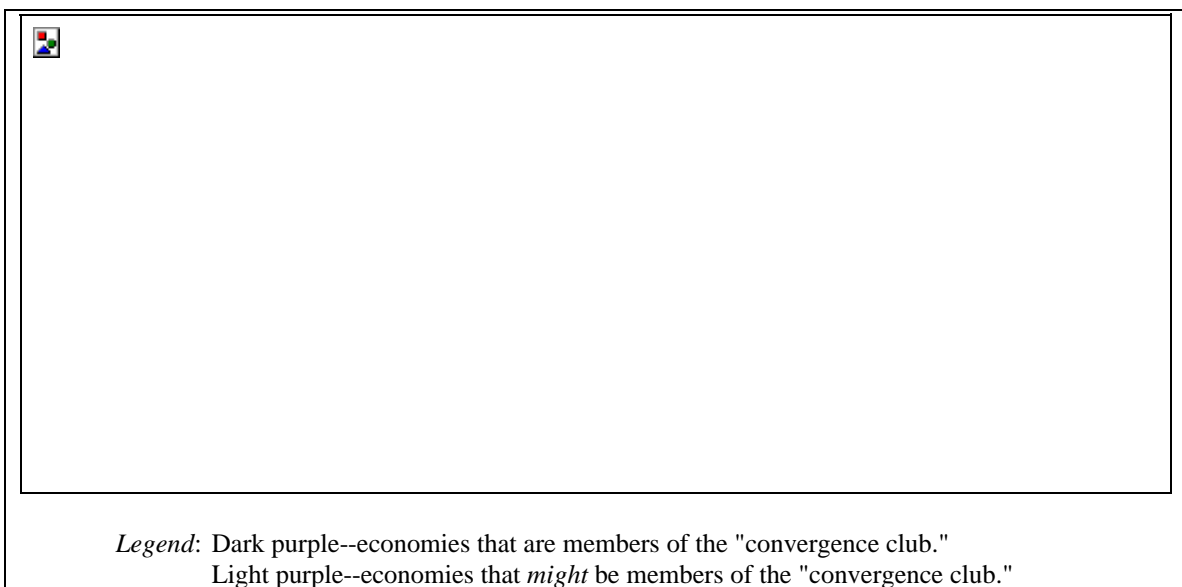
In this period also the industrial revolution, and thus the convergence club, spread to include nearly all the countries of "inner" Europe: Belgium, the Netherlands, France, Germany, Switzerland, Spain (but probably not yet Portugal), Italy (even if surely not its south), Austria, what is now Hungary, what is now the Czech Republic, Denmark, Norway, Sweden, Finland, and Ireland (see Pollard, 1981). Beyond that line, however, the convergence club did not extend, in spite of small and weak enclaves of industrialization. With one exception, the relative gap in per capita productivity and industrial structure between the industrial core and economies like Russia, Turkey, Egypt, and the rest was wider in 1914 than it had been in 1870. That one exception was Japan (see Ohkawa and Rosovsky, 1973).

The failure of the tropical primary product-producing regions to join the convergence club in the 1870-1914 period marks the limited scale of the first, 1870-1914, era of globalization. International trade, international investment, international migration, and international conquest profoundly affected economic, social, and political structures throughout the world. The British Empire brought the rubber plant to Malaysia. British investors financed the movement of indentured workers south from China to Malaysia to work the plantations to produce the rubber to satisfy demand back in the world economy's core. The British Empire brought the tea plant from China to Ceylon. British investors financed the movement of Tamils from India across the strait to work the plantations to produce the tea to satisfy demand from the British actual and would-be middle classes. But these did *not* trigger any rapid growth in real wages. They did not trigger any acceleration in productivity growth or industrialization. They did not trigger any rapid growth in factory employment, or any convergence to the world's economic core (see

Lewis, 1978).

The convergence club remained of limited size, not touching continental Asia at all, and barely touching Africa and Latin America.<sup>7</sup>

**Figure 2: The World's "Convergence Club" ca. 1900**



<sup>7</sup> W. Arthur Lewis (1978) argued that it was the particular position of China and India in the Malthusian cycle at the end of the nineteenth century that gave rise to this peculiar wage increase-less, structural change-less form of development and growth, that whatever increases in demand for labor in the tropical periphery were produced by the first era of globalization were overwhelmed by the elastic supply of potential migrant labor from China and India. But an equally valid way to look at it is not that migrant labor supply from China and India was remarkably large, but that the amount of increased trade between tropical periphery and industrial core was relatively small.

### The Convergence Club, 1914-1950

The enormous physical destruction wrought by two world wars coupled with the enormous economic destruction of the Great Depression make it difficult to discern trends between 1914 and 1950. By 1950 the gap in productivity and living standards between Japan and the United States was larger than it had been in 1914. But does this mean that Japan had fallen further behind in technology and industrial structure? Perhaps, but perhaps not: it depends whether you take the as your benchmark the industrial structure of still war-ravaged Japan in 1950, or the level and quality of the technologies being installed in the rebuilding Japan, which were much closer to world best-practice in 1950 than in 1914 and which by the 1970s would have world leading productivity levels in some industries (see Patrick and Rosovsky, 1976).

We argue, once again, for the second definition—we want to compare relative technology, industrial structure, and productivity gaps in 1914 to what they would have been in 1950 had postwar reconstruction been completed. Thus, from our perspective, Japan and its inner empire of Korea and Taiwan definitely belong in the convergence club over the extended "interwar" period from 1914 to 1950. During this interwar period the southern United States joins the convergence club. Its long economic decline relative to the industrial core comes to an end in this period (see Wright, 1978). The Soviet Union joins as well. Stalinist industrialization was a disaster for human life, social welfare, and economic efficiency. But it was a powerful motor of industrialization. Elsewhere in Europe, however, there was little expansion in the convergence club.

However, the convergence club did expand outside of Europe. In Latin America, Venezuela, Peru, and Brazil appear to have joined. Brazilian real GDP per capita appears to have more than doubled in the years 1913-1950 (see Maddison, 2001). Because of the discovery and exploitation of oil, Venezuelan GDP per capita grew more than sixfold.

