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Abstract

Econometric analysis of impact of fiscal policy stance on gender equality is a new area of research. Using fixed effects model of pooled least squares, the paper examined the impact of public expenditure on gender aware human development processes in Asia Pacific region. The results revealed that fiscal policy stance has a positive impact on HDI and GDI. The widely explored link between economic growth captured in terms of per capita income and the human development has been refuted by the results may be due to the increasing inequality in command over resources. The same results hold for sector-specific models as well. The result broadly conforms to the proposition that fiscal stance on human capital formation gets transformed to the end results of better human development indicators, despite the constraints of intra-household disparities in resource allocation.

Key Words: Fixed Effects, gender equality, human development index, gender development index, public expenditure, fiscal stance, public policy

JEL Codes: C33, E62, H50, I0

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Gender sensitive human development is broadly defined as a process of enlarging people's choices across gender, as well as raising their level of well being. Theoretically, these choices can be infinite and vary intertemporally and spatially. From among these, the choice to lead a long and healthy life; the choice to acquire knowledge and be educated; and to have access to resources needed for a decent level of living are identified as three most critical and socially valuable[1]. A range of social outcomes can reflect these choices in the well being of people, human development paradigm[2] identified the most important being the longevity, literacy and the per capita income. The longevity and attainments in knowledge domain are valued as ends in themselves; and the per capita income is to capture the 'command over resources' dimension, which is a means to attain the socially desirable state of well being.

The aim of the paper is to analyze the impact of fiscal policy stance in terms of the public expenditure incurred on health and education on gender sensitive human development in Asia and Pacific. This paper does not intend to refute the widely explored link between economic growth captured in terms of per capita income and the human development, rather to emphasize that it does impact significantly through higher public expenditure, particularly through public policies on health care and education. The crucial question therefore is that whether public policy stance makes an impact on human development. Since there is a contemporaneous transformation of many socio-economic and policy variables that result in the gender sensitive human development, it is a difficult task to establish a bivariate link between the two. However, an analysis

[1] Human Development Reports, UNDP.

of macrolink between fiscal policy stance, proxied by the public expenditure, and human development would enable us to realise whether the money spent by government, especially on human capital is transformed to the end results of better gender sensitive human development indicators. The disaggregated sector specific link between fiscal policy and gender sensitive indices of health and education has also been analyzed in the paper.

The paper is divided into four sections. Apart from the introduction, section II deals with some theoretical issues related to fiscal policy stance and gender sensitive human development while section III interprets the measurement issues and data. Section IV deals with the specification of the model and econometric estimation. Section V interprets the results and draws conclusions.

I. Theoretical and Empirical Review

In assessing gender sensitive human development, the orthodox measures of well being, such as economic growth in terms of GDP per capita or by some distribution-corrected value of GNP per head, used in empirical literature have inherent limitations in capturing wider aspects of well being and the process of sustainable development. There can be little doubt about the value of higher real income in opening up possibilities of living worthwhile lives that are not available at lower levels of income[3].

Sen's Capability Approach provides an advanced analytical framework for financing gender sensitive human development over mainstream economic welfare criteria and its overemphasis on GDP. It has been central to the Human

[2] Sen, 1998
[3] Dreze and Sen, 1995

Development Reports series (HDRs) launched by UNDP since 1990s by Sen's close associate, the late Mahbub ul Haq, and has subsequently influenced policy at World Bank during the Wolfensohn era (Gasper, D 2002). It provided an apparatus for rethinking economic development, which goes beyond the undue emphasis on economic growth and its trickling down effects. It revealed that disproportionate emphasis on economic growth conceals capability across gender for a significant share of the population in Asian countries and therefore never suited to be a satisfactory measure of well being.

It is relevant to note the debate of 'growth-led' gender sensitive human development' versus 'support-led' gender sensitive human development in this context. The debate revolves around the hypothesis that economic growth per se is necessary but not sufficient for gender sensitive human development; government intervention, in particular, fiscal policies at various tiers, has significant role in redressing capability deprivation.

