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UNEVEN DEVELOPMENT OR CONVERGENCE ?

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Abstract

The present study finds a strong evidence of North-South divergence or uneven development: the gap in the real GDP per capita between the two regions widened in the last three decades. The evidence of uneven development is more pronounced when the real growth of the North is compared with that of Africa and Latin America. There are two factors that obscured this picture of North-South uneven development. One is the rise of OPEC in the 1970s and its subsequent fall in the 1980s. The other is the so-called East Asian Miracle, the bubble of which bursted in 1997.

1. Introduction

The conventional wisdom of Veblen(1915)-Gerschenkron (1952) 'catching-up'/convergence hypothesis is that the late-comers in industrialization tend to grow faster because learning and imitation is typically cheaper and faster than is the original discovery and testing (see also Nelson and Phelps,1966; Gomulka,1987). Veblen(1915) analysed the industrial development of Germany and England and pointed out the 'advantages of relative backwardness'. Gerschenkron(1952) updated and extended the work of Veblen to include Russia, France and Italy.

The convergence hypothesis can be traced even before the publication of the *Wealth of Nations* in 1776 by Adam Smith, to 1752, when it appears in the writings of David Hume on 'specie-flow price mechanism'. Hume(1752) argued that through the mechanism of trade, the wages of a poor country would come up to the level of the rich country leading to a convergence of their standard of living, the rich being less rich and the poor being less poor. Josiah Tucker(1774), however, criticised Hume's idea of convergence and argued that the low-wage advantage of the poor country would be more than counter-balanced by the other advantages of the rich country such as higher labour productivity, a higher endowment of skills, capital and knowledge. In Adam Smith's writings, on the other hand, the ideas of both convergence and divergence can be found (Elmslie and Milberg,1996).

An idea of divergence lies in the essence of the doctrine of uneven development launched by Baran(1957): the world is divided into rich and poor, and there is an ever-increasing gap between the two because of the fundamental inequalising process at work in the present world economic order. The idea can be traced to the writings of other radical and Marxist scholars, the dependency school, and the development economists, including Frank(1957), Prebisch (1950), Singer(1950), Myrdal(1957) and Lewis (1977). An explanation of the phenomenon of uneven development can be

found in Kaldor(1972,1985): due to the existence of dynamic scale economies, the advanced countries with an initial productivity lead would continuously diverge away from the lagging countries. Krugman(1981) formalised a similar idea and showed that, through free trade, a pioneering country will outcompete the lagging countries from a given industry under the condition of external economies.

The recent years have seen a growth in interest in the question of uneven development and convergence. This is greatly the result of the development of theoretical models of endogenous growth (see Romer, 1986; Lucas, 1988 and Rebelo, 1991). These models departed from the idea - contained in the early neoclassical growth models of Solow (1956) and Swan (1956) - of diminishing returns to factors of production. In the Solow-Swan neoclassical framework, a relatively poor country with a lower stock of capital per worker enjoys higher marginal productivity of capital and a higher rate of return to capital because of the assumption of the law of diminishing returns to reproducible capital. As a result, its rate of growth of output per capita is higher until the attainment of the steady-state level of output per capita. The process is accelerated through international capital mobility: capital moves from the low-productivity and low-return area to the high-productivity and high-return area, speeding up the process of convergence.

The convergence implication of Solow-Swan framework was questioned in the 'new' growth theory propagated by Romer(1986), Lucas(1988), Rebelo(1991) and many others through the introduction of constant returns to a broad concept of reproducible capital which includes human capital; the growth rate of per capita product is independent of the starting level of per capita product. Romer(1990) took human capital as the key input to the research sector which generates new products or ideas. So countries with greater initial stocks of human capital experience a more rapid rate of introduction of new goods and tend to grow faster.

