The pace of poverty reduction across the globe: an exploratory analysis

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Abstract

Purpose – This is an account-taking paper on the status of global poverty and its reduction. The purpose of this paper is to examine why some countries reduce poverty more quickly than others.

Design/methodology/approach – The data on the population living below \$1 a day during 2000 and 2002 reported in the World Development Indicators (WDI) 2004 have been used to identify the status and determinants of poverty across countries. Next, using the national data on poverty level with respect to countries having a \$1 poverty level of more than 3 percent as reported in WDI-2004, the rate of change in the poverty level was calculated. In both cases, the explained and the explanatory variables used in the multiple regression frameworks were selected based on theory and other empirical findings.

Findings – The results indicate that countries with sustainable agricultural growth, foreign capital flows, and better infrastructure tend to achieve a faster reduction in poverty.

Research limitations/implications – In a cross-country empirical analysis, it is difficult to obtain consistent and uniform infrastructure indices. The proxies used in this paper could be improved.

Practical implications – The practical implications of policy formulations are to strengthen economic activities such as labour-intensive export promotion, emphasis on agriculture productivity, improved communication and infrastructure, besides effectively implementing policy initiatives such as population control, reduced dependency on aids and reducing malnutrition to achieve a lower incidence of health expenditure.

Originality/value – This paper identifies the common economic characteristics that prevail across the countries with extreme poverty by developing a statistically consistent model from a pool of explanatory variables selected from earlier cross-country poverty studies.

Keywords Poverty, Cross-cultural studies, International investments, Agriculture, World economy

Paper type Research paper

1. Introduction

The United Nations adopted the millennium declaration by announcing the Millennium Development Goals (MDGs) in September 2000 in order to provide a decent livelihood by measurable standards to millions of poor people around the world.

JEL classification – E10, I30

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Of these, the eradication of extreme poverty is the predominant goal, as poverty is the root cause of most of the other social problems covered in the MDGs.

Generally, there are two kinds of analyses presented in the literature on the poverty debate. One is concerned with the definitions, measurements, and levels of poverty across countries and the other with the explanations of why some countries are able to reduce poverty faster than others. The latter aspect is more relevant and important for policy formulations, particularly in developing countries. The \$1 benchmark used by the World Bank is assumed to represent extreme poverty. However, the World Bank survey data on this are not available uniformly on a continuous time series basis. Besides, several countries have adopted their own level of poverty measurement and conduct their own surveys periodically to assess the progress in their efforts to reduce poverty. While using their own measures of poverty, some prefer to move the level of base income, while others adjust the base by the consumer price index.

Whatever approaches one country prefers to adopt, quicker reduction in poverty is a common goal for all countries participating in the poverty elimination program. In this context, it is rational to assume that a country interested in reducing poverty seriously will not allow the level of base used to measure poverty to fall below the previous level, and, therefore, what can be learnt from those countries reporting a faster pace in reducing poverty is vital for other developing countries, which are not able to increase the pace of poverty reduction. If the rates of poverty reduction across countries are not more or less uniform, then inter-country and inter-regional inequalities are aggravated, which can be the source of future social and political instability (Mitra *et al.*, 1998).

The structure of this paper is as follows. In the section that follows, data used in this study are briefly described. In Section 3, an attempt is made to examine the status of extreme poverty using data for extremely poverty-ridden countries, which is followed by an overall analysis of the characteristics of such countries. In Section 4, the pace of poverty reduction across countries is examined. The final section discusses the overall conclusions of this paper.

2. Data description

For the period 1998 to 2002, the World Bank's \$1 poverty survey data are available for 70 countries. The population living below \$1 a day and the population living below \$2 a day are the percentages of the population living on less than \$1.08 a day and \$2.15 a day at 1993 international prices, which are used for the analysis in this paper. As a result of revisions in purchasing power parity (PPP) exchange rates, poverty rates cannot be compared with poverty rates reported in previous surveys for individual countries. Of the 70 countries, 23 countries had less than 2 percent of their population living in extreme poverty, while four countries had less than 3 percent. For the present analysis, it is assumed that countries in which more than 3 percent of the population are living below the \$1 poverty line are extremely poor countries. Thus, the maximum available sample for the analysis is 43 countries.