Empirical evidence showed that in a semi-logarithmic framework of regressing proportionate shortfalls of life expectancy against per capita GDP, revealed that nearly half of the variations in the life expectancy could be attributed to differences in GNP per head (Anand and Ravallion, 1993). In this context, it is important to note that the substantial impact of higher GDP per head on life expectancy and other social outcomes of better literacy level, low mortality rates among children and better schooling among children seems to work via factors in which fiscal policy stance play a significant part.

There are six reasons why fiscal policy stance should promote human development. First and above all, human development is an end itself, which needs no further justification. Second, it is a means to higher productivity. Third, it reduces human reproductivity, by lowering the desired family size. Fourth,

human development is good for the physical environment; that the impact of population growth and population density is detrimental for environment due to deforestation, desertification and soil erosion. Fifth, reduced poverty contributes to a healthy civil society, democracy and greater social stability. Sixth, it has political appeal, for it may reduce civil disturbances and increase political stability [4] (Streeten, 1994).

The arguments for public policy stance, in terms of expenditure as the key policy instrument, rest on the fact that the functioning of the market cannot, by itself, activate the signaling, response and mobility of economic agents to achieve efficiency in both static (allocative efficiency) and dynamic (shift in the production frontier) terms (Arndt, 1998). The theoretical and empirical advancement towards public policy intervention in providing human development reflect the community's growing concern with social aspects of development; steel mills, dams and machine building industries have now been displaced from the commanding heights of development strategy, instead so-called soft sectors such as education and health have occupied the center stage (Mundle, 1998).

The case of public expenditure proceeds from market failures of one kind or another. Markets fail to secure appropriate signals, responses and mobility because: (i) not all goods and services are traded. Markets cannot determine the prices of public goods; (ii) goods exhibiting externalities in consumption and production force a wedge between market prices and social valuation and the market will not ensure a socially desired supply; (iii) some goods are characterized by increasing returns to scale. In case of such natural monopolies, society can gain from lower prices and higher output when the public sector is

[4] Streeten, P (1994) elaborated six reasons why we should promote human development in his seminal paper titled "Human Development: Means and Ends".

the producer or a subsidy is paid to the private sector to cover the losses of producing optimal output; (iv) information asymmetry between the providers and consumers of services such as social insurance can give rise to the problems of moral hazard and adverse selection; and (v) state intervention is necessary also for securing income redistribution (Rao, M G, 1998). Certain public goods such as defense, administration, a clean environment etc that cannot be provided by market, because no consumer can be excluded once these services are provided and hence consumers will not 'buy' these services (Mundle, S, 1998).

II. Data and Measurement Issues

The link between fiscal policy and HDI/GDI of Asian countries (and Pacific) is analyzed in the paper for two periods: 1992-95 and 1997-2000. The data on Human Development Index and Gender-related Development Index was compiled from the UNDP Human Development Reports, while data on GDP, public spending on health and education in US dollar terms (in '000) and relevant population figures are compiled from World Development Indicators electronic database. The data on enrolment, literacy rate and life expectancy at birth have also been compiled from Human Development Reports[5].

The available macroindicator that best reflect human development is Human Development Index (HDI). It is a composite index based on life expectancy at birth, gross enrolment ratio, adult literacy rate and real GDP per capita. However, HDI has been criticized for a first-world bias; that the use of GDP, longevity and literacy levels in the base of the HDI can result in these

[5] For education sector, the enrolment rate is considered as the short run variable (as data on completion rate was not available) and literacy rate is the long run variable. For health sector, time series is not available for short run variables, viz., Child Mortality Rate or Infant Mortality Rate *disaggregated by gender* for the Asian countries. The long run variable used in health equation is Life Expectancy at Birth.

measures producing high rankings for developed countries even when there is significant gender inequality in a country.

The Human Development Index [HDI] is a gender-neutral measurement of the average achievements in a country in three basic dimensions of human development: longevity, knowledge and a decent standard of living. Longevity is measured by life expectancy at birth, knowledge by adult literacy and the combined gross primary, secondary and tertiary enrolment ratio, and standard of living by Gross Domestic Product (GDP) per capita in US dollars in purchasing power parity (PPP) terms.

