Determinants of the Progress of Countries on the Millennium Development Goals*

by

Asma Zubair**

* I would like to thank Dr. Hafiz A. Pasha for his help and guidance.
** Asma Zubair is Assistant Lecturer in the Department of Economics at the Beaconhouse National University, Lahore.

ABSTRACT

The Millennium Development Goals were set by the United Nations in 2000 to be achieved by 2015. The paper constructs a composite index of progress by countries on different targets in the MDGs. Considerable variability is observed among countries in the extent of progress. An attempt is made to explain the variation in the composite index among countries. Variables that emerge as significant are overall rates of economic growth, agricultural growth, population growth, institutional factors, social protection policies and the level of aid. The prospects for achievement globally of the MDGs do not look promising, in the absence of full recovery of the world economy and in the presence of depressed levels of external assistance to developing countries, especially the LDC.

Keywords: Millennium Development Goals, Official Development Assistance, Agricultural Growth Rate, Population Growth Rate.

JFL Classification : O57

1. Introduction

At the Millennium Summit of the United Nations in September 2000, The Millennium Development Goals (MDGs) to be achieved by 2015 were set by the international community to provide a framework for development planning and cooperation in the developing world. The goals include halving (in relation to the level in 1990) by 2015 the proportion of people living in extreme poverty and suffering from hunger and malnutrition. Other goals call for a substantial reduction in maternal and infant mortality along with the reversal of communicable diseases, provision of universal education, safe drinking water and sanitation and environmental sustainability. A summary of the eight goals and targets is given in Table 1.

Ten years later the extent to which countries over the world have been able to make progress on the MDGs has been varied. Not much work has been done to understand the reasons for this differential in performance among countries. This is unfortunate considering that ten years have passed and only five years remain for countries that lag behind to 'catch up' with others.

The motivation behind the research stems from this very concern. An attempt is made in this paper to explain the variation in the performance on the MDGs in a sample of developing countries. Section 2 describes the various MDGs goals and targets. Section 3 reviews the literature on measures of progress and achievement to date of different regions. Section 4 develops a new index for quantifying the extent of progress by a particular country in achieving the MDGs. Section 5 presents the results in terms of goals where

there has been greater progress and others where progress has generally been limited. This is followed in Section 6 by ranking of countries in terms of the overall magnitude of progress on the MDGs. Section 7 undertakes regression analysis to explain the variation in the index among countries. Finally Section 8 derives some policy implications for policy, both international and national, which emerge from the research.

2. The Millennium Development Goals

The Millennium development goals are divided into eight goals which are further disaggregated into targets and indicators that are used to measure progress towards the goals. Analysis is generally carried out at the level of targets. These targets are presented in Table 1.

Table 1
The Targets in MDGs

Goal	Targets
Goal 1: Eradicate extreme hunger and poverty	**Target 1.** Halve, between 1990 and 2015, the proportion of people whose income is less than $1 a day **Target 2.** Halve, between 1990 and 2015, the proportion of people who suffer from hunger
Goal 2: Achieve Universal Primary Education	**Target 3.** Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling
Goal 3: Promote Gender Equality and Empower Women	**Target 4.** Eliminate gender disparity in primary and secondary education, preferably by 2005, and in all levels of education no later than 2015
Goal 4: Reduce Child Mortality	Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate
Goal 5: Improve Maternal Health	**Target 6.** Reduce by three-quarters, between 1990 and 2015, the maternal mortality ratio
Goal 6: Combat HIV/AIDS, Malaria and Other Diseases	**Target 7.** Have halted by 2015 and begun to reverse the spread of HIV/AIDS **Target 8.** Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases

