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IMPACT OF ECONOMIC REFORMS ON POVERTY – INDIAN EXPERIENCE

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ABSTRACT

The purpose of this study is to investigate the impact of economic reforms on poverty levels in India during the period 1975 - 2006. We construct a comprehensive measure of economic reforms index made up of seven subcomponents and percentage of population living below poverty line is used as proxy for aggregate level of poverty levels. The empirical study is conducted within the frame work of unit root, cointegration and Vector Error Correction Method tests. The results display long run equilibrium relationship between the two and the direction of causality flowing from reforms to poverty. Further, it is interesting to find that the current level of economic reforms is having a positive effect on poverty levels. But, the past level of reforms (stock of reforms) has a significant negative effect on poverty levels. Meaning, the immediate adjustment cost of current level of economic reforms is counterbalanced by the negative effects by the level of past reforms during the study period.

Keywords: Poverty; Economic Reforms; Unit root; Cointegration

JEL Classification: O10; I30; I32; C22

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1. Economic Reforms & Poverty – The interrelationship

The focus of this study is on the relationship between economic reforms and poverty in India. Though there is vast number of studies that show inverse relationship between economic reforms and poverty, the consequences of economic reforms leading to improving socioeconomic conditions of the poor remains highly contentious. The literature presents conflicting findings on this topic. The Liberal theorists argue that countries which are highly engaged in economic reforms process are likely to experience higher economic growth, development, greater affluence, improving poor socioeconomic conditions and thereby reduction in poverty levels. It is believed that economic reforms process is most likely to affect poverty levels negatively as it help improving quality of life of the poor. It help promote economic development, providing trade and investment opportunities creating much needed employment generation and reduce income inequality and thereby leading to poverty reduction. Thus, countries with higher levels of economic reforms process should have poverty rates declining. Meaning, higher economic reforms process should not only serve in attaining development goals but also help improve the quality of life of the poor.

On the contrary, skeptics argue that high levels of economic reforms process tend to generate greater economic and social inequalities. They argue that reforms help only certain sections of the society and not all. Also the economic growth generated from the reforms process remains exclusive (Gupta, 1999). Thus, arguing that reforms in fact increase poverty. Some experts like Boswell & Dixon (1990); Barbieri (1996); Rodrik (1997 a, b); Rodrik (1998); Rodriguez & Rodrik (2000); Blinder (2006); Summers (2006) and Krugman (2007) argue that reforms leads to greater economic insecurity and social unrest in the society paving way for the risk of political instability and outbreak of conflicts thereby.

This study attempts to unpack the arguments taking the perspectives of both sides into consideration and test for several dimensions of economic reforms effects on poverty levels in the specific case of India.

There are some noteworthy studies in the case of India which focused on the interrelationship between reforms, economic growth and poverty levels. The planning commission (Government of India Press Information Bureau, 2007), using the expert group methodology has estimated the poverty in 2004-05 using two distributions such as Uniform recall method and Maximum recall method[1]. The share of persons below poverty line in rural areas based on Uniform recall method recorded a decline from 37.3% in 1993-94 to 28.3% in 2004-05.Similarly in urban areas, the share of persons below poverty line also recorded a reduction from 32.4% to 25.7% during the same period. However, based on this Uniform recall method, it is obvious that the reduction of rural poverty (9%) is relatively higher than the reduction of urban poverty (6.7%) during the period under consideration. When the combined figures are considered, it is clear that there is 8.5% decline in number of persons under the poverty line during this study period. The share of persons under poverty line in rural areas based on Maximum recall period recorded a decline from 21.7% in1999-2000 to 21.8% in 2004-05. The share of persons under below poverty line in rural areas based on Uniform recall period recorded a decline of 5.3% whereas the share of persons under below poverty line in urban areas recorded decline 1.9% decline during the period 1999-2000 to 2004-05. Thus, the results reveal that the reduction of rural poverty is relatively higher than the reduction of urban poverty during the period under consideration. In terms of combined figures; it is thus evident that there is 4.3% reduction of persons under the poverty line during the same period. Thus it can be summed up that the reduction of poverty in terms of persons under below poverty line is more significant under Uniform recall method than the Maximum recall method in the post reform period. Datta (1991) finds that there was a significant decline in both rural and urban poverty rates prior to the advent of economic reforms and thereafter there are no traces of such trend. This study reveals, that the head count index of rural poverty declined at the annual rate of 2.7% for the period 1973-74 to 1990-91, however the rate of decline during the post reform period (1990-91 to 1996-97) was not significantly different from zero. Similarly, prior to economic reforms, the head

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[1] Under this Uniform recall method, the household consumption expenditure data collected using 30 day recall method for all the items , But for the Maximum recall method , the data would be s used from the consumer expenditure data collected using 365-day recall period for five in frequently purchased non food items such as clothing, footwear, durable goods, education and institutional medical expenses and 30-day recall period for the remaining items.