In Africa, Ghana, the Ivory Coast, Kenya, Tanzania, Nigeria, and perhaps others appear to make progress (see Hopkins, 1973). French North Africa—Morocco, Algeria, and Tunisia—closed some of the relative gap between themselves and western Europe (see Dumont, 1966). Per capita income in such economies appears to grow as rapidly as in the industrial core. There are signs of if not widespread industrialization, at least widespread integration of plantation and smallholder agriculture into the world economy. Whether this is sufficient structural change to qualify for full-fledged membership in the convergence club is debatable.

**Figure 3: The World's "Convergence Club" in the Interwar Period**



*Legend:* Dark purple--economies that are members of the "convergence club"  
 Light purple--economies that *might* be members of the "convergence club"

An optimist—a John Stuart Mill, say, looking for knowledge, education, trade, and markets to bring the whole world together in a march to a liberal utopia<sup>8</sup>—might have looked at the world in 1950 and been relatively optimistic. Naziism had been defeated. Communism was a bloody and authoritarian form of economic growth, but it might well become less bloody and less authoritarian over time. And elsewhere the convergence club was clearly growing, even if it was growing less rapidly than one would wish.

#### The Convergence Club, 1950-2000

However the next period, the period between 1950 and 2000 that we have just lived through, has brought surprises. The convergence club both expanded and contracted massively, as many economies joined, but as also for the first time many economies dropped out.

For the first time ever, nations that had been in the convergence club fell out of it. In Latin America, countries like Venezuela, Peru, Argentina, Chile, and Uruguay exhibited stunning relative economic declines over the last half century. Argentinian relative income levels had declined during 1913 to 1950, as the value of primary products fell, but

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<sup>8</sup> See Mill (1848).

its industrial structure had converged toward industrial core norms. But between 1950 and 2000 the sectoral distribution of the labor force froze, and Argentinians lost a third of their relative income vis-a-vis the industrial core.

Coastal west Africa fell out of the convergence club (if it had ever belonged in the first place). Coastal east Africa fell out as well (if it too had ever belonged). South Africa did not maintain modern economic growth fast enough to close the gap with the industrial core over the second half of the twentieth century, and educational and industrial structure gaps vis-a-vis western Europe grew substantially. PPP-concept GDP per capita in South Africa was perhaps a quarter of that in the industrial core in 1950, and is less than a sixth of that in the industrial core today.<sup>9</sup>

Moreover, the countries of French North Africa fell out of the convergence club: Morocco, Tunisia, and Algeria are today further behind France in relative material productivity and industrial structure than they were in 1950. And the former Soviet Union dropped its membership in the convergence club as well. First came the stagnation that began in the mid-1970s as the ability of the centrally-planned system to deliver even its own kind of limited, resource- and capital-intensive economic growth eroded and effectively ended in the 1970s. Then came the collapse of economic activity in the 1990s that followed the end of communism.

This shrinkage of the convergence club during what was an era of expanded international trade and massive moves toward an open world economy is remarkable, and very much

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<sup>9</sup> Neighboring Botswana, however, has been one of the fastest-growing economies in the world.

counter to economists' perhaps naive expectations. In each case the driving factors may have been political. Agronomist Rene Dumont warned at the very beginning of African decolonization that the post-colonial governments were following policies that destructively taxed agriculture and enriched relatively parasitic urban elites (see Dumont, 1966). The work of Robert Bates two decades later suggested that little had changed (see Bates, 1983).

Carlos Diaz-Alejandro (1970) and Bradford DeLong and Barry Eichengreen (1993) argued that the failure of the southern cone of South America in economic development after World War II was largely a political failure. And the--largely political--failure of the Soviet Union to live up to its potential both before and after its disintegration is well known. If correct, this would suggest that all the potential for international economic contact and technology transfer cannot survive bad economic policies. It would, however, beg the question of why such bad economic policies were so likely to be adopted by so many countries in the half century after World War II.

As these economies fell out of the convergence club, other economies joined. The East Asian miracle took hold: Japan, South Korea, Taiwan, Hong Kong, Singapore, Thailand, Malaysia, after 1965 Indonesia, and after 1978 China clearly belong to the convergence club. Only the unreformed socialist governments of Burma, Cambodia, Laos, and Vietnam keep them from joining the rest of East and Southeast Asia.<sup>10</sup> In the Balkans, Yugoslavia, Romania, and Bulgaria join the convergence club: once again centrally-planned economies succeed in growth at a particular stage of early industrialization,

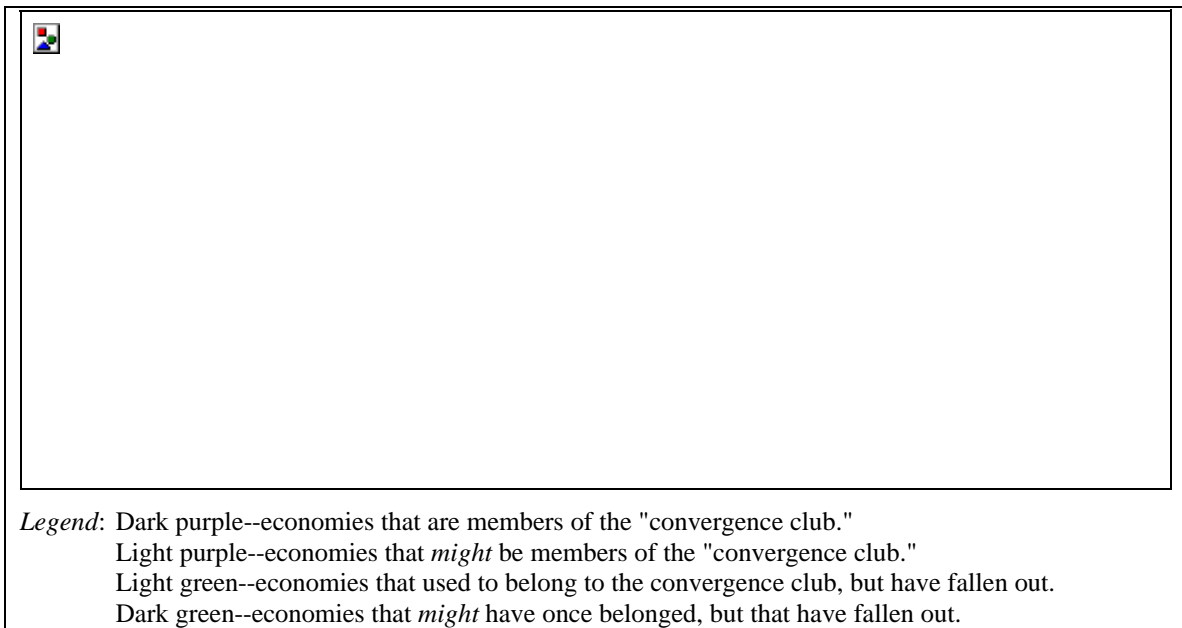
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<sup>10</sup> However, the Philippines and Papua New Guinea go their own way as well.

albeit at a large human cost. In the eastern Mediterranean Greece, Turkey, Israel, and Egypt are now in the convergence club. In Latin America Colombia and Mexico join. After 1980, India begins not only to grow economically but to narrow the gap in aggregate productivity and industrial structure (see [Sachs *et al.*, 2000]).