Let L denote life expectancy at birth in years, A adult literacy as per cent, E combined gross primary, secondary and tertiary enrolment ratio in per cent, and Y per capita GDP in PPP US dollar terms. The value of each variable for a country is transformed into its deviation from the minimum possible value of the variable expressed as a proportion of the maximum deviation possible, i.e. maximum less minimum. Thus, after transformation we have

$L^* = (L-25)/(85-25)$, $A^* = A/100$, $E^* = E/100$, and $Y^* = (Y - \min Y)(\max Y - \min Y)$.

Given the minimum life expectancy for women and men of 27.5 years and 22.5 years, respectively, the average minimum life expectancy is taken as 25 [= (27.5 + 22.5)/2]. Similarly, maximum life expectancy is taken as 85. The maximum and minimum of both adult literacy and enrollment are taken as 100 and 0, respectively. The maximum and minimum for Y are exogenously fixed. HDI is computed as

$$\{L^* + (2/3 \times A^* + 1/3 \times E^*) + Y^*\}/3.$$

The Gender Development Index (GDI) uses the same variables as HDI, but adjusts for the degree of disparity in achievement across genders. The average value of each of the component variables is substituted by "equally distributed equivalent achievements". The equally distributed equivalent achievement for a variable is taken as that level of achievement that if attained equally by women and men would be judged to be exactly as valuable socially as the actually observed disparate achievements. Taking an additively separable, symmetric and constant elasticity marginal valuation function with elasticity 2, the equally distributed equivalent achievement Xede for any variable X turns out to be

$$Xede = [\, nf\ (1/Xf) + nm\ (1/Xm)]\text{-}1$$

where Xf and Xm are the values of the variable for females and males, and nf and nm are the population shares of females and males. Xede is a 'gender-equity-sensitive indicator'(GESI).

Thus, for this chosen value of 2 for constant elasticity marginal valuation function, GDI is computed as

$$\{Lede + (2/3 \times Aede + 1/3 \times Eede) + Yede\}/3.$$

The gender sensitive adjustment of human development index is Gender Development Index (GDI). In other words, GDI adjusts the average achievement of each country in life expectancy, educational attainment [better literacy levels and gross enrolment ratio] and income in accordance with the gender disparity. The values for HDI and GDI range between 0 and 1. The values closer to zero indicate acute deprivation. The values closer to one indicate attainable levels of

development. The developed countries including the Nordic countries, Sweden and Norway top the GDI scale. While the GDI of below 0.5 showed that women suffer the double deprivation of overall achievement in human development.

Among the Asian countries, it is noted that the categories of countries belong to Low Human Development (LHD), Medium Human Development (MHD) and High Human Development (HHD) change across time. In 1992, there were 7 HHD, 9 MHD and 7 LHD; while in 2001, the countries belong to HHD, MHD and LHD have been 4,17 and 2 respectively. Three countries which declined in value from HHD to MHD were Fiji, Malaysia and Thailand. At the same time, Bhutan, Bangladesh, China, India, Maldives and Nepal have shown a more or less constant increas4e in HDI. Yet another point to be noted here is that HDI values declined since 1997 for Fiji, Hong Kong, Malaysia and Thailand. Looking at gender disparity in basic capabilities across time, it is seen that GDI has always been lower than HDI for all countries in 1992-2001 period. The countries which have shown a more or less increasing trend in the value of GDI during this period were Bangladesh, China, India, Korea, Maldives, Nepal, Philippines and Sri Lanka. GDI values exhibit cyclical fluctuations for Hong Kong till 1999, after which it increased steadily. In Thailand, value of GDI noted a sharp decline in 1997, thereafter it has risen steadily. India's overall ranking on gender-related development is poor, even in comparison with the country's human development levels. India’s Gender Development Index (GDI) is lower than that all countries except Pakistan in the medium human development group to which India belongs. Low GDI reflects gender disparity in basic capabilities because of lack of education and health standards.