All the data have been taken from the World Development Indicators (WDI) CDROM and the WDI 2004 book. Appendix 1 lists the countries included in the different sets of analyses, while Appendices 2 and 3 list the variable descriptions for the specific analyses of this paper.

3. Cross-country status of extreme poverty

An attempt is made to identify the common economic characteristics that prevail across the countries with extreme poverty. This is done by developing a statistically consistent model from a pool of potential explanatory variables selected from earlier cross-country poverty studies. Identification has been done using the data on the population living below \$1 a day for 37 countries during 2000 and 2002 reported in the WDI-2004. Of these, 15 countries have less than 3 percent of the population living on \$1 per day. Therefore, we analyse these countries in two sets, one with all 37 countries and another with only 22 countries. In both cases, the explained and the explanatory variables are average values during the three-year period of 2000 to 2002. The selection of three years' data are motivated by the fact that within three years there is less likelihood of dramatic changes in economic structure and the level of poverty, particularly in countries with extreme poverty.

Table I shows the results of the OLS estimations of the identification of the characteristics of the extreme poverty-stricken countries using data for 22 (LM-1) and 37 (LM-2) countries, respectively. At the outset, it must be made clear that the explanatory variables in this regression may not necessarily cause poverty reduction. They only explain the variations in the levels of poverty across the sampled countries.

The results in Table I indicate that the characteristics of countries with less than 3 percent of the population under the \$1 a day poverty line do not differ much from those of countries with more than 3 percent of population living under the \$1 a day benchmark. The countries with lower poverty incidences among the extreme

Dependent variable Regressor	LM-1 PVTY1DLR 22-countries	LM-2 PVTY1DLR 37-countries
INPT	20.1971 (4.2561)*	18.0498 (7.1445)**
YPCPP	-0.0013 (0.0007)***	-0.0014 (0.0009)
POPDEN	0.0167 (0.0037)*	0.0179 (0.0080)**
POPMN	0.0071 (0.0024)*	0.0095 (0.0052)***
AIDPC	0.0871 (0.0294)*	0.0567 (0.0516)
TRDGZ	0.3869 (0.0983)*	0.4246 (0.1620)*
EXGSZ	-0.7507 (0.1858)*	-0.8716 (0.3050)*
HLTHZ	1.8576 (0.6375)*	1.1585 (0.5857)***
CRLYLD	-0.0021 (0.0006)*	-0.0013 (0.0006)**
MOBILE	-0.0490 (0.0204)**	-0.0187 (0.0169)
R ²	0.959	0.71884
R ²	0.928	0.625
F-stat. F (9, 12)	31.183 [0.000]	7.670 [0.000]
DW-statistic	1.93	1.722
Standard error of regression	3.217	7.275
Serial correlation CHSQ(1)	0.0427 [0.836]	0.1257 [0.723]
Functional form CHSQ(1)	0.8521 [0.356]	15.577 [0.00]
Normality CHSQ(2)	0.8730 [0.646]	2.8109 [0.245]
Heteroscedasticity CHSQ(1)	0.4420 [0.506]	0.8279 [0.363]

Notes: Significant at: *1, **5 and ***10 percent levels; number of observations equals number of countries; standard errors are given in round parentheses and *p*-values are given in square parentheses

Table I.
OLS estimates of
cross-section equations
identifying the
characteristics of the
extreme poverty-ridden
countries

poverty-stricken countries are likely to have higher per capita income measured in a constant purchasing power basis, which is as expected. Though controversial, it is widely accepted that poverty reduction is best addressed by sustained economic growth. Bhagwati (1988) argued that the growth-oriented reform strategy is an activist strategy for impacting on poverty. Dollar and Kraay (2000) have also argued that the incomes of the poorest quintile rise in line with overall economic growth, lending credence to the well-known saying "A rising tide lifts all boats." However, as Sen (1992) has emphasised, poverty may not be adequately reflected in income or consumption-based measures. Areas with a large concentration of poor are also those with low levels of income, low-nutritional levels, low-literacy rates, low-life expectancy and high rates of infant mortality. They also have low standards of physical and social infrastructure, particularly in rural areas, and low levels of public expenditure on them. Thus, poverty is a multi-dimensional problem and it needs to be explained by not only income measures, but also non-income measures. Accordingly, in this paper we have considered non-income explanatory variables such as the age dependency ratio, physical infrastructure and financial infrastructure. Nevertheless, drawing on Anand and Ravallion (1993) and Bidani and Ravallion (1995), it may be argued that progress in reducing income poverty is crucial to reduce most non-income dimensions of poverty. Therefore, we have used the percentage of people living below the \$1 a day threshold level of poverty as the target to identify poverty.