In the first, 1870-1914, era of globalization its implications for the size of the convergence club were clear. Globalization forces were sufficient to pull the temperate economies of European settlement into the convergence club, but insufficient to pull any other regions into the club even though they had powerful effects on economic structure.

**Figure 4: The World's "Convergence Club" in Recent Years**



In the second, 1950-2000 era of globalisation, the implications of globalisation for the

size of the convergence club are less clear. Why has it been such a friend to East Asia but not to Latin America? Why has the eastern Mediterranean done so well and the southwestern Mediterranean so badly? What explains the economic collapse of Africa relative to the high hopes of the decolonisation era and to the 1914-1950 interwar period?

### **III. Debating Convergence whilst Incomes Diverge**

#### Is "Conditional Convergence" Meaningful?

Recent debates on growth theory have contrasted the convergence predictions of the neo-classical growth models of Trevor Swan (1956) and Robert Solow (1956) with predictions of potential non-convergence from the newer models of endogenous technological progress of Paul Romer (1990) and Philippe Aghion and Peter Howitt (1998). Most of this debate has been in the context of closed economy modelling. The standard neo-classical assumption of diminishing returns to investment implies that each economy converges to its own steady state level of labour productivity. Higher rates of saving and lower rates of population growth will raise the long-run level of income, but not its growth rate. Long-run growth is simply the world's rate of technical progress.

In this framework, empirical studies of short-run growth are predicted to find conditional convergence if they control for factor accumulation. A negative partial correlation between growth and initial income is confirmation of convergence towards steady state. (In the terms of modern time series econometrics, it is evidence of cointegration between income levels and the country-specific determinants of steady state.) Even when this

negative partial correlation is observed on cross-country data, it has no implications for convergence across countries. Thus studies such as Mankiw, Romer and Weil (1992) can find strong conditional convergence, at a rate of around two or three percent per year, on post-war data covering both industrialised and un-industrialised economies.

Over recent years, the use of panel data and higher levels of econometric sophistication (or sophistry?) have produced ever-increasing estimates of the magnitude of the conditional convergence coefficient. The annual rate of global convergence since 1960 is estimated to be around ten percent both by Islam (1995) and by Caselli, Esquivel and Lefort (1996), whilst Lee, Pesaran and Smith (1998) suggest that the true figure is closer to thirty percent.<sup>11</sup> This focus on conditional convergence has tended to obscure the fact that, across the globe, income levels have actually been diverging rather than converging over the past forty years.<sup>12</sup>

Perhaps the foremost advocate of the position that there has been or is "convergence" in the world over the past fifty years and today is Harvard economist Robert Barro (1996).

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<sup>11</sup> In this last case, the use of annual time series data and dummy variables for country-specific exogenous technical progress may have resulted in the convergence coefficient capturing the average frequency of the business cycle.

<sup>12</sup> We need to qualify this statement as referring to an unweighted measure of global income dispersion. When population weights are applied, there is evidence of some decrease in global income inequality--but this depends entirely on the rapid growth of average real income in China over the past twenty and in India over the past fifteen years.

His work finds "strong support [for] the general notion of conditional convergence"--that is, that if other things are held equal then there is a strong tendency for countries to converge toward a common level of total factor productivity, a common level of labor productivity, and a common standard of living.

In Barro's view, strong and powerful forces are pushing countries together. His regressions show that, on average, a country with the same value of the other right hand-side variables closes between 2.5 and 4.5 percent of the log gap between it and the world's industrial leaders each year. This means that even a country as poor as Mozambique could - if it attained the same values for the other right hand side variables - close half the (log) gap between its level of productivity and that of the United States in between 16 and 29 years, and in such an eyeblink of historical time become as rich and productive as Thailand or Panama or Lithuania is today.

The joker in the deck, of course, is the assumption that other things--the other right hand side variables in Barro's regression--could be made equal. Barro's other right hand side variables include an index of democracy, an index of the rule-of-law, government non-investment spending as a share of GDP, life expectancy, the male secondary school attendance rate, and the fertility rate. And a moment's thought will convince anyone that these other right hand side variables could never be brought to the mean values found in the industrial core of the world economy in any country that has not already attained the productivity level and socio-economic structure found in the industrial core.

First and most important, consider the fertility rate. At extremely low levels of income per capita--levels lower than found anywhere in the world today save in exceptional

years--there is a positive Malthusian causal relationship running from income to fertility. But once one passes over this Malthusian hump, there is a strong negative causal relationship running from income to fertility. In richer countries access to birth control is easier, and birth control means that those who did not wish to have more children could exercise their choice. Life expectancies are longer in richer countries, so parents no longer needed to birth four sons to be reasonably sure that one would survive into middle age. Starting in eighteenth century France and continuing in every single country we have observed since, as the resources and educational level of the average household rises, fertility falls.

The same argument applies to life expectancy and to educational levels as well. These are things that are at least as much results of wealth and productivity as causes of it. It is not possible to consistently imagine a counterfactual world in which a poor country like Mozambique could have a secondary school enrolment rate and a life expectancy as high as those of the industrial core.

For the third group of his right hand-side variables, the "government group" made up of the rule of law index, the democratization index, and government non-investment spending as a share of GDP, Barro has more of a point. States that tax heavily and do not spend the proceeds on public investments, states too weak to enforce the rule of law or control the corruption of their functionaries, and states that rest not on the consent of the governed but on the bayonets of soldiers and the whispers of informers destroy economic growth. But here as well the cause-and-effect links run both ways. Richer countries with larger tax bases afford governments more resources that they can use to enforce the rule of law and control the corruption of their own functionaries. In richer countries the rewards from concentrating activity on the positive-sum game of production are greater

relative to the rewards of grasping for a redistribution of rents from the export trade.