The recent spurt of statistical debate on the question of convergence and catching-up owes much to the publication of historical time series data in

Maddison(1982) and internationally comparable data for the post-Second World War period, known as the Penn World Tables (Summers and Heston,1984,1991). Baumol(1986) made a regression analysis of the historical time series of 16 industrialised countries from 1870 to 1979 (available in Maddison,1982) and found a strong evidence of convergence among these countries: a country with a lower real GDP per worker in 1870 experienced a higher rate of growth of real GDP per worker over the period 1870-1979. This finding of Baumol(1986) was challenged by De Long(1988). Long observed:

> .... Baumol's regression uses an *ex post* sample of countries that are now rich and have successfully developed. By Maddison's choice, those nations that have not converged are excluded from the sample because of their resulting present relative poverty. Convergence is thus all but guaranteed... Only a regression run on an *ex ante* sample, a sample not of nations that have converged but of nations that seemed in 1870 likely to converge, can tell us whether growth since 1870 exhibits 'convergence'. The answer to this *ex ante* question - have those nations that a century ago appeared well placed to appropriate and utilise industrial technology converged? - is no(De Long, 1988, pp. 1138-1139).

Baumol (Baumol and Wolff,1988) accepted the validity of this criticism and using Summers-Heston(1984) series extended his analysis to include a large group of rich and poor countries. It was found that only the countries who were already rich in 1960 had been coming closer during the subsequent years. This pattern has been noted in many other studies (see Sheehey,1996). An explanation of this pattern can be found in Abramovitz (1986); he argued that the potential to realize the 'advantages of relative backwardness' depends on certain 'social capabilities' that vary positively with income.

The rejection of the 'absolute' convergence hypothesis is not taken as an evidence against the Solow-Swan neoclassical growth theory. It is argued that the neoclassical growth theory predicts 'conditional' convergence - the countries that are similar in all respects except for their initial level of output per capita are expected to converge to the same steady-state level of output

per capita. The cross-country studies of Barro(1991), Mankiw *et al.*(1992), Barro *et al*(1992,1995) and Sala-i-Martin(1996) found enough evidence of 'conditional' convergence - the countries that are similar in preferences, technologies, rates of population etc. tend to converge in terms of per capita GDP and standard of living. However, using alternative econometric methods, some studies questioned this finding of conditional convergence and showed that the pattern of cross-country growth is consistent with new growth theory and its divergence implication(Durlauf,1996).

Thus the debate has been turned into one of academic interest. It is no longer concerned with the more fundamental issue - whether a typical poor country can catch up with a rich country in the process of growth and development. Nor is it concerned with whether the global income inequality has a tendency to decline in the process of evolution of the world economy. It is basically concerned with whether Solow was right or wrong.

This paper deviates from this latest trend and examines the issue of absolute convergence and uneven development in terms of regions such as the North and the South in the Prebisch-Singer-Lewis tradition. In the next section, our findings are presented after a discussion of the data source and methodology.

2. Uneven Development: Some Evidence

In the recent convergence debate, literature starting from Baumol(1986), a cross-country regression, often nicknamed 'Barro regression', is fitted:

$$RGPCI_{t,i} = a + b.\log(PCI_{0,i}) \qquad (1)$$

where $RGPCI_{t,i}$ is the rate of growth in real income per capita of the ith country in period t and $PCI_{0,i}$ is the level of real income per capita of the ith country in the initial year.

. Most of the studies found a positive (and statistically significant) estimate of the regression coefficient,b. This is taken as an evidence of divergence, nicknamed β-divergence: at a cross-country level the higher the initial level of per capita real income of a country, the higher its rate of growth is. Finding β-divergence, however, does not necessarily provide a support for the North-South divergence or uneven development with which the present paper is concerned. Divergence obtained by fitting the Barro regression may well be due to the divergence among the individual countries in the South (as observed in Sarkar,1999) and/or in the North.

An alternative procedure of measuring divergence (called sigma divergence) is to calculate the coefficient of variation of real income per capita of the whole sample in each year and examine its trend behaviour. There is some evidence of divergence in this measure too (See Sala-i-Martin,1996). But this measure also suffers from the same problem of intra-South and/or intra-North sigma divergence.