Higher population density and larger population appear to be one of the negative characteristics of the extreme poverty-stricken countries. The impact of per capita aid on the level of poverty in these countries needs attention. Though controversial, per capita foreign aid does not appear to be reducing poverty in the sampled countries, which seems to be a special characteristic of the countries with populations living below the \$1 a day threshold level of poverty. Theoretically, it is argued that foreign aid has the potential to reduce poverty by way of facilitating the production of goods needed by the poor and helping the poor to earn more income. However, in reality, aid not directed specifically at poverty reduction has an insignificant impact on poverty reduction. Further, it may be the case that foreign aid aimed at poverty may not be sufficient to reduce poverty levels. For example, in Ethiopia and other African countries, large amounts of aid have at most served to avert catastrophes, but have not reduced overall poverty. This is partly due to inefficient administration and designing development projects in using the aid by poor developing countries, and most importantly due to the insufficient funds given as aid by the developed countries. In the early 1990s, donors pledged to spend 0.7 percent of their GNP on aid. However, in reality, they have cut their aid budgets to 0.22 percent of GNP. Per capita aid to sub-Saharan Africa, the region that is furthest off track for the 2015 goals, fell from \$34 to \$20 in the second half of the 1990s (Oxfam, 2004). One positive sign for the future is that foreign aid is being increasingly linked to anti-poverty programs. For example, in 1970 the World Bank spent only 5 percent of its budget on poverty relief, but it now devotes many times that level to poverty projects.

Increases in the exports of labour intensive goods and services significantly reduce poverty, which highlights the importance of trade liberalization not only in developing countries, but also in developed countries. However, increases in trade appear to increase poverty in extreme poverty-ridden countries, which may be due to the

increased trade deficit these countries have been facing during the period of analysis. Increases in health expenditure do not seem to have any influence on poverty, as the coefficients are not statistically significant. The "poverty of opportunity" of access to basic health services is now regarded as important as is the lack of income in defining the extent of poverty and hardship in a society. Nevertheless, often the conditions and circumstances giving rise to the poverty of opportunity are the causes of income poverty. Thus, the health expenditure may be influencing poverty through the per capita income measure. Improvements in agricultural, particularly cereals yields, tend to reduce poverty. As the majority of the population in these extreme poverty-ridden countries live in rural areas, increasing agricultural productivity is crucial towards reducing poverty. Increases in the use of mobile phones, which is proxied here to represent infrastructure, also significantly reduce poverty.

Next, we use the national data on poverty level with respect to 30 countries for the two surveys as reported in WDI-2004 to calculate the rate of change in the poverty level. The selection of 30 countries is based on the consideration that the sample should have countries with a \$1 poverty level of more than 3 percent. Countries with less than 3 percent extreme poverty are assumed to have almost eradicated poverty. It is also possible that such countries may not be comparable in the pace of poverty reduction with countries having larger populations under extreme poverty, and additionally their base level poverty could be relatively higher. We then develop a model to explain the differential pace of poverty reduction.

4. Explaining the pace of poverty reduction

Why a particular country is able to reduce poverty faster than another is an important question posed at the beginning of this paper. The results of a cross-section of the 30 countries listed in Table II reveal interesting drivers of poverty eradication. Table III presents the three sets of regression results for the change in poverty models (CM-1-CM-3). The dependent variable is the annual change in the national poverty level between two consecutive surveys. In most cases, both surveys were done during the 1990s. The second surveys in all cases were done during the second half of the 1990s. Therefore, the values of the selected explanatory variables are taken as the period averages during 1991 and 2001. As noted earlier, all the sample countries have more than 3 percent of extreme poverty as measured by the \$1 basis. The variable description is provided in Appendix 3.