For these reasons we find demonstrations of convergence "conditional" on fertility, on life expectancy, on education, and even on the structure and effectiveness of government of dubious value. A claim that convergence is a powerful and active force in the world today but is masked by other factors suggests that there is an alternative, counterfactual set of political and economic arrangements in which that convergence would come to the forefront and be clearly visible. Yet we can see no way of bringing the poor-country values of Barro's other right hand side variables to their rich-country means that does not presuppose that full economic development has already been successfully accomplished.

This argument applies even more strongly to convergence regressions like those of DeLong and Summers (1991) that include measures of investment in their list of right hand side variables. A poor country will face a high relative price of the capital equipment it needs to acquire in order to turn its savings into productive additions to its capital stock. This should come as no surprise. The world's most industrialized and prosperous economies are the most industrialized and prosperous because they have attained very high levels of manufacturing productivity: their productivity advantage in unskilled service industries is much lower than in capital- and technology-intensive manufactured goods. The higher relative price of machinery in developing countries means that poor countries get less investment--a smaller share of total investment in real GDP--out of any given effort at saving some fixed share of their incomes.

Development Traps, Conditional Convergence, and Absolute Divergence

So the co-existence of actual divergence and conditional convergence reflects the observation that some of the 'conditioning' variables in the standard convergence regressions are distributed in such a way as to promote divergence – in particular, faster population growth and lower rates of investment in poorer countries. In autarchic models, this implies the existence of a development trap or poverty trap: a population living close to subsistence is unable to mobilise the surplus required for substantial domestic investment<sup>13</sup>; they will typically face high prices for imported capital goods; they may well be caught in a prisoner's dilemma whereby each family substitutes quantity of children for quality of human capital investment (schooling) in attempting to maximise family welfare, running foul of diminishing returns to labour in the aggregate.

A related explanation for the limited range of "convergence" over the past century and a half is put forward by Richard Easterlin (1981), who attributes limited convergence to a lack of formal education throughout much of the world. As Easterlin puts it, the diffusion of modern economic growth has depended principally on the diffusion of knowledge about the productive technologies developed during and since the industrial revolution, and this knowledge cannot diffuse to populations that have not acquired the traits and motivations produced by formal schooling. Political conditions and ideological influences played the biggest role in restricting the spread of formal education before World War II. But Easterlin looks forward to a world in which formal education is universal, hence in which the blockages to "convergence" have vanished.

Perhaps the most interesting contribution to this literature over the past several decades

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<sup>13</sup> Ben-David (1997) models exactly such a development trap by introducing the notion of subsistence consumption into the neoclassical exogenous growth model.

has been that of Gregory Clark (1987), who suggests that the chief obstacle to convergence was not the inability to transfer technology to relatively poor economies, but the relative inefficiency of labor. Clark studies the state of cotton mills worldwide around 1900, and finds that the technologies of automated cotton-spinning had indeed been successfully transferred all around the world: there were cotton mills not just in Manchester and Lowell, but also in Tokyo, Shanghai, and Bombay, all using the same technology and all equipped with machinery from the same spinning-machine manufacturers in New England or in Lancashire. Yet, according to Clark, labor productivity in factories equipped with the same machines varied by a factor of ten-to-one worldwide, neatly offsetting the ten-to-one variation in real wages worldwide and so making the profitability of cotton-spinning mills approximately equal no matter where they were located.

Clark points out that given the enormous gaps in real wages, something like an equivalent gap in labor productivity was essential if competition were not to rapidly eliminate the cotton-spinning industry from large chunks of the globe. Capital costs were much the same worldwide: factories did use common sources of machines. Raw material costs varied, but not grossly worldwide. Labor costs were the overwhelming bulk of total costs. Thus unless labor productivity varied directly and proportionately with the real wage, a cotton-spinning mill in a low-wage economy would have an overwhelming cost advantage. And competition would lead to an international division of labor in which such low-wage economies dominated the worldwide industry of a good as easily and cheaply tradeable as cotton threads.

Clark (1987) has been an extremely influential and disturbing paper for the decade and a half since it was first written. But its striking results may be due to some peculiarity with

the cotton-spinning industry, rather than with the general nature of modern economic growth. Consider: in order for Clark to do his comparisons of productivity levels in one industry across the whole world, he needs to find an industry that is not heavily concentrated in one particular region or among one particular slice of the world income distribution. Thus he needs to find an industry in which it is profitable to locate in a country no matter what that country's level of real wages--in which it is profitable to locate in Manchester, Milan, or Mobile as well as Mumbai.

When will it be profitable to locate an industry in a country no matter what that country's relative level of real wages? It will be profitable if and only if labor productivity in that industry is proportional to the local real wage. Thus Clark's major conclusion--that in the cotton-spinning industry at the turn of the last century there were extraordinary variations in labor productivity that were roughly proportional to the local real wage--could have been arrived at without any of his calculations just by observing that there were cotton-spinning mills in Mumbai, and also in Manchester.

But how common are industries like the cotton-spinning industry? How much of the world's industry is of this same character in which labor productivity is proportional to the local real wage? We know that it is not the case today in toy manufacture: Mattel just closed down its last U.S. toy manufacturing plant. We know that it is not the case in steel: U.S. producers and unions continue to demand protection against steel makers in Brazil and Korea lest large chunks of their industry vanish. We know that it is not the case in microprocessor manufacture or (Bangalore aside) software design. We know that it is not the case in grain agriculture.

There are some industries in which labor productivity worldwide is roughly proportional to the local real wage. There are more industries in which it is not: either labor productivity varies less than the real wage (and the industry tends to be concentrated in at least some relatively poor countries), or labor productivity varies more than the real wage (and the industry tends to be concentrated in the richest and most technologically capable economies). We are going to have to learn lessons from many more industries than just the cotton mills before we can understand why the whole world isn't developed.

Our picture of world development is one where some economic forces push in the direction of convergence whilst other forces are divergent. Globalisation is typically presumed to reinforce the convergent trend – through the flow of capital towards capital-poor economies, through trade-induced factor price equalisation and through international knowledge spillovers. Why might globalisation have failed to produce convergence over the past fifty years?