To address the question of North-South divergence or uneven development, the intra-regional divergence should be netted out by aggregation. This is done here. Our source of data is Penn World Tables(PWT) available through the World Wide Web. The PWT displays a set of national accounts time series data covering a large number of countries. 'Its unique feature is that its expenditure entries are denominated in a common set of prices in a common currency so that *real* international quantity comparison can be made both between countries and over time' (Summers and Heston,1991, p.327). Since our objective is to make an intertemporal international comparison of standard of living the PWT data are the most useful among the alternative data sets available so far.

The PWT publishes a number of series on real GDP per capita at constant dollar. For measuring real income per capita we have used the series called RGDPT, Real GDP per capita in constant dollar adjusted for changes in the terms of trade. The series uses 1985 international prices for aggregating domestic absorption and current prices for exports and imports to allow for

changes in the terms of trade to influence real income. The RGDPT data are collected for a sample of all the 120 countries for which the data are available over a reasonably long period starting from 1960 till 1985-92. We have excluded ex-socialist countries of East Europe and China on the grounds that North-South divide is meant for the so-called market economy countries [and also because comparable reliable data for these countries are not available].

Out of the 120 countries, 27 belong to the UN 'Developed Market Economy' (we shall call it 'North') and the rest 93 countries belong to 'Developing Market Economy'(we shall call it 'South') - the categories often used in the UN data(all the countries are listed in notes 3 to 6, Table 1 below). The subsample, the North, includes almost all the members of the club of rich, OECD(Turkey is a member of the OECD club but in our study it is included in the South).

The South, however, is not a homogeneous group. The post-Second World War period is marked by the rise and fall of OPEC. There is also the phenomenon of East Asian miracle. All these call for a division of the South into some major sub-groups. Following UNCTAD (1994), the 93 countries of the South are divided into three sub-groups: 'Major Manufacture Exporters of the South' or MMES (9 countries viz. Brazil, Mexico, Turkey, South Korea, Hong Kong, Singapore, Taiwan, Malaysia, Thailand), 'Major Petroleum Exporters of the South' or MPES (12 countries viz. Algeria, Angola, Congo, Ecuador, Gabon, Indonesia, Iran, Iraq, Nigeria, Saudi Arabia, Trinidad and Tobago and Venezuela) and 'Other Countries of the South' or OCS (72 countries). The OCS group is further divided into three continents, Africa(41 countries), Latin America and Caribbean, LAC(20 countries), Asia(9 countries); the remaining two belong to Oceania.

For deriving the average real income per capita of each group, the RGDPT figure of each country is multiplied by its population figure (also available in PWT) to get its total real income, TRGDPT in a particular year. The group total of TRGDPT is divided by the group total population and this gives the

average per capita real income of each group. The same procedure is followed to get the average real income per capita of the North (27 countries).

After calculating the average RGDPT of each group of the South, its trend behaviour is studied in relation to that of the North. For this, a time trend is fitted to the log-difference between the average RGDPTs of the North and each sub-group of the South:

$$dlns_k = c + d.t \qquad (2)$$

where t is the time variable, $dlns_k$ = log (average RGDPT of the North) - log (average RGDPT of the kth sub-group of the South), c and d are the parameters to be estimated (k = MMES, MPES, OCS etc.)

The Equation (3) is fitted to the whole period, 1960-1992 as well as to the sub-periods, the 1960s, the 1970s and the 1980s in order to compare the overall behaviour with that over the decades. The estimates are presented in Table 1.

The gap in RGDPT between the North and the MMES widened significantly in the 1960s and the 1980s; but the higher relative growth of the MMES in the 1970s dominated the scene so that they experienced a weak tendency towards catching up (see Table 1, panel IA).

The similar is the experience of the MPES. Their real income gap with the North widened in the 1960s and the 1980s. But due to their better performance in the 1970s, the overall picture for the whole period is neither convergence nor divergence(Table 1, panel IB).