Goal 7: Ensure Environmental Sustainability	**Target 9.** Integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources **Target 10.** Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation **Target 11.** Have achieved by 2020 a significant improvement in the lives of at least 100 million slum dwellers
Goal 8: Global Partnership for Development	**Target 12.** Develop further an open, rule-based, predictable, nondiscriminatory trading and financial system. **Target 13.** Address the special needs of the Least Developed Countries. **Target 14.** Address the special needs of landlocked developing countries and small island developing states. **Target 15.** Deal comprehensively with the debt problems of developing countries through national and international measures in order to make debt sustainable in the long term **Target 16.** In cooperation with developing countries, develop and implement strategies for decent and productive work for youth **Target 17.** In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries **Target 18.** In cooperation with the private sector, make available the benefits of new technologies, especially information and communications technologies

3. Review of Literature

Ahmed and ***Ahmed*** (2004) in their paper measure the performance on Millennium Development Goals of countries of Sub Saharan Africa in relation to the targets of poverty, hunger, education and health. This is a region which performs poorly in terms of the rate of economic growth. As such, there is little reduction in poverty and hunger between 1990 and 2005.Education shows some significant improvement, but half of the countries are still off-track, while in eliminating gender disparity the region lags behind. The authors emphasize the need for a higher growth which could be fuelled by higher domestic savings and more aid from the international community

Gentilini and ***Webb*** (2005) construct a summary index for progress in Goal I. They demonstrate the stark contrast between Africa and East Asia in achievement of the MDGs

Global Monitoring Report 2009- A Development Emergency prepared by the World Bank (2009) deals with the implications of the recent global financial crises on the MDGs and suggests actions to counter the negative effects. A number of priority areas are identified, including, first, the strengthening of the social safety nets, second support for private investment ,and, third, enhancement of aid along with the opening of trade to the less developing countries. The report emphasizes on the need for collective global effort for recovery of the world economy, otherwise there could be catastrophic effects on human development.

Pasha (2007) uses linear interpolation to calculate individual index values. A summary index is then calculated. Overall only three regions that are North East Asia, Latin America, North Africa and West Asia are on track to meet five of the eleven targets. In conclusion the report says that lack of economic growth, inequality, governance failures and policy neglect are the main reasons for neglect in reaching the MDG goals.

The ***Human Development Report 2005*** prepared by the United Nations (2005) calls on the rich countries to deliver on the promises made at the start of the Millennium by keeping their part of the bargain and provide development assistance and trade incentives to the developing countries. As for the MDGs it estimates that at least fifty countries are going back on at least one MDG of which twenty four are in Africa. Reducing child mortality by two thirds, halving poverty and universal primary education are the targets likely to be missed by 2015. With regard to malnutrition the report indicates that although the proportion of poor has fallen but because of population growth the number of people has remained unchanged.

4. Composite Index of Progress on the MDGs

Before a composite index can be constructed, we first develop an index to measure progress on an individual target. For this, indicator values of the target are specified as follows:

V_0 = base year value

V_T = terminal year (2015) value

V_{at} = actual value in year t

To be on track, the value V_{ct}, in year t is given by

$$V_{ct} = V_0 + \frac{t}{T}[V_T - V_0] \dots\dots\dots\dots\dots\dots (1)$$

Two indices of progress are constructed. The first is a discrete index, of the type first developed by Aisha Pasha [2007] for analysis at the regional level as follows:

$$I_t^1 = 1 \text{ if } V_{at} < V_{ct}$$

$$I_t^1 = 0 \text{ if } V_{at} < V_0$$

and,

$$I_t^1 = -1 \text{ if } V_{at} > V_0$$

in the case when $V_T < V_0$ and the target involves reduction, for example, in the incidence of poverty.

Alternatively, when $V_T > V_0$ as for example, in the case of school enrolments, then we have

$$I_t^1 = 1 \text{ if } V_{at} > V_{ct}$$

$$I_t^1 = 0 \text{ if } V_{at} > V_0$$

and,

$$I_t^1 = -1 \text{ if } V_{at} < V_0$$

Therefore I_t^1 has a negative value when there is retrogression and a zero or positive value when there is progress.