Among the Asian countries (and Pacific), Brunei, Bhutan, China, India, Korea, Maldives and Sri Lanka noted a more or less increasing trend in the percapita expenditure on health. Thailand has shown a declining trend in public

health expenditure in percapita terms since 1997. As mentioned above, the focus of analysis is to examine whether the variation in HDI (GDI) across countries has any link with the public spending policy. An econometric test is proposed to find the link between HDI (GDI) and fiscal policy stance, which is analyzed in the next section. The sector-specific links between public expenditure and gender-sensitive indicators have also been analyzed in the next section in the context of Asia and Pacific.

III. Specification of the Model and Econometric Results

The model is specified with per capita expenditure on health and education and economic growth rate as regressors. It is generally hypothesized that the human development is positively correlated to the economic growth rate of a country. However, the question we are interested is that to determine the effectiveness of government's social sector expenditure in attaining better levels of human development in general, and gender development, in particular. The model thus is specified in the following form:

$$\mathbf{HDI}_{it} = \alpha_i + \beta \log (\mathbf{PUB})_{it} + \gamma \mathbf{EG}_{it} + \mathbf{u}_{it} \quad \text{------} \quad \mathbf{(1)}$$

where HDI_{it} = Human Development Index

α_i = country-specific intercepts

PUB_{it} = log of per capita combined expenditure on education and health in US $

EG_{it} = economic growth rate

Table 1: Effect of Public Expenditure on Education and Health and Economic Growth on HDI in Asia: Fixed Effects Model: Period I

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(?PE+ ?PH)	0.043512	0.010849	4.010783	0.0003
?EG	0.003672	0.001441	2.548739	0.0148
Fixed Effects				
BR—C	0.575040			
BD—C	0.257599			
CH—C	0.447484			
FJ—C	0.621199			
HK—C	0.589661			
IN—C	0.501359			
ID—C	0.306683			
KR—C	0.594833			
LA—C	0.306237			
ML—C	0.559128			
MG—C	0.479873			
NP—C	0.238268			
PH—C	0.508907			
PK—C	0.317182			
SG—C	0.561308			
SL—C	0.537744			
TH—C	0.591549			
VN—C	0.359806			
VT—C	0.425290			
R-squared	0.996251	Mean dependent var		0.653098
Adjusted R-squared	0.994376	S.D. dependent var		0.184265

The estimation of the fixed effects model (of pooled least squares with white heteroskedasticity-consistent standard errors) between HDI and per capita combined expenditure on health and education showed a significant positive relationship between the two. (Table 1). Further, the results showed that increase in public expenditure on human resource development by one per cent could increase the HDI to 0.044 percentage points in the period 1992-1995. The economic growth rate is also found to be positive and significant in this period. The coefficient of economic growth rate is 0.0037; which translate that rise in rate of growth of economy by one per cent in an Asian country can lead to 0.0037 percentage point rise in HDI. In the second period, 1997-2001, the coefficient of public expenditure on health and education increased marginally to 0.05,

positive and significant; while the coefficient of the rate of economic growth became negative but insignificant in the second period (Table 2).

Table 2: Effect of Public Expenditure on Education and Health and Economic Growth on HDI in Asia: Fixed Effects Model: Period II

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Log (per capita combined expenditure on health and education)	0.049508	0.014826	3.339318	0.0021
Economic growth rate	-0.000120	0.000313	-0.382697	0.7044
Fixed Effects				
BR—C	0.504256			
BT—C	0.288766			
BD—C	0.341078			
CD—C	0.424101			
CH—C	0.536816			
FJ—C	0.510421			
ID—C	0.421768			
KR—C	0.560192			
LA—C	0.368386			
ML—C	0.500282			
MG—C	0.465391			
MD—C	0.465226			
NP—C	0.366215			
PP—C	0.352938			
PH—C	0.543909			
PK—C	0.378366			
SG—C	0.535060			
SL—C	0.548348			
TH—C	0.508519			
VN—C	0.344751			
VT—C	0.531386			
Adjusted R-squared	0.991257			