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count index of urban poverty declined at the annual average rate of 2.2%, same trend is continued in the post reform period (1990-91 to 1996-97) also at the average rate of 2.2% per annum. This study also concludes that the urban sector seems to have continued its march of poverty reduction in the process of growth. In an another study Gupta (1999) show that there is an inverse growth relationship between reduction of poverty and economic growth, and this trend becomes even much more prominent if one observes the trends in recent years. Besides this, he pointed out that the new liberalized policies are more biased towards elite group and failed to improve the employment opportunities in the country. As a result of this, the poverty ratio has increased in India during the post reform period. While the study by Jha (2002) establishes the fact that a rise in rural and particularly in urban inequality and only a marginal decline in poverty have characterized the post liberalization period. The rise in inequality is explained in terms of an increase in the relative share of output going to capital as compared to labor, a decline in the rate of labor absorption and the fast growth of the service sector. The rise in inequality has lessened the poverty-reducing effects of higher growth. He also finds that the economic reforms have been characterized by widening regional inequality. It is clear that the incidence of rural poverty is relatively higher than the urban poverty.

2. Measuring Economic Reforms in India

There is a vast amount literature to estimate the effects of economic reforms on the long run rate of growth of output of the theoretical growth models and economic development process. In all these studies economic reforms is measured only partially with one or a few economic variables like the trade ratio, direct foreign investment, capital flows, tariff rates, trade restrictions, monopolization of exports, and country specific reforms dummies or sometimes combination of these variables and so on. Such measures are generally known as openness of the economy. Subsequently, many other measures of reforms were developed later on using different methods. The well known Sachs and Warner (1995) binary index of openness is based on the weighted averages of some economic variables.

Others, while accepting economic variables are important to measure reforms process, argued that reforms also includes various dimensions and subcomponents like for example competition policy or internal structural reforms, which are difficult to measure[2]. The well known EBDR discrete index of economic reforms for transition economies is based on a few such variables from the competition policy and private sector. The EBDR's reforms index and similar measures are often used, along with a few other crucial economic variables, as the conditioning variables.[3] In practice it is hard to maintain a distinction between openness which is proxied with mostly economic variables and economic reforms measured with variables from various policies related subcomponents. Nevertheless there are no prominent studies in the literature which measured the effects economic reforms on poverty in India. There seem to be two issues which are critical and they are partly methodological. Firstly, and more generally, what should be an appropriate specification to estimate the effects of economic reforms on poverty levels. The specification issue is also important for estimating the effects of economic reforms on other variables associated with poverty like human development and social development. Secondly, how economic reforms should be measured because it has not only economic but various policy related dimensions.

In light of these observations, Vadlamannati (2007) is a welcome contribution related to India because his comprehensive measures of economic reforms will help to decrease many disagreements on the measurement issue. The Economic Reforms Index (ERI) for India is formulated with seven subcomponents viz., Social Sector Reforms, Fiscal Reforms, Trade Reforms, Domestic Financial Reforms, International Financial Reforms, Public sector Reforms and Structural Reforms from 1975 to 2006 and updated yearly. For

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[2] Studies like Fidrmuc (2000, 2003); Herbert (2001); Jensen (2002); Kim & Pirttila (2003) and Falcetti, Tatiana & Sanfey (2005) make use of EBRD's economic reforms index constructed for all the CIS countries from 1989 to 2004. While other prominent studies related to Latin American economies like Jordan Gans-Morse & Simeon Nichter (2008) make use of United Nations Economic Commission for Latin America and the Caribbean's Economic Reforms Index for Latin American countries. There is also another index of reforms for Latin American countries constructed by Lora (1997).