The continuous index is derived as follows:

$$I_t^2 = \frac{V_{ct}}{V_{at}} \text{ when } V_T < V_0$$

$$I_t^2 = \frac{V_{at}}{V_{ct}} \text{ when } V_T > V_0$$

This index was discarded in the analysis because of the possibility of dominance by one or more indicator values for a country. Also, a continuous indicator may not be justified due to the quality of the underlying data.

The composite index, I_{it}, for country i in year t is derived as follows:

$$I_{it} = \sum_{j=1}^{n} w_j I_{ijt} \quad \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

where w_j is the weight of the *j*th indicator. The weights are assigned in such a manner that they add to unity. *n* is the number of indicators included in the analysis

Due to the paucity of data on many indicators for recent years in the case of many developing countries, especially LDCs, indicators related to seven key targets have been included in the analysis, as follows:

Target 1: ***Halve, between 1990 and 2015, the proportion of people whose income is less than $1 a day***

For measuring poverty the indicator used was 'population below $1 a day, percentage' from the Millennium Development Goals Database [UN Statistics Division]. The base year for all the countries is from 90's and the calculated year is in the 2000s. Where poverty rate was below 2 percent and had remained unchanged over time the index value was taken to be one.

Target 2: ***Halve, between 1990 and 2015, the proportion of people who suffer from hunger***

For measuring hunger the indicator used was 'prevalence of undernourishment (% of population)' from the World Bank data base. The cut off value was assumed to be 5%. If the country had reached the point where only 5% of

population was hungry and value fluctuated around this level then the country was assumed to have had reached the goal

Target 3: ***Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling***

For measuring the primary education enrolment rate the indicator 'total enrolment, primary (% net) from the World Bank data base was used.

Target 4: ***Eliminate gender disparity in primary and secondary education, preferably by 2005, and in all levels of education no later than 2015***

To measure gender disparity we subdivide the target by measuring gender disparity at both primary and secondary level. For measuring gender disparity at primary level we use 'ratio of females to male primary enrolment' and for measuring gender disparity at secondary level we use 'ratio of females to male secondary enrolment'. The World Bank data base was used to measure this target.

Target 5: ***Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate***

For infant mortality rate the indicator used to measure this target was 'Under 5 Mortality Rate (probability of dying by age 5 per 1000 live birth) for both sexes from the Millennium Development Goals Database [UN Statistics Division].

Target 10: ***Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation***

This target has been subdivided into two parts namely: access to safe drinking water and sanitation. For measuring access to sanitation and to safe drinking water 'Improved sanitation facilities (% of population with access)' and 'Improved water source (% of population with access)' respectively were used. The World Bank data base was used for measuring this target.

The study compromised of fifty eight LDCs and low to middle income countries that were chosen from the UN and World Bank data bases of developing countries on the basis of completeness of information. The final

data comprised of fifteen American countries, eighteen Asian and twenty five African countries. Data on the above indicators is available for most countries up to 2005.

In terms of weights, the highest weight (two times) has been assigned to the indicator on incidence of poverty. Sensitivity analysis has been undertaken to test if the rankings of the 58 countries change significantly if equal weights are assigned to all the seven indicators. The results confirm the robustness of the ranking

We undertake first an analysis of the correlation between indicators, shown in Table 2. The correlation coefficient matrix proves that between individual indexes there is little correlation in performance that is an improvement in poverty figures does not necessarily mean an improvement in hunger index. In fact there is also some indication, given the negative correlation coefficients that with severe resource constraints better performance on one indicator may imply a worse performance in some other indicator.

Table 2
Correlation Coefficients Among Indexes

	Poverty	Hunger	Infant Mortality	Literacy	Sanitation & Safe Drinking	Gender Disparity
Poverty	1	0.085	-0.100	0.223	0.065	0.172
Hunger		1	0.255	-0.179	0.278	0.195
Infant Mortality			1	0.131	0.409	0.306
Literacy				1	-0.329	-0.250
Sanitation & Safe Drinking					1	0.303
Gender Disparity						1

5. Results

We first summarize the progress of the sample countries on different targets in Table 3.