In order to capture regional effects, dummy variables are created for six regions as indicated in Appendix 1. Only the helpful dummies are reported in models CM-2 and CM-3. In the present analysis, only the dummies for Latin America (MMLA) and East Asia (DMEASIA) were helpful in improving the explanatory power of the model. In both these regions, the pace of reduction in poverty is slower than in other regions.

5. Initial poverty level

The analysis indicates conditional convergence towards a lower level of poverty. Countries with a higher level of initial poverty have a faster pace of reducing poverty compared to those having a lower poverty incidence. This also is a reflection of the preference of multilateral donor agencies and of the urgency with which extreme poverty needs to be reduced.

Country name	Initial year	Poverty level national (%) initial period	Final year	Poverty level national (%) final period	Duration	Annual rate of change in PVT (percentage points)
1. Armenia	1996	54.70	1998	53.70	2.00	0.50
2. Bangladesh	1995	51.00	2000	493.8	5.00	0.24
3. Bolivia	1997	63.20	1999	62.70	2.00	0.25
4. Bulgaria	1997	36.00	2001	12.80	4.00	5.80
5. Burkina Faso	1994	44.50	1998	45.30	4.00	-0.20
6. Cameroon	1996	53.30	2001	40.20	5.00	2.62
7. China	1996	6.00	1998	4.60	2.00	0.70
8. Colombia	1995	60.00	1999	64.00	4.00	-1.00
9. Egypt, Arab Rep.	1995	22.90	1999	16.70	4.00	1.55
10. Ethiopia	1995	45.50	1999	44.20	4.00	0.32
11. Ghana	1992	50.00	1998	39.50	6.00	1.75
12. Guatemala	1989	57.90	2000	56.20	11.00	0.15
13. Honduras	1992	50.00	1993	53.00	1.00	-3.00
14. India	1993	36.00	1999	28.60	6.00	1.23
15. Indonesia	1996	15.70	1999	27.10	3.00	-3.80
16. Kenya	1994	40.00	1997	52.00	3.00	-4.00
17. Lao PDR	1993	45.00	1997	38.60	4.00	1.60
18. Madagascar	1997	73.30	1999	71.30	2.00	1.00
19. Malawi	1990	54.00	1997	65.30	7.00	-1.61
20. Mauritania	1996	50.00	2000	46.30	4.00	0.93
21. Nicaragua	1993	50.30	1998	47.90	5.00	0.48
22. Nigeria	1985	43.00	1992	34.10	7.00	1.27
23. Pakistan	1993	28.60	1998	32.60	5.00	-0.80
24. Peru	1994	53.50	1997	49.00	3.00	1.50
25. Philippines	1994	40.60	1997	36.80	3.00	1.27
26. Sri Lanka	1990	20.00	1995	25.00	5.00	-1.00
27. Tanzania	1991	38.60	2000	35.70	9.00	0.32
28. Uganda	1993	55.00	1997	44.00	4.00	2.75
29. Zambia	1996	69.20	1998	72.90	2.00	-1.85
30. Zimbabwe	1990	25.80	1995	34.90	5.00	-1.82

Table II.
National poverty data for
the 30 countries selected

Table III.
OLS estimates of the
models explaining
changes in national
poverty levels in the
30 countries