[3] Using mainly economic variables Edwards (1998), Dollar & Kraay (2004). Rodrick (1997), Crafts (2000) & Rincon (2007) found that economic globalization process positively affects growth. Chanda (2001) used capital account openness as a proxy for reforms process to find that it does not help developing countries in growth. Alesina et al. (1994) find the opposite. On the other hand Bussessmen et al. (2005) & Beer & Boswell (2001) examined the effects of globalization on income inequality.

more information on the methodology of construction of the economic reforms index for India, see Annexure 1 at the end[4]. Using his comprehensive economic reforms index, the main purpose of this paper is to study the implications of reforms on poverty levels using time series analysis.

3. Methodology

To investigate the impact of economic reforms on poverty, the following 'parsimonious model' is adopted:

$$Y_t = \alpha + \psi_1 X_{1t-1} + \psi_2 X_{2t} + \psi_3 X_{3t} + \psi_4 X_{4t} + \psi_5 X_{5t} + \psi_6 X_{6t} + \psi_7 X_{7t} + \psi_8 X_{8t} + \varepsilon_t$$

.... (1)

Where, Y denotes the poverty rate, X_t (t = 1, 2, 3, 4, 5, 6), and ε are economic reforms lagged to one year, GDP growth rate, percapita GDP, Inflation, Wages, Gini index, Employment rate, percapita Food availability and error term. The sign of ψ_2 and ψ_2 should be negative as economic growth and development process tends to improve the poverty levels. Similarly, we also expect the signs of ψ_5, ψ_7 and ψ_8 to be negative as improvement in average wages, employment levels and percapita food availability tend to reduce the poverty levels. However, we expect a positive sign for ψ_6 and ψ_6 **as** an increase in inflation and income inequality would hamper poverty levels.

Since we are interested in finding the impact on economic reforms on poverty levels in India, the direct application of conventional regression techniques to equation (1) many not be appropriate since most of the macroeconomic time series variables listed may be found not to be stationary. Overlooking this aspect might lead to spurious results and the findings might be unreliable. In order to avoid this situation, it is imperative to investigate the stationarity aspect of all the series listed in equation (1). The empirical exercise comprises two parts: (1) testing for a unit root, I (1), in each series and (2) testing for the number of cointegrating vectors in the system, provided that we cannot reject the null

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[4] These indices can be downloaded from http://sticerd.lse.ac.uk/eopp/_new/data/Indian_Data/default.asp

hypothesis of unit root in each of the time series being studied. Fulfilling this test, we proceed ahead with testing for long-run causal relationship between economic reforms and poverty levels by undertaking cointegration tests and subsequently followed by causality test.

i. Unit Root Test:

The first step in this exercise involves performing Dickey-Fuller (DF) Unit Root Test and subsequently based on the results, we might conduct Augmented Dickey-Fuller (ADF) test. Let a variable "X" be Y_t, the DF Unit Root Test are based on the following three regression forms:

a. Without Constant and Trend:

$$\Delta Y_t = \varphi Y_{t-1} + \partial_t$$
.... (2)

b. With Constant

$$\Delta Y_t = Ч + \varphi Y_{t-1} + \partial_t$$
.... (3)

c. With Constant and Trend

$$\Delta Y_t = Ч + þT + \varphi Y_{t-1} + \partial_t$$
.... (4)

Testing Hypothesis for Unit Root:

H_0: ς = 0 **(Presence of Unit Root)**

H_1: ς = 1 **(No Unit Root)**

The Decision rule:

a. If t stat values > ADF critical value, = do not reject null hypothesis, i.e., unit root exists.

b. If t stat values < ADF critical value, = reject null hypothesis, i.e., unit root does not exist.

i. i. Augmented Dickey Fuller (ADF) test:

Sometimes, even after using the above mentioned three different propositions and fail to attain proper desired results, it subsequently it leads to more confusion to determine whether the series is stationary or otherwise. In these circumstances, we use ADF method. This method takes the lag transformation into consideration. This can be specified as follows:

$$\Delta Y_t = Ч + þT + φ Y_{t-1} + Ѓ_i Σ \Delta Y_{t-i} + ∂_t$$

.... (5)

ii. Cointegration Test:

To investigate the existence of a long-term relationship between trade balance and other variables, we explore existence of any significant long-run relationship among the variables in our model. If the variables that we are using in the study are found to be cointegrated, it will provide statistical evidence for the existence of a long-run relationship. Though, a set of economic series are not stationary, there may exist some linear combination of the variables which exhibit a dynamic equilibrium in the long run (Engle and Granger, 1987). We employ the maximum-likelihood test procedure established by Johansen and Juselius (1990) and Johansen (1991). Specifically, if Yt is a vector of n stochastic variables, then there exists a p-lag vector auto regression with Gaussian errors of the following form:

$$\Delta Y_t = K + Ѓ_1 \Delta Y_{t-1} + ... + Ѓ_{p-1} \Delta Y_{t-p+1} + Π Y_{t-1} + μ_t$$

.... (6)

Where,

$Γ_1,.. ... Γ_{p-1}$ and $Π$ are coefficient matrices, Z_t is a vector of white noise process and **K** contains all deterministic elements.