Lucas (1990) suggests that human capital complementarity may block the capital channel. The marginal product of capital in a capital poor country may well be much higher than that in the USA, other things being equal. But typically those other things are not equal: in particular, the availability of the skilled labour required to operate and adapt a new technology. When physical and human capital are complementary, the problems of moral hazard in human capital investment explain the failure of international capital markets to invest in the capital poor economies.

Similar problems are likely to impede the international transfer of technology, as argued by Abramovitz (1986) who cites a lack of social capability as the major obstacle preventing the technologically backward from absorbing the technological developments

of the advanced economies. This hypothesis is supported by Benhabib and Spiegel (1994) who find evidence that the growth rate of total factor productivity depends on the national stock of human capital.

### Openness and Convergence

An alternative explanation for the failure of globalisation to bring about convergence comes from Sachs and Warner (1995). They have constructed an index of openness for the twenty-year period 1970-89, where the index takes the value of one for an open economy but a value of zero if the economy was closed according to at least one of the following five criteria:

1. Tariff rates averaging over 40%.
2. Non-tariff barriers covering at least 40% of imports.
3. A socialist economic system.
4. A state monopoly of major exports.
5. A black market premium of 20% or more on foreign currency.

They find evidence for the period 1970-89 of strong convergence in *per capita* GDP amongst the group of countries classified as open, but no convergence amongst the closed economies. The average growth premium for opening an economy is estimated to be a massive 2.5 percentage points on annual growth.

Sachs and Warner argue that globalisation has indeed promoted both growth and

convergence (i.e. faster growth for poorer countries) – but only to those countries that allow relatively free movement of goods and capital. In other words, those countries that have failed to catch-up have usually failed to jump on the globalisation bandwagon.

The Sachs and Warner evidence has been criticised by Rodriguez and Rodrik (1999). They find that the crucial components of the SW index are the measures of export monopoly and black market premia. These variables identify all but one of the Sub-Saharan economies in Africa plus a group of largely Latin American economies with major macroeconomic and political difficulties. R&R conclude that “The SW measure is so correlated with plausible groupings of alternative explanatory variables ... that it is risky to draw strong inferences about the effect of openness on growth ...” (p.24).

We turn in the next section to an empirical examination of the robustness of the Sachs and Warner result. We investigate whether their result holds for the most recent decades, noting the contrary finding by Kevin O'Rourke (2000) for the beginning of the last century.

#### **IV. Evidence on Openness and Convergence, 1960-98**

Descriptive statistics are given in Table 1 for real GDP *per capita* (RGDP) for 109

countries in 1960, 1980 and 1998<sup>14</sup>, using the Penn World Tables 5.6a<sup>15</sup> and World Bank estimates of real GDP growth in the 1990s. We also report real GDP per member of the workforce (RGDPW) and real GDP *per capita* as adjusted by Summers and Heston (1991) for changes in the terms of trade (RGDPTT). This terms-of-trade adjustment gives a better measure of changes in average welfare than the fixed price measure. These latter two measures are available only up until 1992.

Dispersion is measured by the variance of the logarithm. Other measures of dispersion are often used, particularly in welfare analysis; but the log variance is particularly useful in that it can be directly related to the regression analysis of growth rates. In the fifth row of Table 1 we report changes in population-weighted variances for the whole sample (a measure appropriate to analysis of inequality across individuals), but for the rest of our analysis we adopt a positivist approach to hypothesis testing and treat each country's performance over a period as a single, equal weighted observational unit.

All three measures show increasing dispersion. We have divided the sample of 109 countries into three groups, depending on whether 1960 RGDP was above or below I\$1,500 or I\$5,000 (measured in constant international prices with the I\$ normalised to the purchasing power of the US\$ in 1985). Divergence has occurred within each group,

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<sup>14</sup> To reduce the influence of asynchronous business cycles, the data labelled 1960 are actually five-year averages for the period 1960-64; similarly 1978-82 averages for 1980, 1988-92 for 1990 and 1994-98 for 1998.

<sup>15</sup> We have identified some problems with the PWT data on population and real GDP growth for 1960 and 1970 for a number of countries such as Nigeria. This should not be a problem for the study reported here because the data mistakes appear to cancel out over the period 1960-80.

except for the richest 19 countries between 1960 and 1980. But the principal cause of divergence has been the failure of the poorest to match the growth of the more developed.

**Table 1: Breakdown of s-Divergence 1960-1998**  
**Countries Ranked by 1960 Relative Real GDP Levels**

	REAL GDP per capita (1985\$)			REAL GDP per worker (1985\$)			REAL GDPpc terms of trade adjusted (1985\$)		
	1960	1980	1998	1960	1980	1990	1960	1980	1990
<b>WHOLE SAMPLE: 1960-80</b>									
MEAN	2454	4170	5544	4079	6629	6971	1631	2628	2831
Annual Growth Rate	0.025	0.010		0.027	0.005		0.027	0.007	
VAR(log)	0.815	1.004	1.347	0.955	1.047	1.156	0.815	1.015	1.209
Change in VAR(log)		+0.189	+0.343		+0.092	+0.109		+0.200	+0.194
Change in Var- population weighted		+0.097	-0.158		-0.002	-0.035		+0.084	-0.081
<b>RICH SAMPLE: y60 &gt; \$5,000 : N=19</b>									
MEAN	7117	11475	14788	17168	25588	28182	6906	11365	13127
Annual Growth Rate	0.027	0.015		0.022	0.010		0.028	0.014	
VAR(log)	0.042	0.023	0.064	0.049	0.016	0.032	0.050	0.025	0.066
Change		-0.019	+0.041		-0.033	+0.016		-0.025	+0.041
<b>MIDDLE SAMPLE: \$1,500 &lt; Y60 &lt; \$5,000 : N=35</b>									
MEAN	2434	4579	6398	6478	11393	11551	2314	4201	4410
Annual Growth Rate	0.032	0.013		0.031	0.001		0.033	0.005	
VAR(log)	0.008	0.035	0.466	0.009	0.048	0.270	0.007	0.034	0.419
Change		+0.027	+0.431		+0.039	+0.222		+0.027	+0.385
<b>POOR SAMPLE: Y60 &lt; \$1,500 : N=55</b>									
MEAN	855	1385	1808	1850	2945	3027	793	1176	1219
Annual Growth Rate	0.021	0.006		0.026	0.003		0.022	0.004	
VAR(log)	0.187	0.329	0.622	0.323	0.495	0.575	0.198	0.347	0.451

Between 1960 and 1980, the middle-income countries grew fastest, at 3.2 percent per year, followed by the rich at 2.7 percent and the poorest at 2.1 percent. Over the subsequent two decades growth rates slowed for all groups, with a meagre 0.6 percent per year for the 55 poorest economies.