Dependent variable	CM-1 DPVTYNA	CM-2 DPVTYNA	CM-3 DPVTYNA
<i>Regressor</i>			
INPT	-2.709 (1.696)	-3.1819 (1.6854)***	3.5523 (3.2152)
PVT1INL	0.029 (0.011)**	0.0454 (0.0221)**	0.0632 (0.0226)*
AGRG	0.821 (0.254)*	0.7262 (0.2358)*	0.9511 (0.1903)*
INDG	0.153 (0.096)****	0.2626 (0.1071)**	0.2178 (0.0819)**
AIDGCFR	-0.015 (0.006)**	-0.0172 (0.0058)*	-0.0225 (0.0046)*
GPCFZ	0.090 (0.044)**	0.0871 (0.0408)**	0.1107 (0.0310)*
INDZ	-0.095 (0.040)**	-0.0736 (0.0404)***	-0.1737 (0.0411)*
TELIN	0.026 (0.006)*	0.0260 (0.0058)*	0.0109 (0.0069)****
LANDARBL	0.022 (0.021)	0.0262 (0.0281)	0.0466 (0.0230)***
DMLA		-1.8166 (0.7990)**	-2.8890 (0.6530)*
DMEASIA		-1.1897 (1.0605)	-1.9589 (0.8642)**
DMSASIA		-1.4928 (1.1245)	-2.8350 (1.0823)**
CRDTDBZ			0.0134 (0.0089)****
AGEDCY			-8.2562 (3.3510)**
FDIZ			0.4350 (0.1980)**
R^2	0.62	0.730	0.88
$\bar{R}^2$	0.48	0.566	0.76
F-stat. $F(8, 21)$	4.35 [0.003]		
F-stat. $F(11, 18)$		4.433 [0.003]	
F-stat. $F(14, 15)$			7.59 [0.000]
DW-statistic	1.92	1.98	2.33
Standard error of regression	1.44	1.32	0.98
Serial correlation CHSQ(1)	0.0356 [0.850]	0.001 [0.971]	1.866 [0.172]
Functional form CHSQ(1)	0.8248 [0.364]	0.358 [0.549]	0.081 [0.777]
Normality CHSQ(2)	1.1431 [0.569]	0.511 [0.775]	3.285 [0.194]
Heteroscedasticity CHSQ(1)	0.6265 [0.429]	0.715 [0.715]	1.436 [0.705]

Notes: Significant at: *1, **5, ***10, and ****15 percent levels, respectively; number of observations equals number of countries; standard errors are given in round parentheses and p -values are given in square parentheses

6. Sector level growth performance

Growth in the agriculture sector (AGRG) has a larger effect in reducing the overall poverty incidence as compared to growth in the industrial sector. The analysis did not indicate any significant effect of the services sector in explaining the pace of poverty reduction. These results remain significant and robust even after including the dummy variables and other explanatory variables. This is intuitive given the fact that most of the population in the poor countries reside in the rural sector and the growth in agriculture has a direct effect in reducing the poverty of a larger segment of the population than that achieved by industrial growth and service sector growth. In addition, countries with a higher level of arable land (LANDARBL) can also achieve better results in the pace of poverty reduction; with higher level of arable land, food security is better even if the productivity is sub-optimal.

In fact, the Commonwealth Report "Action to Reduce Poverty: Proposals for Needed Initiatives Developed by a Commonwealth Consultation on Rural Poverty Alleviation, Colombo, Sri Lanka, 5-9 October 1992" (Commonwealth Secretariat, 1993) also recognised the overall growth of the agricultural and rural sector as central towards

the achievement of sustainable reductions in poverty in the long run. However, the growth of the agriculture sector requires the government's market intervention in the market in a way that influences supply and demand rather than self-defeating measures such as price controls (Dreze and Sen, 1989). In this context, it can be argued that societies having a higher level of awareness, greater participation of women, democratic institutions and programs to accelerate rural connectivity are likely to reduce extreme poverty much faster.

A related result is the negative pace of poverty reduction in relatively more industrialised countries. Countries with a higher level of industrial contribution (INDZ) to the gross domestic product (GDP) may give rise to higher growth but this may not be as effective in reducing extreme poverty existing in the rural areas unless the growth in industrial output (INDG) is high enough to absorb the rural population in the production process. The Chinese experiment with land reform, and effective agriculture production infrastructure, which was backed by comprehensive industrial growth tells the initial success of a comprehensive policy package (Yao, 2005) in reducing rural poverty. Similar successes have been obtained in the Punjab, Haryana, western Uttar Pradesh and other parts of India due to the Green Revolution program undertaken and also due to the implementation of substantial land reforms in these regions.