The focal point of conducting Johansen's cointegration tests is to determine the rank (r) of matrix $Γ$ k. In the present application, there are three possible outcomes. First, it can be of full rank, (r=n), which would imply that the variables are stationary processes, which would contradict the earlier finding of non-stationarity. Second, the rank of k can be zero

(r=0), indicating that there is no long-run relationship among the variables. For instance when Γ k is of either full rank or zero rank, it will be appropriate to estimate the model in either levels or first differences, respectively. Finally, in the intermediate case when there is at most r cointegrating vectors 0≤r≤ n (i.e., reduced rank), it suggests that there are (n-r) common stochastic trends. The number of lags used in the vector auto-regression is chosen based on the evidence provided by Akaike's Information Criterion (AIC). The cointegration procedure yields two likelihood ratio test statistics, referred to as the maximum Eigen value (λ-max) test and the trace test, which will help to determine which of the three possibilities is supported by data.

iii. Causality Test:

If the two variables specified shares a long-run relationship with each other, then the immediate next step is to examine causality, since if two or more variables are cointegrated; there is causality in at least one direction (Engel and Granger, 1987). We proceed to determine whether total revenue Granger causes expenditure and vice-versa, using Vector Error Correction Model (VECM). According to Engle and Granger (1987), if two variables are cointegrated, then a more comprehensive test of causality, which has become known as an Error-Correction Model (ECM), should be adopted. The Vector Error Correction specification restricts the long-run behavior of the endogenous variables to converge to their cointegrating relationships while allowing a wide range of short-run dynamics (Granger Causality). The cointegration term is known as the error correction term since the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments.

4. Empirical Results & Estimations

i. Results of Unit root test

The results of the unit root tests are presented in table-1 and we have used Augmented Dickey Fuller tests to find the existence of a unit root in each of the time series variables. The ADF test results show that for Poverty, Economic Reforms, Percapita GDP and Gini Index variables are in level form. The null hypothesis of a unit root cannot be rejected at the conventional significance level both in the presence of time trend. This is because the

T-ADF Statistic is less than their critical values and thus we accept the null hypotheses that the variables are not significantly different from zero. Then we advanced to include intercept and trend, but still found both the series to be non-stationary.

Table 1: Results of Unit Root Test (ADF)

Variables	Constant without Trend				Constant with Trend			
	Levels	lags	1st Difference	Lags	Levels	lags	1st Difference	Lags
Poverty Levels	-0.71	[0]	-6.00 *	[0]	-2.94	[0]	-5.88 *	[0]
Economic Reforms	1.20	[0]	-3.86 *	[0]	-1.04	[0]	-4.71 *	[0]
Growth Rate of Reforms	-3.34 **	[0]	-7.05 *	[0]	-3.62 **	[0]	-6.92 *	[0]
GDP Growth Rate	-5.90 *	[0]	----	----	-6.78 *	[0]	----	----
Percapita GDP	6.53	[0]	-1.99 ***	[0]	2.04	[0]	-3.78 **	[0]
Inflation	-3.71 *	[0]	----	----	-3.70 **	[0]	----	----
Wages	0.48	[4]	----	----	-5.55 *	[4]	----	----
Gini Index	-1.95	[0]	-6.51 *	[0]	-3.00	[0]	-6.40 *	[0]
Employment rate	-3.91 *	[0]	----	----	-0.84	[0]	----	----
Percapita Food Availability	-1.62	[0]	----	----	-5.55 *	[0]	----	----

Notes:
1. The values in brackets are number of lags.
2. The lag length selection was done based on the SIC criterion
3. * Significant at 1% confidence level; ** Significant at 5% confidence level & *** Significant at 10% confidence level.