As for the gap in RGDPT between the North and the OCS, it widened significantly in all the three decades and so, on the whole, the picture is one of strong divergence for the whole period,1960-1992 (Table 1, panel IC).

Taking all the countries of the South covered in the sample, the picture is again one of strong divergence in the 1960s and the 1980s but due to the catching-up

experience in the 1970s, the picture of divergence in the whole period is obscure (Table 1, panel III). The catching-up experience in the 1970s does not owe fully to the rise of OPEC in the 1970s. Rather the catching-up experience of the manufacture exporters (MMES) in the 1970s was more powerful force. So, if the 9 MMES countries are excluded and the 12 MPES countries are included, the catching-up in the 1970s is barely significant and over the whole period, the South (excluding MMES) experiences a strong divergence(Table 1, panel II).

To examine the continental difference in experience, the regression equation (2) is fitted to the OCS group divided into Africa, Latin America (including Caribbean) and Asia. It is observed that the continents, Africa and Latin America experienced divergence in all the three decades and so far the whole period,1960-1992. But for the 9 countries of Asia (combined together) the evidence of divergence is strong only in the 1960s, followed by a very weak evidence of divergence (if at all) in the 1970s and a significant evidence of catching up in the 1980s. So the overall picture is one of weak divergence (the regression coefficient, d, is significant at 10 per cent level).

To identify the countries of Asia experiencing the catching-up in the 1980s, the equation (2) is fitted to all the 9 Asian countries separately for all the three decades. The same country-wise disaggregated analysis is made for the manufacture exporters (MMES group) to get a better view of East Asian Miracle. Skipping the details, the estimates of the regression coefficients(d) are presented in Table 2.

The estimates show that highly populated countries in South Asia such as India, Pakistan, Bangladesh and Sri Lanka did well in the 1980s. On the contrary, Syria, Jordan and Philippines did well in the 1970s and failed to pick up their growth in the 1980s. This explains the performance of the OCS-Asia.

Among the manufacture exporters, Brazil, Mexico and Malaysia did well only in the 1970s and cut a very sorry figure in the other two decades, particularly

in the 1980s. In fact, Brazil experienced stagnation while Mexico experienced negative real growth in the 1980s. Both are in the HIC(Highly Indebted Country)-list of the World Bank and faced the impact of the debt crisis in the 1980s. Turkey (a member of OECD) showed some tendency towards catching up in the 1970s and 1980s. The Gang of Four (South Korea, Taiwan, Singapore and Hong Kong) and Thailand experienced a more or less uniform better performance. But the performance of the former group (with high population) dominated the scene. Hence the MMES group showed the tendency to catch up only in the 1970s.

To sum up, the present study finds a strong evidence of North-South divergence or uneven development: the gap in the real GDP per capita between the two regions widened in the last three decades. The evidence of uneven development is more pronounced when the real growth of the North is compared with that of Africa and Latin America. There are two factors that obscured this picture of North-South uneven development. One is the rise of OPEC in the 1970s and its subsequent fall in the 1980s. The other is the so-called East Asian Miracle, the bubble of which bursted in 1997.

Table 1

Trend Behaviour of North-South Gap in Real GDP Per Capita, 1960-1992

Period	-: Estimates[1]:-					
	c (t-ratio)	d (t-ratio)	R bar sq.	F-statistic	D-W statistic	Procedure[2]
1A. *North[3] vis-a-vis Major Manufacture Exporters of the South(MMES)[4]*						
1960-1992	1.33 (18.99)	-0.0068 (-2.00)	0.98	347.02	1.72	AR(2)
1960-1969	1.32 (93.88)	0.0074 (3.23)	0.85	18.58	2.25	AR(2)
1970-1979	1.66 (37.54)	-0.03 (-10.80)	0.97	94.41	2.14	AR(2)
1980-1989	0.92 (12.01)	0.0062 (2.11)	0.60	7.66	1.50	AR(1)

Table 1(contd.)