However, there is a flip side to the story of the Chinese success, which is uniquely possible in an authoritarian regime alone. According to Yao (2005) the government in China following reforms lifted taxation on agriculture but continued to transfer rural resources to urban development by creating an environment, sucking tens of millions of young peasant workers into urban areas of Beijing, Shanghai, Guangzhou and Shenzhen, where they have been made to work for 12 hours a day, seven days a week in the most arduous and dirtiest conditions for a fraction of the wage that a normal urban worker gets for similar work, and yet their contribution is not reported in the official GDP calculation of the region (pp. 69-70). Living in costly cities with such low-earnings leaves them in extreme poverty, thus forcing a shift of poverty from rural areas to urban centres. The Chinese reform which began with the agricultural sector during 1978, benefited the peasantry more than the urban population, but later the urban sector was compensated adequately and so much so at the cost of the rural population that the inequality between urban and rural China forces one to reassess the sustainability of such experiments. The prices of agricultural products were reduced in real terms, while the prices of agriculture inputs rose sharply during the 1990s, a situation capable of toppling governments in democratic societies. Therefore, it would be more sustainable to lead industrial growth and improve agriculture infrastructure simultaneously.

7. Aid and investment

It is argued that aid can be useful in reducing poverty only if it is used on productive investments such as providing efficient institutions, and improving education and health care. An important lesson that one can learn from the East-Asian growth model is that sustained investment in education and health care are central to socio-economic progress. If aid is not effectively used in improving human capital and social capital such as better institutions, it may not contribute to a reduction in poverty over time. Aid in this paper is represented as a ratio of gross capital formation (AIDGCFR) and the result shows that it has a negative effect in reducing poverty. In a similar context,

Rehman (2005) notes that increased aid merely alleviates the symptoms of poverty unless people have access to productive assets and an awareness about the market economy. The empirical evidence that foreign aid has a direct impact on poverty is weak has been supported by region-specific studies also. Freeny (2004) in the case of Papua New Guinea, does not find sufficient evidence to support the hypothesis that the poverty levels have been reduced in recent years despite the increase in aid. Rather, he found that it got worse. Masud and Yontcheva (2005) find that non-government organization aid reduces infant mortality more effectively than official bilateral aid, while the impact on illiteracy is less significant. Clearly aid has to be associated with efforts to produce sustainable sources of income.

Thus, in respect to aid-based poverty alleviation programs, much more than simply obtaining aid should be done in order to make aid an efficient means of poverty alleviation. From our regression results it appears that aid could not be used effectively in the production process and in the macro-economic management in most of the countries, which has lead to aid becoming counterproductive.

8. Foreign private capital flows

Increasing foreign private capital flows (GPCFZ, as a percentage of GDP) including Foreign Direct Investment (FDIZ) is found to increase the pace of poverty reduction across most countries. Thus, countries, which attract more private flows are able to address their poverty problems better than those with less of such flows because such capital brings along with it better technology and markets for exports. Therefore, FDI particularly helps in increasing exports. However, if scarce resources are diverted to attract FDI at the cost of poverty alleviation programs, then the pace of poverty reduction could suffer in such regions, and it could also lead to increased inequality at least in the short run.

The literature has identified at least two clear channels through which a positive outcome from FDI is possible. First, foreign capital complements domestic savings in lifting the economy out of the low-equilibrium trap. Since, most of the poverty-ridden economies have labour surplus and are capital deficient, the standard outcome of the endogenous growth theory is output enhancing. Second, through technology spillover effects, there could be improvements in factor productivity and export competitiveness leading to more trade. There is strong evidence that exports from developing countries, which are mostly of a labour intensive nature, and the openness of developed countries lead to higher rates of economic growth in developing countries. Thus, the resulting growth could help reduce poverty directly or through a "trickle down" effect. Does growth really reduce poverty? Several studies (World Bank, 2001; Bhalla, 2002), while disagreeing on the details of the poverty reduction-growth nexus, find broad agreement that the outcomes are positive.

Most recently, Cline (2004) has analysed the poverty intensity of trade with respect to importing developed countries and products. While the USA account for 38 percent of its world wide imports weighted by the headcount poverty of the supplier country, the developing countries' exports are dominated by fewer countries such as China, South Korea, Mexico, Russia, and Malaysia, which together accounted for about 46 percent of developing countries' exports to the world market during 2000. Clearly, these countries are at the forefront of reducing poverty. The study reports that "pearls, precious and semi-precious stones" (SITC 667) are the most poverty intensive product.