**Table 2: Average Characteristics of Country Income Groups**

		<b>RICH</b>	<b>MID</b>	<b>POOR</b>	<b>SLOWEST GROWERS</b>
<b>REAL GDP PER CAPITA</b>	1960	7117	2433	855	800
<b>(I\$)</b>	1980	11475	4579	1385	978
	1990	13416	5365	1555	878
	1998	14788	6398	1808	885
<b>RGDP GROWTH RATE</b>	1960-80	0.027	0.032	0.021	0.007
<b>(annual average)</b>	1980-98	0.015	0.013	0.006	-0.007
<b>PROPORTION AFRICAN</b>		0.00	0.14	0.62	0.81
<b>PROPORTION OECD</b>		0.89	0.17	0.00	0.00
<b>PROPORTION OPEN</b>	1960-80	0.83	0.39	0.12	0.03
<b>(extended Sachs-</b>	1980-98				
<b>Warner)</b>		0.88	0.75	0.32	0.22
<b>(IMPORTS+ EXPORTS) /</b>	1960-80	0.62	0.70	0.51	0.47
<b>GDP</b>	1980-98	0.71	0.85	0.62	0.54
<b>ADJUSTED TRADE</b>	1960-80	0.01	-0.10	-0.22	-0.28
<b>SHARE</b>	1980-98	0.20	0.17	0.10	-0.02
<b>REAL INVESTMENT /GDP</b>	1960-80	0.26	0.20	0.11	0.08
<b>SHARE</b>	1980-98	0.23	0.17	0.11	0.07
<b>RELATIVE PRICE OF</b>	1960-80	1.02	1.35	2.37	2.89
<b>INVESTMENT GOODS</b>	1980-98	0.93	1.39	2.48	2.99
<b>AVERAGE YEARS OF</b>	1960-80	4.7	3.8	2.4	2.0
<b>SCHOOLING</b>	1980-98	6.2	5.2	3.6	3.1
<b>POPULATION GROWTH</b>	1960-80	0.010	0.020	0.025	0.026
<b>RATE (annual average)</b>	1980-98	0.007	0.016	0.024	0.027
<b>GROWTH OF</b>	1960-80	0.005	0.002	-0.003	-0.005
<b>WORKFORCE /</b>	1980-98				
<b>POPULATION</b>		0.005	0.005	0.002	0.000

1. The 'Rich' group is composed of 19 countries with Real GDP *per capita* 1960-64 averaging above \$5,000; the 'Poor' group comprises 55 countries with RGDP 1960-64 averaging below \$1,500. The 'Mid' group comprises the remaining 45 countries. The 'slow growers' are the 35 slowest-growing countries (1960-98) within the 'poor' group.

**Sources:**

Penn World Tables 5.6a (<http://pwt.econ.upenn.edu/home.html>) for trade share, investment share and price, and work force/population up to 1992.

World Bank World Tables for real GDP and population.

Sachs & Warner (1995) for Open (for adjustments see Table 2B)

Barro & Lee (1993) & <http://www.nber.org/data/> for schooling, taken as average years of schooling in the adult population over the first decade.

It is this falling behind of the poorest countries, in a period of increasing globalisation, that we investigate. From Table 2 we can see that the 55 poorest countries in 1960 are characterised, relative to the richer groups, by high prices of investment goods and low rates of real investment, by low levels of education, by high population growth, low values of openness on the Sachs & Warner (SW) index, low trade:GDP ratios and low growth of the working age population relative to total population. These discrepancies are exaggerated if we examine the 35 slowest growers within the poor group.

The regressions reported in Table 3 replicate some of the analysis carried out by Sachs and Warner (1995). We use the S&W distinction between open and closed economies for the period 1960-80 to construct a dummy variable equal to 1 for countries they deemed to be open for the period 1970-89. This restricts our sample to 96 countries. Since we are also examining growth over the period 1980-98, we extend the S&W classification to our later period, reclassifying countries as open if S&W report that have been open for a significant number of years since 1980: Table 3 gives the details of our classifications. This enables us to check whether the Sachs Warner results carry over to the 1990s – in particular for the 24 poor and middle-income countries that have only recently opened their economies.

**Table 3: Extension of the Sachs-Warner Classifications**

The following countries, classified as closed by Sachs and Warner (1995) for the period 1970-89, are ranked as open for the period 1980-98 based on the comments in their Table 14.

Benin:	“Open since 1990 .”
Botswana:	“Open since 1979 .”
Chile:	“Open since 1976 .”
Colombia:	“Opens in 1986”
Costa Rica:	“Opens in 1986” .
El Salvador:	“Opens in 1989” .
Gambia:	“Reform 1985 .”
Ghana:	“Open since 1985 ”.
Guatemala:	“Open since 1988.”
Guyana:	“Open since 1988 .”
Israel:	“Open since 1985 .”
Mali:	“Opens in 1988. ”
Mexico:	“Opens in 1986. ”
Morocco:	“Open since 1984.”
New Zealand:	“Opens in 1986. ”
Paraguay:	“Opens in 1989. ”
Philippines:	“Opens in 1988. ”
Sri Lanka:	“Opens in 1991. ”
Tunisia:	“Opens in 1989” .
Turkey:	“Opens in 1989. ”
Uganda:	“Opens in 1988. ”
Uruguay:	“Opens in 1990. ”

Regression 1 in Table 4 confirms the Sachs-Warner result that open economies grew substantially and significantly faster than closed economies over the period 1960-80. Our estimate of a 2.0 percentage point growth premium is only slightly lower than the S&W estimates for 1970-89. By any standards, it is a huge premium – implying that 20 years of openness lifts per capita GDP by a cumulative fifty percent.