The results also suggest that rest of the variables (growth rate of reforms, GDP growth rate, Inflation, wages, employment rate and percapita food availability) have been found to be stationary in their current levels. In that, growth rate of reforms, GDP growth rate and Inflation have been found to be stationary irrespective of whether we include time trend or not. But for the variables: employment rate and percapita food availability we find that they are stationary only after including time trend. The results to extreme right under the head "constant with Trend" suggest that all the variables that were non-stationary in the levels have been found to be stationary in first difference form as their critical values were less than the ADF Statistics at 1% and 5% levels of significance, that is, the variables are integrated of order 1 [I (1)].

We now proceed to apply cointegration tests between the variables viz., economic reforms and poverty levels to detect any possible long-run equilibrium. The cointegration

test is the statistical implication of the existence of a long - run relationship between economic variables. The test stipulates that if variables are integrated of the same order, a linear combination of the variables will also be integrated of that same order. The idea behind cointegration analysis is that although macro variables may tend to trend up and down over time, groups of variables may drift together. If there is some tendency for some linear relationships to hold amongst a set of variables over long periods of time, then cointegration analysis helps us to discover it.

Table 2: Cointegration Test for Economic Reforms and Poverty Levels

Variables Relationship	Equations	Trace Statistic	Critical Value at 5%	Prob Values	Max Eigen Statistic	Critical Value at 5%	Prob Values
Economic Reforms & Poverty Levels	None	27.92301	15.50 *	0.0004	27.84923	14.27 *	0.0002
	At most 1	0.073775	3.84	0.7859	0.073775	3.84	0.7859
Observations	32						
Lags interval (in first differences)	1 to 1						

Notes:
1. * Indicates one cointegrating equation at 5% confidence level
2. MacKinnon-Haug-Michelis (1999) p-values

The null of no cointegrating vector can be rejected for the variables used above (see Table 2) and the empirical findings reinforce the conclusions about the presence of long run relationship and that there exist a linear combination between economic reforms and poverty levels. The results show that both tests (trace statistic and max-eigen statistic) rejects the null hypothesis that the number of cointegrating vectors is zero, in favor of the alternative hypothesis that there exists one cointegrating vector in this case. This leads to a conclusion that there exists long run equilibrium relationship between both variables.

We now move towards examining the causal relationship between the two. The results of the causality tests are presented in Table – 3. The empirical findings suggest that there is no significant bi-directional causal relationship between economic reforms and poverty levels. However, there is a uni-directional causal relationship flowing from economic reforms to poverty levels, which means, that the later is influencing the former where as it is not the other way round.

Table 3: Results of VECM Test for Economic Reforms and Poverty Levels

Equations	Cointegration Equation 1	Constant
Poverty Levels	-1.093603 * (0.15588)	0.499270 (5.70174)
Economic Reforms	-0.484493 (0.31465)	0.400066 (0.25874)
Observations	32	
Lags interval (in first differences)	1 to 1	

Note: * Significant at 1% confidence level & Standard Errors are reported in parenthesis

Thus it is evident that there is a uni-directional Granger-causality between economic reforms and poverty levels. This suggests that the past values of economic reforms are used to predict poverty levels. In the next step, the cointegrating coefficients are then normalized based on poverty rates. The results of significance test are placed in table 4. Further examination of the short-run dynamic properties of economic reforms process and poverty levels is investigated by estimating forecast error variance decomposition. The variance decomposition results placed in annexure 2 reveal that with a lag of eight periods, the economic reforms result the variance in poverty levels by 87.27% and 88.52% by the end of the ten periods. This means that the "own shocks" variation of total poverty levels ranged only from 12.73% to 11.48% over the ten-year horizon. In line with the empirical results, the variance in economic reforms is explained by poverty levels at the end of eight periods is 3. 25% and 2.67% at the end of ten years. Thus, the salient features of the variance decomposition results are that the fluctuations in the predominant sources of poverty levels are largely due to shocks by economic reforms. In sum, the forecast error variance decomposition shows that the innovations of economic reforms process can be a better predictor of poverty levels in India.