IB. *North[3] vis-a-vis Major Petroleum Exporters of the South(MPES)[5]*

1960-1992	1.74	0.0012	0.90	102.20	2.18	AR(2)
	(11.57)	(0.17)				
1960-1969	1.76	0.022	0.92	100.74	1.25	OLS
	(131.01)	(10.04)				
1970-1979	2.35	-0.04	0.75	28.63	0.88	OLS
	(17.59)	(-5.35)				
1980-1989	0.41	0.049	0.92	107.54	1.01	OLS
	(3.37)	(10.37)				

IC. *North[3] vis-a-vis Other Countries of the South(OCS)[6]*

1960-1992	1.97	0.0119	0.94	244.42	1.65	AR(1)
	(36.42)	(4.75)				
1960-1969	1.88	0.0301	0.91	87.84	1.28	OLS
	(93.85)	(9.37)				
1970-1979	2.09	0.0087	0.38	6.52	1.10	OLS
	(38.72)	(2.55)				
1980-1989	2.07	0.0072	0.79	34.22	1.14	OLS
	(65.90)	(5.85)				

Table 1 (contd.)

IC(i). *North[3] vis-a-vis AFRICA(of OCS)*

1960-1992	2.26	0.0093	0.95	293.56	1.74	AR(1)
	(55.79)	(4.91)				
1960-1969	2.19	0.02	0.97	254.46	1.04	OLS
	(278.71)	(15.95)				
1970-1979	2.34	0.0070	0.51	10.35	1.45	OLS
	(67.95)	(3.22)				
1980-1989	2.22	0.012	0.79	35.83	1.76	OLS
	(43.16)	(5.99)				

IC(ii) *North[3] vis-a-vis LATIN AMERICA incl. Caribbean Countries(of OCS)*

1960-1992	0.88	0.002	0.96	439.39	1.75	AR(1)
	(13.2)	(6.63)				
1960-1969	0.92	0.019	0.93	114.2	2.05	OLS
	(278.71)	(15.95)				
1970-1979	0.98	0.01	0.73	24.93	2.53	OLS
	(67.95)	(3.22)				
1980-1989	0.46	0.034	0.93	125.77	1.21	OLS
	(5.98)	(11.21)				

Table 1 (contd.)

IC(iii) *North[3] vis-a-vis ASIA(of OCS)*

1960-1992	2.18 (20.76)	0.0086 (1.86)	0.86	96.96	1.51	AR(1)
1960-1969	2.03 (56.71)	0.038 (6.64)	0.83	44.15	1.27	OLS
1970-1979	2.35 (27.7)	0.0072 (1.34)	0.18	1.80	0.89	OLS
1980-1989	2.52 (55.16)	-0.0046 (-2.57)	0.38	6.59	1.37	OLS

II. *North[3] vis-a-vis All Countries of the South excluding MMES*

1960-1992	1.92 (37.30)	0.0089 (3.69)	0.88	120.20	1.47	AR(1)
1960-1969	1.85 (119.30)	0.029 (11.30)	0.95	56.19	2.29	AR(2)
1970-1979	2.19 (39.31)	-0.0066 (-1.86)	0.21	3.45	1.34	OLS
1980-1989	1. 62 (38.51)	0.0192 (11.67)	0.94	136.26	1.45	OLS

Table 1 (contd.)