Now we turn to attempt the impact of per capita combined expenditure on health and education and economic growth rate on Gender Development Index (GDI).

$$\mathbf{GDI_{it} = \alpha_i + \beta \log (PUB)_{it} + \gamma EG_{it} + u_{it}} \text{ ---------- (2)}$$

where

GDI_{it} = Gender Development Index

α_i = country-specific intercepts

$\log(PUB)_{it}$ = log of per capita expenditure on education and health inUS $

EG_{it} = economic growth rate

The results presented in Table 7 revealed that combined public expenditure on education and health in per capita terms has a significant positive effect on GDI. An increase in per capita combined expenditure on health and education of one per cent tend to raise GDI by 0.061 percentage points. The economic growth rate is also found to have positive and significant impact on GDI, but the value of coefficient (0.003) is less than that of public expenditure in period I (Table 3).

Table 3: Effect of Public Expenditure on Education and Health and Economic Growth on GDI in Asia: Fixed Effects Model: Period I

Variable	Coefficient	Std. Error	t-Statistic	Prob
LOG(?PE+ ?PH)	0.060580	0.012743	4.754112	0.0000
?EG	0.002994	0.001338	2.238181	0.0308
Fixed Effects				
BR--C	0.398690			
BD--C	0.196536			
CH--C	0.396315			
FJ--C	0.399895			
HK--C	0.419806			
IN--C	0.425457			
ID--C	0.237170			
KR--C	0.418713			
LA--C	0.255890			
ML--C	0.421742			
MG--C	0.413250			
NP--C	0.180771			
PH--C	0.419908			
PK--C	0.200196			
SG--C	0.403593			
SL--C	0.459116			
TH--C	0.491084			
VT--C	0.399020			
R-squared	0.995518	Mean dependent var		0.618750
Adjusted R-squared	0.993389	S.D. dependent var		0.175889
S.E. of regression	0.014301	Sum squared resid		0.008181
F-statistic	8884.424	Durbin-Watson stat		2.059581
Prob(F-statistic)	0.000000			

In period II, though the effect of combined per capita expenditure on health and education has been found positive, the coefficient (0.003) is found to be lesser than that of first period. Like that of HDI model, the economic growth rate is found insignificant in the second period of analysis, yet positive (Table 4).

Table 4: Effect of Public Expenditure on Education and Health and Economic Growth on GDI in Asia: Fixed Effects Model: Period II

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(?PE+ ?PH)	0.025886	0.011397	2.271279	0.0307
?EG	0.000282	0.000229	1.227306	0.2296
Fixed Effects				
BR--C	0.662925			
BT--C	0.349059			
BD--C	0.386925			
CD--C	0.476111			
CH--C	0.614782			
FJ--C	0.616185			
ID--C	0.470894			
KR--C	0.699618			
LA--C	0.409223			
ML--C	0.622898			
MG--C	0.544155			
MD--C	0.584944			
NP--C	0.395825			
PP--C	0.435356			
PH--C	0.633132			
PK--C	0.405635			
SG--C	0.692999			
SL--C	0.628834			
TH--C	0.623463			
VT--C	0.589855			
Adjusted R-squared	0.995573	S.D. dependent var		0.149979

Public expenditure on health and education can be expected to influence HDI and GDI over a period of time. The specified models by abstracting from the lagged effect of such expenditure on HDI and GDI may have a downward bias in the estimated effect, but the dynamics of the impact could not be estimated because of data problems.