**Table 4: Regressions Relating Convergence and Openness****A: VARIABLES AVERAGED OVER 1960-80**

	No. of obs.	Logy0 <sup>1</sup>	SW Open <sup>2</sup>	SW Open <sup>2</sup> x logy0	Invest- ment <sup>4</sup>	Pop growth	W/Pop growth	adj. R <sup>2</sup>	s.e. of estimate
1	96	-0.0014 (0.7)	<b>0.020</b> (4.9)					0.208	.017
2	96	0.0026 (1.0)	<b>0.108</b> (3.3)	<b>-1.10</b> (-2.8)				0.247	.016
3	96	-0.004 (-1.5)	<b>0.077</b> (2.1)	-0.8 (-1.8)	0.078 (2.9)	0.09 (0.4)	<b>0.68</b> (2.1)	0.347	.015

**B: VARIABLES AVERAGED OVER 1980-98**

	n.	Log y0 <sup>1</sup>	SW Open <sup>2</sup>	Trade Open <sup>3</sup> x logy0	School x logy0	Invest- ment <sup>4</sup>	Pop growth	W/Pop growth	adj. R <sup>2</sup>	s.e. of estimate	
4	96	<b>0.004</b> (2.1)	<b>0.013</b> (2.8)						0.174		
5	96	0.003 (1.3)	<b>0.010</b> (2.3)	<b>0.23</b> (4.3)					0.286		
6	96	<b>-0.008</b> (-2.6)	0.005 <sup>sw</sup> (1.2)	<b>0.17</b> (2.9)		<b>0.104</b> (2.7)	<b>-0.80</b> (-3.3)	0.43 (1.2)	0.451	0.016	
7	70	0.006 (1.8)	<b>0.014</b> (2.6)	<b>0.25</b> (3.9)	<b>0.012</b> (2.2)	<b>-0.14</b> (-2.2)			0.341	.019	
8	70	-0.007 (-1.4)	0.009 (1.8)	0.15 (1.8)	0.007 (1.1)	-0.08 (-1.0)	<b>0.118</b> (2.2)	<b>-0.70</b> (-2.1)	0.57 (1.1)	0.495	0.017

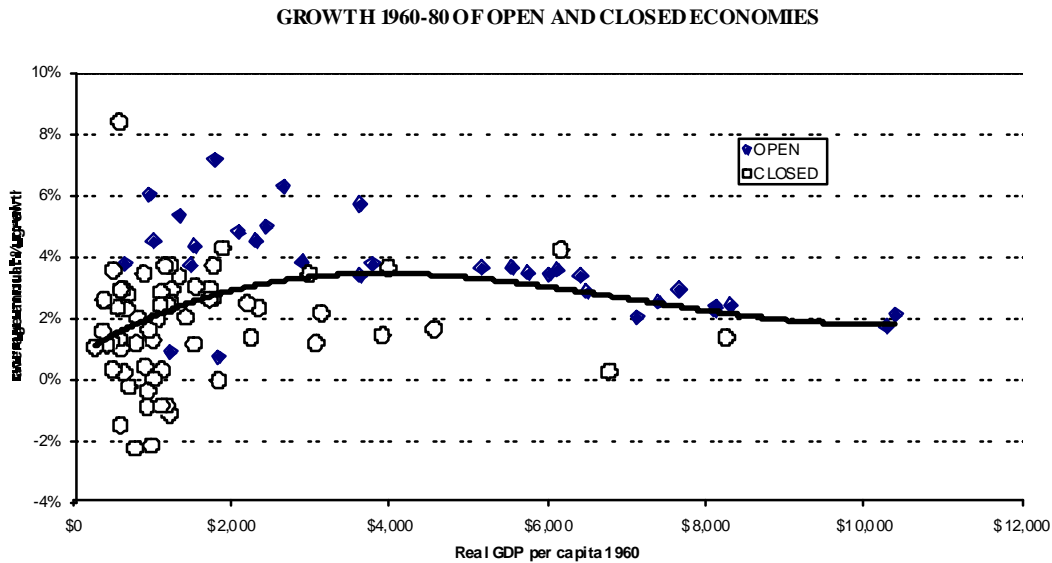
The dependent variable is the annual growth rate of real GDP per capita, measured at 1995 local prices. White's heteroscedasticity-adjusted t-statistics are reported in brackets. Coefficients that are significantly different from zero at the 95% confidence level are shown in bold.

**Notes**

1. logy0 is the natural logarithm of real GDP per capita at the beginning of the period (Penn World Tables 5.6a). When used in interactive terms, it is divided by 100.
2. 'SW Open' is the extended Sachs & Warner dummy variable for openness.
3. Trade Open is the residual from regressing log(trade share in GDP) on log(population) for the full pooled sample with 218 observations.
4. Regressions using investment are estimated using 2SLS with beginning of period investment and investment prices as instruments.

When we interact openness with initial income, regression 2 indicates that the growth premium for openness tends to be higher for poorer countries – averaging 3.4 percentage points compared with 1.0 points for rich countries. This confirms the Sachs-Warner finding that openness promoted convergence over the period 1960-80. The differences in growth rates for open and closed economies are illustrated in Figure 5, where the solid trend-line represents the predicted growth rate from a regression on a cubic polynomial in log income.

**Figure 5: Relative Growth Rates and Initial Income Levels of "Open" and "Closed" Economies, 1960-1980**



Controlling for openness, these regression show no evidence of conditional convergence, indeed the beta coefficients are positive: conditional on openness, there were additional factors slowing the growth of the poorest relative to the richest countries. Regression 3