Table 3
Distribution of Sample Countries by Progress on MDG Targets
(Figures are percentages of the sample of 58 countries)

Indicator	Retrogression[1]	Some Progress[2]	On-Track[3]
Population below $1 a day, percentage'	25.9	31.0	43.1
Prevalence of Undernourishment (% of population)	15.5	43.10	41.4
Total Enrolment, Primary (% net)	25.5	46.8	27.7
Ratio of females to male primary enrolment'	16.7	40.7	42.6
Ratio of females to male secondary enrolment'	3.7	40.7	55.6
Under 5 Mortality Rate (probability of dying by age 5 per 1000 live birth) for both sexes	8.6	48.3	43.1
'Improved sanitation facilities (% of population with access)'	5.2	63.8	31.0
Improved water source (% of population with access)'	3.4	38	58.6

[1] Deterioration since 1990 in the value of the indicators ($I_t^1 = -1$).
[2] $I_t^1 = 0$.
[3] $I_t^1 = 1$.

Across the countries, the greatest progress appears to have been made in achieving gender equality in education at the secondary level with 30 out of the 58 countries on track. The indicator in which the largest numbers of countries have retrogressed is in poverty reduction. Poverty has actually increased in fifteen countries. The largest proportion of these countries is in Africa including Cote D Ivory, Djibouti, Nigeria, South Africa and Tanzania. The highest percentage of off track countries is in the indicator relating to improved sanitation facilities.

The magnitude of the composite index for individual countries in the sample is given in Table 4. Important conclusions emerge from this Table.

Table 4
Composite Index of Progress on the MDGs
of the Sample Countries

Overall Retrogression $I_t^1 < 0$	Little Progress $0 \leq I_t^1 < 0.33$	Moderate Progress $0.33 \leq I_t^1 < 0.67$	Substantial Progress $I_t^1 \geq 0.67$
Argentina(-0.25)	Bolivia(0.00)	Bangladesh(0.33)	Brazil(0.86)
Burundi(-0.07)	Burkina Faso(0.07)	Ethiopia(0.50)	Chile(0.67)
Columbia(-0.36)	Cambodia (0.17)	Ghana(0.57)	China(0.92)
Cote d Ivoire (-0.25)	Cameroon(0.25)	Indonesia(0.50)	Ecuador(0.71)
Djibouti(-0.07)	El Salvador(0.29)	Mauritania(0.50)	Egypt(0.75)
Dominican Republic (-0.14)	Gambia(0.29)	Mexico(0.50)	Iran(0.86)
Madagascar(-0.07)	Guinea(0.29)	Morocco(0.57)	Malaysia(0.92)
Nigeria(-0.21)	India(0.29)	Nepal(0.36)	Nicaragua(0.71)
Paraguay(-0.14)	Jordan(0.07)	Panama(0.36)	Thailand(1.00)
South Africa(-0.36)	Kenya(0.14)	Philippines(0.36)	Tunisia(0.86)
Swaziland((-0.07)	Lao PDR(0.29)	Senegal(0.36)	Uruguay(0.67)
Tanzania(-0.43)	Lesotho(0.21)	Sri Lanka(0.50)	Vietnam(1.00)
Turkey(-0.07)	Malawi(0.21)		
Venezuela(-0.42)	Mongolia(0.14)		
Yemen(-0.50)	Mozambique(0.14)		
	Niger(0.00)		
	Pakistan(0.21)		
	Peru(0.14)		
	Uganda(0.17		
15	**19**	**12**	**12**

First, only twelve out of the fifty eight countries appear to have made substantial progress in achieving the MDGs included in the analysis. The only two countries which are on track on all indicators are Thailand and Vietnam. Despite this extra ordinary progress, the former country is virtually in the grips of a civil war. Other countries which have made great progress are China and Malaysia. The former has experienced very rapid rates of growth and has achieved remarkable reduction in the incidence of poverty. It is significant that all four high achieving countries are located in East Asia.