Table 4: VAR Results of Economic Reforms & Poverty equation

Dependent Variables: Poverty Rate

Variables	Model 1	Model 2	Model 3
Poverty (t-1)	0.471486 [2.40785]	0.411616 [2.26329]	0.471321 [2.43536]

Poverty (t-2)	-0.007395 [-0.03372]	0.026820 [0.13327]	0.001559 [0.00717]
Constant	36.00347 [1.71884]	38.03262 [1.98334]	39.24193 [1.88692]
Economic Reforms	0.322079 [2.14464]	------	------
Economic Reforms (t-1)	-0.586973 [-2.89737]	-0.229728 [-1.91160]	-0.585366 [-2.98825]
Economic Reforms Growth	------	0.005936 [2.25341]	------
Economic Reforms Squared	------	------	0.005936 [2.25341]
Economic Growth Rate	-0.041861 [-0.27645]	-0.022020 [-0.15894]	0.012164 [0.08039]
Economic Development	-0.011227 [-0.61873]	-0.011867 [-0.72780]	-0.047623 [-1.72450]
Inflation	0.185325 [1.37287]	0.146336 [1.17724]	0.212020 [1.58320]
Wages	0.002932 [0.99120]	0.002126 [0.84571]	0.004950 [1.46064]
Gini Index	0.176734 [0.59750]	0.169536 [0.62714]	0.237936 [0.80610]
Rate of Employment	-2.074290 [-2.70650]	-1.938372 [-2.79840]	-1.861342 [-2.48745]
Percapita Food Availability	0.027838 [0.48547]	0.013673 [0.26190]	0.064463 [1.06663]
R-squared	0.972154	0.976706	0.972731
Adj. R-squared	0.955136	0.962472	0.956066
F-statistic	57.12736	68.61332	58.37118
Log likelihood	-52.37287	-49.69490	-52.05868
Akaike AIC	4.291524	4.112993	4.270579
Schwarz SC	4.852003	4.673472	4.831058

Note: Standard Errors are reported in parenthesis.

We see from the results presented in model 1 the hypothesis variable, i.e. current level of economic reforms is having a positive effect on poverty levels in India. The t-stat value shows that it is statistically significant at 5% confidence level. But we find that Reforms lagged for one year is having a significant negative effect on Poverty levels. The t-stat suggests that this is also statically significant at 5% confidence level.

In model 1 we find that the current level of reforms is affecting poverty levels positively, whereas the level of past reforms leads to decline in poverty levels. Meaning, the

immediate adjustment cost of economic reforms is offset by the positive effects by the level of past reforms. This can be seen though the coefficient values of both the variables. The positive effect of economic reforms in current level shows 32% increase in poverty for every 10% increase. Whereas in the past economic reforms level, every 10% increase has a 59% negative effect on poverty levels. Thus, the net effect of economic reforms on poverty levels is -27%. In model 2 we replace the current reforms level with what we call as new reforms levels, which is rate of growth of economic reforms. We find that the new reforms are helping in increasing the poverty levels. However, the coefficient value is very low compared to current reforms level. A 10% increase in new reforms level is leading to 0.59% increase in poverty levels. This being so, the past reforms level is still statistically significant with negative sign. We find that the past reforms level is leading to decline in poverty levels by 23%. Thus, the net effect on poverty remains -22.41%. In the final model 3 we replace the rate of growth of reforms variable with reforms squared value. We find that even the acceleration of reforms is helping increasing poverty levels by 0.59%, while the past level of reforms is leading to decline in poverty levels by 58%. The point worth noting is the comparison of reforms and reforms squared value. We see the though both are increasing the poverty levels. But the coefficient values show that as reforms process is accelerated, the positive effect is getting reduced substantially. The only other variable, which is statistically significant, is the rate of employment level in the country which is exerting negative sign.

We do agree that the impact of globalization process and economic reforms on poverty and inequality remains highly contentious issue with limited and divergent empirical findings. However, our study indicates that economic reforms in India though have an immediate adjustment cost in the immediate current year, the past level of reforms produced favorable impacts on poverty.

05. Conclusion & Summary

In this paper, we have investigated the impact of economic reforms on Indian poverty levels. Our empirical investigation is conducted within the framework of the unit root,

cointegration and VECM tests. Empirical results indicate that there is a long run equilibrium relationship between economic reforms and poverty levels in India. The results also show that the direction of causality is flowing from reforms to poverty levels. The VAR estimates show that current level of economic reforms is having a positive effect on poverty levels in India. But, the past level of reforms has a significant negative effect on poverty levels. Meaning, the immediate adjustment cost of economic reforms is offset by the positive effects by the level of past reforms. We also find the results to be almost similar when we introduce acceleration of reforms process. However, the positive effect of coefficient value has significantly come down, indicating that acceleration of reforms process might help in controlling the poverty levels, if not completely bring down. These results are very informative to the policy makers.