These are heavily concentrated in India and South Africa. With more of the income share going to the poor from these operations, India benefited in reducing poverty. Investments in the gem cutting and polishing industry and the manufacturing of jewellery using modern techniques and training could enhance the potential of poverty alleviation programs. A number of such products could be identified for other countries and the importing countries could invest in such activities to alleviate poverty in the supplier countries.

However, Hertel and Reimer (2004) have reviewed the critical role of factor markets in determining the poverty impacts of trade policies and caution that due to the existence of loping economies, there exist substantial wage differentials between the formal and informal sectors in the developing countries, and the loss of a high-wage job can be sufficient to plunge the entire household into poverty. Similar concerns were raised by Ravallion (2004), who pointed out to the importance of combining trade reforms with well-designed social protection policies. Therefore, it is further important to be careful in the deployment of FDI, and trade negotiation outcomes, which are likely to affect the majority of the people in developing countries.

9. Physical and financial infrastructure

The role of physical and financial infrastructure in the development process cannot be over emphasised[1]. Development economists have emphasized that reliable and affordable infrastructure can reduce poverty and contribute to the achievement of the MDGs by promoting growth and supporting the delivery of key services, and human development (education and health) (Briceño-Garmendia *et al.*, 2004). Another study on Latin America estimates that inadequate investment in infrastructure during the 1990s reduced long-term growth by 1 to 3 percentage points, depending on the country (Easterly and Serven, 2003).

In a cross-country empirical analysis, it is rather difficult to obtain consistent and uniform infrastructure indices and many studies have used different kinds of proxies for infrastructure. In our analysis, infrastructure is composed of physical infrastructure and financial infrastructure. Owing to the availability of data, telephone lines per thousand population (TELIN) proxies development in physical infrastructure and communications. Countries with better infrastructure are likely to reduce their poverty incidence faster. Infrastructure development includes all aspects of connectivity, education, health and market. Kilkenny (2004) notes that electrification and the development of telecommunications and passenger elevators supported an exponential rate of urban concentration:

As the market expands, a pre-existing plant can enjoy profits due to internal scale economies. That profitability entices new establishments in the same industry to open in the same location. As the number of plants rises, the local demand for inputs into the industry rises. At some point, the market for inputs becomes large enough to support plants that specialize in the inputs. This outsourcing allows both the upstream input supplying plants and downstream industry plants to profit from both the economies of scale and the productivity gains due to specialization. Thus, in larger markets, both costs and prices are lower.

Rural migration to such agglomerates reduces the pressure of underemployment in the agriculture sector, while the presence of cost-reducing infrastructure allows farmers to earn more profits. In the case of India, several villages are obtaining benefits from E-Chaupal where farmers get market information on the internet and are able to sell

their products electronically. The popularity of mobile phones in India is exceptionally high because it has done away with the inefficient landline system.

Similarly, the credit capacity of the domestic banking sector is an indicator of financial infrastructure, which is a key requirement for economic activities both in rural and urban areas. Credit by the domestic banks as a percentage of GDP (CRDTDBZ) has a positive effect in increasing the pace of poverty reduction. Such factors have the potential in nature to lead to sustainable increases in job opportunities and income enhancement. A micro-finance program of Bangladesh through the Grameen Bank is a widely acclaimed enabler, benefiting the rural poor, particularly women self-help groups. Beck *et al.* (2004) report that financial development also reduces income inequality by disproportionately boosting the incomes of the poor. Countries with better-developed financial intermediaries experience faster declines in measures of both poverty and income inequality. These results are robust when controlling for other country characteristics and potential reverse causality. In all the instances, it can be argued that social systems and the adaptability of the population to new changes are critical in harnessing the benefits of poverty alleviation programs and policies.