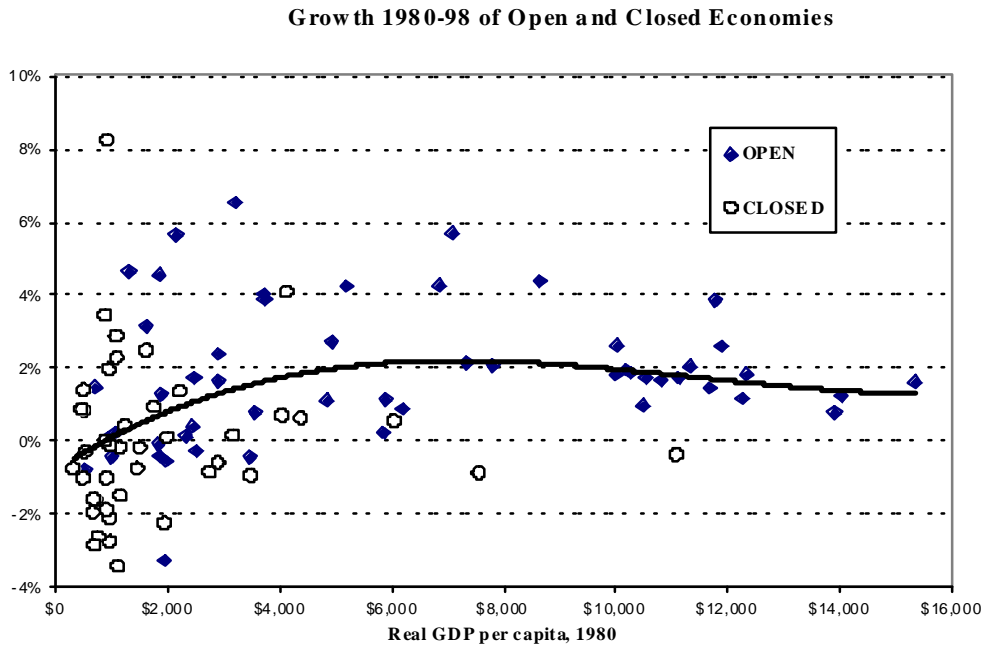
confirms that the usual suspects were involved. Multiplying the regression coefficients by the differences in sample means from Table 2 we find that investment rates and demographic differences accounted for 1.3 percentage points of slower growth for the poor countries, relative to the group of rich countries.

Taking account of factor accumulation, and of the differential effects of openness, there is now some weak evidence of conditional convergence. This should be interpreted as conditional convergence in multi-factor productivity, proceeding at a slow rate of only 0.4 percent per year, possibly resulting from international technology transfer. Since the regression is controlling for trade effects, any such technology spillovers are not operating through trade.

We have followed Benhabib and Spiegel (1994) by adding a variable measuring the level of schooling in the adult population, and also adding the product of schooling with initial income. Neither variable adds significant explanatory power.

We perform similar analysis to explain growth between 1980 and 1998 (see regressions 4–8 in Panel B of Table 4). Openness appears to deliver a smaller growth premium than that of the previous twenty years, although 1.3 percentage points is still a very substantial addition to annual growth rates. The positive sign on the interactive term, introduced in regressions 5-8, suggests that poorer countries benefit less from openness than do rich countries. This is the opposite of the Sachs-Warner finding, which we confirmed for the earlier period 1960-80. The differences in growth rates for open and closed economies are illustrated in Figure 6.

**Figure 6: Relative Growth Rates and Initial Income Levels of "Open" and "Closed" Economies, 1980-1998**



When we use the Sachs-Warner measure of openness in the interactive term, we find that neither of the variables is statistically significant. In the reported regressions 5-8, in order to reduce multicollinearity, we have used instead a direct measure of trade openness, not the Sachs-Warner variable, in the interactive term. This measure, based on the observation that countries with small populations tend to engage in more international trade than do more populous nations, consists of the residuals from an OLS regression that explains half of the observed variation in trade shares over the pooled sample:

$$\text{Log}((\text{exports} + \text{imports}) / \text{GDP}) = 6.23 - 0.25 \log (\text{population}); \quad n=218, R^2 = 0.498.$$

Regression 6 adds in control variables for investment and demography. We calculate that, for the period 1980-98, the lower rate of capital deepening in the poorer countries now explains 2.2 points of slower growth, relative to the group of rich countries. Conditional convergence is statistically significant once we control for factor accumulation. The coefficient of  $-0.008$  on the initial income term in regression 6 implies that, over the period 1980-98, the technology gap between countries was eroded at a rate approaching one percent per year.

The seventh regression reported in Table 3B includes the School and School x Log(Initial Income) variables. These were found to be insignificant for the earlier period, but add significant explanatory power in explaining growth over this later period. The sign pattern, positive on School and negative on School x Log(Initial Income), confirms the Benhabib and Spiegel finding that a high level of initial human capital does promote growth, especially when initial income is low. It also provides some support for the Abramovitz hypothesis that successful technology transfer requires a certain level of social capability – although it is puzzling that the schooling variables are not significant when the investment and demographic variables are added in regression 8.

A summary of our empirical findings runs as follows:

- The failure of the world's poorest countries to catch-up on the income levels of the richest countries over the past four decades is attributable to the poverty trap conditions of subsistence income, low savings and investment, low levels of education and high fertility.

- Openness to the world economy does appear to provide a significant boost to growth. But it does not necessarily promote convergence. A large number of the poorer countries have opened their economies since 1980. But it is precisely during this period that the benefits of openness appear to have diminished.

#### **IV. Conclusion**

Our historical narrative makes it clear that globalisation of the economy does not necessarily imply global convergence. Periods of expansion of transport and trade and flows of capital and migrants have marked the development of a club of convergent economies, but countries outside the club have fallen behind in relative terms even in eras of strong growth. Moreover, over the past two decades many countries have fallen behind not just relatively but absolutely in terms of both income levels and structural development.

The fact that the news has been very good for India and China over the past few decades has created a sharp division between the average experience of countries--where divergence continues to be the rule, and in fact to accelerate--and the average experience of people--where for the first time in centuries there are signs of *unconditional* convergence.

It is also apparent that failure to join the convergence club is not just a consequence of a country turning its back on the global economy and sheltering behind tariff barriers and

capital controls. During the high years of the great Keynesian boom after World War II, openness to the world economy does appear to have been a "magic bullet" making for convergence--and those countries that closed their economies, whether in the southern cone of Latin America or in post-independence Africa, suffered enormous penalties. But things appear to have been somewhat different in other eras. At the beginning of the twentieth century, it is hard to see openness to trade and migration as promoting convergence outside a small charmed circle--a point that was made by Lewis (1978) a generation ago. And at the end of the twentieth century, the growth benefits of opening-up appear substantially lower than in the twentieth century's third quarter.

It remains an open question whether the growth benefits of openness have really declined in recent decades, or whether an early turn to openness is correlated with other growth-promoting factors omitted from standard cross-country studies.

In either case, there is little reason to be confident that opening doors to the world economy will guarantee a place at the High Table. Poor countries remain poor, and so the purchase of investment goods from overseas that embody technology and assist in technology transfer remains expensive. Poor countries remain poor, and so finding the resources to support mass education remains difficult. Last, the world's poorest countries have still not successfully completed their demographic transitions--and the failure to have shifted to a regime of low population growth puts pressure on resources and capital accumulation that will in all likelihood continue to sharpen the jaws of the poverty trap.

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