Twelve countries have made moderate progress, while nineteen countries have had only limited success in achieving the targets. In overall

terms as many as fifteen countries have retrogressed, with negative values of the composite indicator. Not only does this list include LDCs from Sub Sahara Africa like Cote D Ivory and Djibouti, but there are some middle income countries like Argentina, Nigeria, Turkey and South Africa in this group. Most of the retrogressing countries are from either Latin America or Africa. South Asian countries show little or moderate progress.

There are also some major surprises. Nigeria and Venezuela are both major oil exporting countries but do poorly on the MDGs. Probably these countries are suffering from the 'resource curse.' India has experienced rapid growth during the last decade but demonstrates only limited progress in achieving the MDGs. This indicates that India has not experienced 'inclusive growth'. As opposed to this some low income countries especially from Africa have done relatively well. This includes Tunisia, Ghana and Ethiopia. Clearly many of the MDGs targets are achievable even by poor developing countries subject to the political commitment on the part of countries and, as envisaged in Goal 8, with support from the international community.

6. Determinants of Progress

Given the estimated magnitude of the composite index of progress on the MDGs we now try and explain the variation in the index value among the sample countries on the basis of the following explanatory variables.

GDP growth rate (GDP): It is generally hypothesized that for larger poverty reduction and for improvement in living standards, faster growth of the economy is a necessary, although perhaps not a sufficient, condition. As such, the average GDP growth rate is included in the analysis for the same period that data is available on the MDGs for a particular country.

Agricultural Growth Rate (AGR): One of the critical elements of inclusive growth is the pace of rural development, especially in agriculture. Most of the poor reside in the rural areas and food security has a vital bearing on levels of nutrition of the general population.

Population Growth Rate (PGR): Other things being equal, a higher population growth rate implies a lower rate of increase in per capita income. Also, the demographic pressures created by rapid expansion in population impact on the availability and quality of public services

Public Sector on Social Services (PEX): The level of public expenditure on basic social services like health and education is likely to impact on achievement of MDG indicators like school enrolments, mortality levels etc

Employment Growth rate (EMP): This is another key dimension of the inclusiveness of growth. Higher levels of employment are likely to contribute significantly to poverty reduction

Aid Inflows as % of GDP (AID): Larger inflows of external assistance are likely to finance higher levels of public investment, and thereby not only promote growth but also enable large allocations for social services.

Institutional Factors: Limitations of institutional capacity are likely not only to limit possibilities of growth but also constrain the public sector in the effective delivery of services. LDCs, in particular, are likely to be more inhibited by these factors. As such a dummy variable, DLDC, is defined, which takes a value of 1 when a country is an LDC and zero otherwise.

Other Dummy Variables: In addition we propose two other dummy variables. The first, DEAS, has a value of one for the two best performing countries, Thailand and Vietnam, and zero otherwise. If this variable emerges as significant then it will highlight that there are special factors in operation in these countries, over and above the variables identified above. The second variable DBM, is for Brazil and Mexico, which have put in place elaborate conditional cash transfers like the *Fomo Zero* and the *Bolsa Familia* for poverty mitigation and improvement in social indicators.

Analysis of the zero order correlation coefficients among the explanatory variables, shown in Table 5, reveals that there is no problem of multicollinearity.

Table5
Correlation Coefficients Among Explanatory Variables

	GDP	AGRI	POP	AID	PEX	EMP
GDP	1	0.339	-0.370	-0.356	-0.081	0.004
AGRI		1	0.107	-0.164	-0.141	-0.033
POP			1	0.448	0.018	0.030
AID				1	-0.023	0.065
PEX					1	0.063
EMP						1

Table 6 presents the results of alternative regressions. Virtually all the variables emerge statistically significant and with the right signs, with the exception of PEX and EMP. The elasticity of the composite index with respect to the significant variables (excluding the dummy variables) is given in table 4.