10. Conclusions

The results of this paper give a direction for policy formulation at the macroeconomic level which could be helpful in reducing poverty. The practical implications of policy formulations are to strengthen certain economic activities such as labour-intensive export promotion, emphasis on agriculture productivity, improved communication and infrastructure, besides effectively implementing certain policy initiatives such as population control, reduced dependency on aids and reducing malnutrition to achieve a lower incidence of health expenditure. In this context, it becomes necessary to recollect the statement by Nelson Mandela about poverty – “poverty is man-made” and macroeconomic policies have the potential to eradicate poverty. Thus, one can argue that poverty has been effectively eradicated when mass-produced consumer goods and durable consumer goods can be accessed by the poor with higher employment and higher incomes and at affordable prices, and also when the governments begin to acquire surpluses to launch social services to cushion the poor.

Note

1. The World Bank's *World Development Report 1994: Infrastructure for Development* highlighted an emerging debate on the relationship among infrastructure access, productivity, and growth.

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Appendix 1

	DMEUCA	DMAFRICA	DMSASIA	DMMEAST	DMEASIA	DMLA
	22-country set Azerbaijan Bulgaria Moldova Uzbekistan Russian Fed.	Cameroon Ethiopia Madagascar Mauritania Cameroon	Bangladesh India	Egypt, Arab Rep.	China Indonesia Philippines	Argentina El Salvador Brazil Guatemala Mexico Nicaragua Peru Argentina El Salvador Brazil Chile Costa Rica Guatemala Mexico Nicaragua Panama Peru Uruguay
	37-country set Albania Azerbaijan Bulgaria Croatia Moldova Uzbekistan Russian Fed. Georgia Kazakhstan Kyrgyz Rep. Lithuania Romania Turkey	Cameroon Ethiopia Jamaica Madagascar Mauritania	Bangladesh India	Egypt, Arab Rep. Tunisia	China Indonesia Philippines Thailand	
	30-country set Armenia Bulgaria	Burkina Faso Cameroon Ethiopia Ghana Kenya Madagascar Tanzania Uganda Zambia Zimbabwe Malawi Mauritania Nigeria	Bangladesh India Pakistan Sri Lanka	Egypt, Arab Rep.	China Indonesia Lao PDR Philippines	Bolivia Colombia Guatemala Honduras Nicaragua Peru

Table AI.
List of countries included
in the global analysis
of poverty

Appendix 2

Variable	Measurement description
AIDPC	Aid per capita (current US\$)
CRLYLD	Cereal yield (kilogram per hectare)
EXGSZ	Exports of goods and services (percentage of GDP)
HLTHZ	Health expenditure, total (percentage of GDP)
MOBILE	Mobile phones (per 1,000 people)
POPDEN	Population density (people per square kilometer)
PPMN	pop/1,000,000
PVTY102	Living on less than \$1 a day (PPP) (percentage of people) average 2000-2002)
TRDGZ	Trade in goods (percentage of GDP)
YPCPP	GDP per capita, PPP (constant 1995 international \$)

Poverty
reduction across
the globe

Table AII.
List of variables used in
identifying the
characteristics of extreme
poverty-stricken
countries

Appendix 3

Variable	Description and measurement
AGEDCY	Age dependency ratio (dependents to working-age population) (SP.POP.DPND-)
AGRG	Agriculture, value added (annual percentage growth) (NV.AGR.TOTLKD.ZG)
AIDGCFR	Aid (percentage of gross capital formation) (DT.ODA.ALLD.GL.ZS)
CRDTDBZ	Domestic credit provided by banking-sector (percentage of GDP) (FS.AST.DOMS.GD.ZS)
DMEASIA	East Asia Dummy
DMLA	Latin America Dummy
DPVTNA	Annual rate of change in national PVT (percentage points)
GPCFZ	Gross private capital flows (percentage of GDP) (BG.KAC.FNEIGD.ZS)
INDG	Industry, value added (annual percentage growth) (NV.IND.TOTLKD.ZG)
INDZ	Industry, value added (percentage of GDP) (NV.IND.TOTL.ZS)
LANDARBL	Land use, arable land (percentage of land area) (AG.LND.ARBL.ZS)
PVTIINL	Poverty level national (%) initial period
TELIN	Telephone mainlines (per 1,000 people) (IT.MLT.MAIN.P3)
FDIZ	Foreign direct investment (percentage of GDP) (BG.KLT.DINV.GD.ZS)

Table AIII.
List of variables used in
estimating the
determinants of changes
in poverty

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