Although the results obtained in this paper may be regarded as preliminary while we await the availability of even longer and better time series data on poverty rates, if at all they are available, for India. Also, the process of tracing back the economic reforms process back to 1970 or so on is underway. Nevertheless, these results should also be viewed as an important first step in addressing such a vital topic, which is of paramount importance for public policy makers in India.

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Annexures

Annexure – 1

Economic Reforms Index: Methodology

Construction of Composite Index

A comprehensive measure for Economic reforms for India was developed in the form of Economic Reforms Index for the period 1975 to 2006. For this purpose, I use the methodology developed by Morris and McAlpin in 1982-83 for constructing the Physical Quality of Life Index (PQLI)[5]. The need for composite indices aroused because, the ratios have different numerators and denominators and hence their simple summation is not possible.

Economic Reforms Index (ERI) = Social Sector Reforms Index (SSRI) + Fiscal & Tax Reforms Index (FTRI) + Domestic Financial Sector Reforms Index (DFSRI) + International Financial Sector Reforms Index (IFSRI) + Trade Reforms Index (TRI) + Structural Reforms Index (SRI) + Public Sector Reforms Index (PSRI)

Earlier, many attempts were made in this direction by many eminent experts and scholars who have developed indices for measuring various variables at central level. The work of Dholakia and Solanki (2001) focused on developing a composite index of fiscal performance consisting of six different fiscal indicators and the states were ranked on the basis of the value of the index for different years. Similarly, Bhide and Panda (2002) had come up with another composite fiscal index, made up of five components, for judging the quality of central government budgets. Again, Dholakia (2005) and Vadlamannati (2005) constructed a composite index for all states and Andhra Pradesh respectively by taking eight key ratios, based on which ranks were given for the states for their fiscal performance from 1991 to 2003. Using similar methodology, I construct a comprehensive measure of Economic Reforms Index for India.

In the first step, we identify the appropriate indicators under each head. While selecting the indicators under each head, excess care is taken to identify the difference between "cause & affect" to best represent the *policy aspect of reforms* carried out in each sector/area. For example, reforming spending on Social Sector needs is the "cause" and the "affect" is higher literacy rate, higher primary and secondary school enrollment ratios. So I was very careful to the maximum extent to NOT to mix "cause" with "affect" while selecting indicators for each indices. Second, the objective of this index is to make it as comprehensive as possible covering all the reforms policy aspects. Unlike Lora (2001) and Morley et. al (2000) Reforms Index for Latin American countries, this reforms index captures even most sensitive and important issues like: Tariff rates, Exports subsidies, tax

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[5] PQLI was developed in a research work by Morris and Mc Alpin in 1982-83 for measuring the conditions of poor in India.

rates, tax efficiencies, corporate governance issues, stock market and banking reforms, Trade Openness (in a new way of calculation) & public sector reforms[6].

The selected indicators under each group are listed as under:

Table 5: List of Indicators selected under various sub heads

1. Social Sector Reforms Index	2. Fiscal & Taxation Reforms Index	3. Public Sector Reforms Index	4. Trade Reforms Index	5. Domestic Financial Reforms Index	6. International Financial Reforms Index	7. Structural Reforms Index
Social Sector Spending	Fiscal Deficit/Govt expenditure	Privatization Proceeds / GDP	Trade Openness ({Imports + Exports / GDP PPP} / Population)	Average Lending Rates	Exchange Rate Stability/Instability	Number of Industries De-licensed
Rural Development Spending	Revenue Deficit/Fiscal Deficit	Levels of Employment in PSUs	Total Customs Collections Rate	Number of Scheduled Commercial Banks	Number of Months Imports are covered by Forex Reserves	Registration of companies under MRTP Act
	Highest Corporate Tax Rates	Average Government stake in PSUs	Duty Collection Rate on Agriculture products	Number of New Public Issues (Listing & Pricing requirement relaxation	Capital Account Convertibility Index	Industrial Licences issued
	Highest IT Rates	Govt Equity holding in PSUs/total Equity of Corporate India	Duty Collections Rate on Industrial Products	Total Reserves / Total Deposits (Liabilities) of banking system	Repatriation of Profits & Dividends Risk	Number of Foreign Collaborations approved
	Corporate Tax Efficiency		Anti Exports Bias (Exports Subsidies)	Access to Money (5 years average of M3 - 10 years Avg. of GDP growth)		Entry of Foreign Firms
	IT Tax Efficiency			Share Holder Protection Index		Dismantling of Capita Import Goods
	Average Effective Indirect Tax Rates					Dismantling of TDF approvals for Design & Consultancy