Now we turn to the estimation of sector specific equations. For the education sector, we have used enrolment rate as the short run variable to capture the impact of the public expenditure on education and economic growth; and literacy rate as the long run variable. Four models have been attempted with short run and long run dependent variables for gender neutral indicators and

gender-equity sensitive indicators (GESI). Model 4 and 6 are gender neutral specifications, while Models 3 and 5 are specifications with gender equity sensitive indicators of enrollment rate and literacy rate respectively.

$$\mathbf{GER}_{it} = \alpha_i + \beta \log (\mathbf{PUB_E})_{it} + \gamma \mathbf{EG}_{it} + \mathbf{u}_{it} \quad \text{---------- (3)}$$

where

GER_{it} = Gender Equity Sensitive Indicator (GESI) of Gross Enrolment Rate

α_i = country-specific intercepts

$\log(PUB_E)_{it}$ = log of per capita expenditure on education in US $

EG_{it} = economic growth rate

$$\mathbf{TER}_{it} = \alpha_i + \beta \log (\mathbf{PUB_E})_{it} + \gamma \mathbf{EG}_{it} + \mathbf{u}_{it} \quad \text{---------- (4)}$$

where

TER_{it} = Gross Enrolment Rate (Total)

α_i = country-specific intercepts

$\log(PUB_E)_{it}$ = log of per capita expenditure on education in US $

EG_{it} = economic growth rate

$$\mathbf{GLR}_{it} = \alpha_i + \beta \log (\mathbf{PUB_E})_{it} + \gamma \mathbf{EG}_{it} + \mathbf{u}_{it} \quad \text{---------- (5)}$$

where

GLR_{it} = Gender Equity Sensitive Indicator of Literacy Rate

α_i = country-specific intercepts

$\log (PUB_E)_{it}$ = log of per capita expenditure on education in US $

EG_{it} = economic growth rate

$$\mathbf{TLR}_{it} = \alpha_i + \beta \log (\mathbf{PUB_E})_{it} + \gamma \mathbf{EG}_{it} + \mathbf{u}_{it} \text{ ---------- (6)}$$

where

TLR_{it} = Total Literacy Rate

α_i = country-specific intercepts

$\log (PUB_E)_{it}$ = log of per capita expenditure on education in US $

EG_{it} = economic growth rate

All four models are estimated for two sub periods; 1992-1995 and 1997-2000 (Table 5 and 6). In the period I, the estimates revealed that one per cent of increase in public expenditure on education could rise the total enrolment rate and total literacy rate by 5.67 points and 2.45 points respectively (Models 4 and 6). When gender equity sensitive indicator of enrolment rate is used as regressand, public expenditure on education turned out to be insignificant. The equation of GESI of literacy rate as dependent variable revealed that one per cent rise in public spending on education increases the gender-equity adjusted literacy rate by 0.026 points. The economic growth is found to be negative in all models, but insignificant (except for Model 4).

In the Period I, public expenditure on education has been found to be positive and significant for Models 4, 5 and 6. In Period II, public expenditure on education has been found positive but not significant for all the models except Model 4. In Model 4, contrary to hypothesis, public expenditure have negative and significant impact on gender sensitive indicator of enrolment rate. In the same model, economic growth has been positive and significant. This result needs a careful interpretation; why economic growth has positive impact on GESI-enrolment rate while public expenditure on education turned out to have negative impact on short run variable on education in the period 1997-2000.

Table 5: Effect of Per-capita Public Expenditure on Education and Economic Growth on Education Indicators: Period I

	1992-1995 Model 3 Enrolment Rate (GESI)	1992-1995 Model 4 Total Enrolment Rate	1992-1995 Model 5 Literacy Rate (GESI)	1992-1995 Model 6 Total Literacy Rate
Log of public expenditure on education	-0.023671	5.663388	0.026104	2.451315
	(0.043163)	(1.502571)*	(0.005272)*	(0.486781)*
	[0.5867]	[0.0005]	[0.0005]	[0.0000]
Economic growth	-0.003238	-0.593243	-8.08E-05	-0.008710
	(0.003724)	(0.269840)*	(0.000469)	(0.044154)
	[0.3902]	[0.0339]	[0.8641]	[0.8447]
		Fixed Effects		
BR--C	0.837283	32.54397	0.702183	71.58110
BD--C	0.428226	31.99341	0.284206	31.51061
CH--C	0.761009	53.36623	0.742872	75.48536
FJ--C	0.905261	54.14172	0.769397	77.78162
HK--C	0.855125	36.67895	0.740339	75.39798
IN--C	0.718488	51.46773	0.754369	76.23273
ID--C	0.611609	45.60580	0.429093	46.33458
KR--C	0.942438	52.63385	0.815414	82.48449
LA--C	0.552374	42.32168	0.513298	54.53976
ML--C	0.761876	37.50329	0.695414	70.68424
MG--C	0.618575	40.19448	0.904346	90.89991
NP--C	0.584545	48.39234	0.215573	29.84211
PH--C	0.851120	61.51283	0.846737	85.17632
PK--C	0.384566	23.88219	0.256429	32.09660
SG--C	0.855435	38.57659	0.732754	74.53161
TH--C	0.666741	31.89572	0.817860	82.57967
VN--C	-	29.52129	-	-
VT--C	0.593750	48.58362	0.870363	87.27771
Adj. R squared	0.886385	0.955608	0.999126	0.999080