III. *North*[3] *vis-a-vis All Countries of the South*

1960-1992	1.81 (35.84)	0.0033 (1.35)	0.79	40.24	1.81	AR(2)
1960-1969	1.75 (129.34)	0.022 (10.13)	0.92	102.56	1.19	OLS
1970-1979	2.08 (44.07)	-0.0139 (-4.63)	0.69	21.47	1.22	OLS
1980-1989	1.48 (42.98)	0.0144 (10.75)	0.93	115.61	1.53	OLS

1. The estimates are obtained by fitting the following regression:
   $d\ln s_k = c + d.t$
   where t is the time variable, $d\ln s_k$ = log(average RGDPT of the North) - log(average RGDPT of the kth sub-group of the South), c and d are the parameters to be estimated.
2. OLS = Ordinary Least Squares technique; AR(1) and AR(2) are the 1st and 2nd order autoregressive processes fitted through the Maximum Likelihood (ML) procedure (appropriate model is chosen through the log-likelihood ratio tests).
3. North: Austria, Belgium, Cyprus, Denmark, Finland, France, (West) Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, UK, Australia, New Zealand, South Africa, Canada, USA, Israil and Japan.
4. Major Manufacture Exporters: Brazil, Mexico, Hong Kong, Malaysia, Korea(South), Singapore, Taiwan, Thailand and Turkey.
5. Major Petroleum Exporters: Algeria, Angola, Congo, Ecuador, Gabon, Indonesia, Iran, Iraq, Nigeria, Saudi Arabia, Trinidad & Tobago and Venezuela.
6. Other Countries of the South (72 countries): Egypt, Morocco, Tunisia, Benin, Botswana, Burundi, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Ivory Coast, Ethiopia, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Reunion, Rwanda, Senegal, Seychelles, Somalia, Swaziland, Togo, Uganda, Tanzania, Zaire, Zambia, Zimbabwe(41 countries from Africa); Argentina, Bolivia, Chile, Columbia, Guyana, Paraguay, Peru, Surinam, Uruguay, Barbados, Costa Rica, Dominican Republic, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Nicaragua, Panama, Puerto Rico (20 countries from the Latin America and Caribbean,LAC); Jordan, Syria, Bangladesh, India, Mynamar, Nepal, Pakistan, Philippines, Sri Lanka (9 countries from Asia), Fiji and Papua New Guinea (2 countries from Oceania) .

Table 2

Trend Behaviour of the Gap in Real Income Per Capita (RGDPT) between the North and Selected Countries of the South

Countries	-: Regression Coefficients(d)[1]:-			
	1960-69	1970-79	1980-89	1960-92
Asia(of the OCS Group)				
Bangladesh	0.014	0.024	-0.002[x]	0.013
India	0.052	0.011	-0.014	0.009[x]
Jordan	-0.001[x]	-0.055	0.032	-0.009[x]
Myanmar	0.017[x]	0.004[x]	0.021[x]	0.006[x]
Nepal	0.036	-0.029	0.01	0.007[x]
Pakistan	-0.009[x]	0.015[x]	-0.003[x]	0.003[x]
Philippines	0.019	-0.011	0.043	0.012
Sri Lanka	0.044	-0.008[x]	-0.003[x]	0.008[x]
Syria	0.005[x]	-0.054	0.047[x]	-0.01[x]

Table 2(contd.)

Countries	-: Regression Coefficients(d)[1]: -			
	1960-69	1970-79	1980-89	1960-92
Major Manufacture Exporters(MMES)				
Brazil	0.024	-0.038	0.0172	-0.001[x]
Mexico	0.003[x]	-0.014	0.047	0.0001[x]
Hong Kong	-0.033	-0.042	-0.032	-0.039
Korea	-0.015	-0.057	-0.057	-0.044
Malaysia	0.02	-0.036	0.019	-0.018
Singapore	-0.044	-0.006	-0.08	-0.018
Taiwan	-0.019	-0.046	0.043	-0.036
Thailand	-0.008	-0.018	-0.016	-0.017
Turkey	0.007	-0.018	-0.003	-0.001

1 The estimates of d are obtained by fitting the following regression:

$$d\ln s_k = c + d.t$$

where t is the time variable, $d\ln s_k$ = log (average RGDPT of the North) - log (average RGDPT of the kth country of the South), c and d are the parameters (k = countries studied here).

x Significant at 10 per cent level. All others are significant at 5 per cent level or less.

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