Table 6
Results of Regressions
(Dependent Variable Is The Composite Index I_{it})

	Regression I		Regression II	
	Coefficient	t-ratio	Coefficient	t-ratio
Constant	0.166	0.899	0.089	0.566
GDP	0.090	3.110	0.087	3.012*
AGR	0.060	2.232	0.060	2.264*
PGR	-0.148	-2.47	-0.140	-2.424*
PEX	-0.022	-0.83	-	-
EMP	-0.011	-0.43	-	-
AID	0.018	2.682	0.015	2.839*
DLDC.GDP [a]	-0.076	-1.968	-0.088	-2.369*
DEAS	0.560	2.992	0.550	2.930*
DBM	0.533	2.523	0.500	2.400*
Adjusted R^2	0.479		0.473	
Degrees of Freedom	48		50	
F-stat	6.72		8.313	

*significant at the 5% level

[a] interactive dummy variable with GDP

Table 7
Elasticity* Of The Composite Index Of Progress On The MDGs

With respect to	Elasticity
GDP	0.636
AGR	0.722
PGR	-1.073
AID	0.370

The magnitudes of elasticities are high. First, a one percent jump in the GDP growth rate pushes up the index by as much as 0.636 percent. This explains the exceptional performance of fast growing countries like China. Second, the high elasticity of 0.722 with respect to the growth rate of agriculture demonstrates the centrality of rural development in tackling income poverty and other forms of deprivation. The performance of countries like India on the MDGs has been retarded by the poor record in boosting food production since the early 1990s. Third, population growth does matter and with a high elasticity of -1.073 the conclusion is that countries with high rates of population growth face special constraints in achieving the MDGs. Fourth, foreign aid does help countries in making progress on the MDGs. A one percent increase in net aid to a country can improve performance on the MDGs by 0.37 percent on average.

7. Policy Implications

A composite index of progress on the MDGs has been constructed for a sample of 58 countries from three continents- Africa, Latin America and Asia. The results are disappointing and demonstrate that the majority of countries have either experienced deterioration in some of the key indicators like incidence of poverty or have made only limited progress. The exception is some of the fast growing countries like China, which improve the averages and give a somewhat distorted impression about the global success in achieving the MDGs. The global financial crisis of recent years is likely to have exacerbated the problem due to the slowdown in economic growth and rise in commodity prices.

The basic policy implication is that while high rates of economic growth are generally necessary for tackling problems of poverty, hunger and access to basic services, growth alone is not enough. What is also required is the right kind of growth, that is, growth which is inclusive in character and benefits disproportionally the poor. In particular, countries like India, which had moved away from agriculture to either services or industry, need to focus once again on rural development to build food security and reduce poverty among the rural poor, who constitute bulk of the poor in most countries.

Another important message from the research findings is the need to give priority to policies and programs for population control, otherwise there is the danger of pre-emption of public resources largely for catering for the needs of incremental population thereby leaving few resources for enhancing the quality of service provision with the objective of improving the indicators of human development. On top of this, countries like Brazil and Mexico have demonstrated that elaborate programs of social protection in the form of conditional cash transfers can also make major contribution to alleviating poverty and facilitating progress on the MDGs.

Finally the research has highlighted the role of concessional assistance in improving prospects, especially of LDCs, of achieving the MDGs. The global commitment towards the MDGs in 2000 was predicated in Goal 8 on a global partnership for development that required the developed countries to almost treble their aid allocations to developing countries. But this has not happened. In the wake of financial crises aid inflows have actually declined in 2009 by 7 percent. Therefore, in the presence of a persistent slow down in the world economy and lower aid inflows, prospects for achievement of the MDGs by most developing countries by 2015 are likely to worsen even further.

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