In the next step, the values under each indicator were converted into an index, namely individual indicator indices. This is because, the selected indicators are ratios with different numerators and denominators and hence their simple summation is not possible. For this purpose, the paper used the methodology of Physical Quality of Life Index (PQLI). Accordingly, the worst and best values of each indicator during the period of 1975 to 2006 were identified. For each indicator the performance of each indicator in each year was put on a 0 to 100 scale where, 0 represents an absolutely defined worst

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[6] If there are any drawbacks, to the best of my knowledge, they are two: i. Due to lack of any data I couldn't capture & quantify "Non Tariff Barriers" and ii. "Administrative Reforms" (like slow relaxation in rules & regulations related to FDI norms).

performance and 100 represents an absolutely defined best performance and to aid the calculations, one unit point was added to the best values of the indicators[7].

Thus,

$$\textbf{Indicator Index} = \frac{1}{m_i} \frac{1}{n_i} \sum_{j_i}^{m_i} \sum_{t_i}^{n_i} \left(\frac{\textbf{Actual value}_j - \textbf{Minimum value}_{jit}}{\textbf{Maximum value}_j - \textbf{Minimum value}_j} * \textbf{100} \right)$$

Where, *Indicator Index* is a value of *j*-th variable of *i*-th country (India) in time *t, n* stands for the number of the years and *m* for the number of variables. One main advantage of such transformation is that it allows the reform index to be measured over the same scale. This is an easy method to find out the performance of the Reforms, as an increase in the value of an indicator index would necessarily mean improvement in the economic reforms process and vice versa.

Once the indicator indices are formed, the comprehensive Composite Index is then calculated as a simple average of the indicator indices.

$$\textit{Composite Index} = \frac{\sum \textbf{Individual Indicator Indices}_i}{\textbf{N}} * \textbf{100}$$

Where, *composite index* is the summation of all the individual indices and N is the total number of individual indicator indices.

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[7] The best & worst values are defined in such a way that all the indexes could become unidirectional, i.e. an increase in value of an index would necessarily mean improvement in the fiscal performance of the state.

Annexure – 2: Results of Variance Decomposition

Variance Decomposition of Poverty			
Period	Standard Error	Poverty	Reforms
1	1.244788	100.0000	0.000000
2	1.307312	92.07175	7.928245
3	1.862336	45.50834	54.49166
4	2.990792	21.22834	78.77166
5	3.642323	14.48085	85.51915
6	3.974244	12.16521	87.83479
7	4.075934	12.52304	87.47696
8	4.128176	12.73350	87.26650
9	4.200208	12.48838	87.51162
10	4.390774	11.47949	88.52051
Variance Decomposition of Reforms			
Period	Standard Error	Poverty	Reforms
1	2.512695	3.346758	96.65324
2	3.462425	2.683751	97.31625
3	4.182151	2.313834	97.68617
4	4.424645	2.645257	97.35474
5	4.512895	3.117835	96.88217
6	4.571813	3.755722	96.24428
7	4.697525	3.562677	96.43732
8	4.960758	3.249239	96.75076
9	5.331609	2.977878	97.02212
10	5.637072	2.672364	97.32764

Annexure – 3: Data Sources

Variables	Indicators	Data Sources
Poverty levels	Poverty Rate	Fan, Hazell & Thorat (1999); Guha-Khasnobis, Basudeb & Kar, Saibal (2003)
Economic Reforms	Economic Reforms Index	Author's construction
New Reforms	Growth Rate of Reforms	Author's construction
Economic Growth	GDP Growth rate	World Development Indicators 2006, World Bank
Economic Development	Percapita GDP (US$ 2000 Constant)	World Development Indicators 2006, World Bank
Inflation	Growth rate of Consumer Price Index	World Development Indicators 2006, World Bank
Wages	Total Wages earned in US$	ILO Statistics 2006
Inequality levels	Gini Index	WIDER, UN & own calculations
Employment levels	Employment rate	ILO Statistics 2006 & World Development Indicators 2006, World Bank
Availability of Food	Percapita Food Availability	Economic Survey 2007, Government of India

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