Note: The figures in brackets and square parentheses are standard error and probability respectively.

Table 6: Effect of Per-capita Public Expenditure on Education and Economic Growth on Education Indicators: Period II

	1997-2000 Model 3	1997-2000 Model 4	1997-2000 Model 5	1997-2000 Model 6
Dependent variable	Enrolment Rate(GESI)	Total Enrolment Rate	Literacy Rate (GESI)	Total Literacy Rate
Log of public expenditure on education	-0.046087	1.718755	0.003898	0.414356
	(0.026835)*	(5.130442)	(0.007957)	(0.697448)
	[0.0953]	[0.7396]	[0.6276]	[0.5566]
Economic growth	0.002743	0.203175	-8.08E-05	0.018595
	(0.000951)*	(0.122904)	(0.000469)	(0.015525)
	[0.0068]	[0.1072]	[0.1896]	[0.2398]
BR--C	1.016569	60.61026	0.876943	87.73325
BT--C	0.229708	18.94596		
BD--C	0.501565	37.55077	0.360724	38.43894
CD--C	0.630938	56.07321	0.650188	66.63184
CH--C	0.804673	62.66405	0.822181	82.77321
FJ--C	1.005431	71.76471	0.905316	90.46920
ID--C	0.645873	49.05731	0.523622	54.80781
KR--C	1.149394	79.47916	0.952212	95.10098
LA--C	0.626498	52.27029	0.604403	62.63798
ML--C	0.903899	57.16669	0.841293	84.20231
MG--C	0.705074	54.31898	0.972352	97.17876
MD--C	0.953409	67.90543	0.948598	94.74191
NP--C	0.670487	56.63220	0.317289	39.08123
PP--C	0.507718	34.07898	0.613535	62.02992
PH--C	0.986914	75.72287	0.927397	92.65787
PK--C	0.459128	36.10532	0.356147	41.06071
SG--C	1.035322	61.76427	0.890758	89.06312
SL--C	0.803284	61.52491	0.901972	90.08082
TH--C	0.849596	56.51828	0.933724	93.29517
VN--C	0.703407	42.04363		
VT--C	0.697066	56.40899	0.908461	90.80754
Adj R squared	0.931885	0.901114	0.998546	0.998602

Note: The figures in brackets and square parentheses are standard error and probability respectively.

Now we turn to the estimation of health sector to analyze the impact of public expenditure on health and economic growth on health indicators. For health sector, the gender disaggregated data on short run variables like Child Mortality Rate (CMR) or Infant Mortality Rate (IMR) (which can capture the impact of

public expenditure on health than long run variables) is not available for the Asian countries. Therefore life expectancy at birth is used as the dependent variable for the equations on health. Models 7 and 8 estimates the impact of public expenditure on health and economic growth on gender equity adjusted life expectancy at birth and general indicator for life expectancy. In Models 9 and 10 we include literacy rate as a non-health variable to examine the impact of education on health attainment.

$$\mathbf{GLEB_{it} = \alpha_i + \beta \log (PUB_H)_{it} + \gamma EG_{it} + u_{it}} \quad \text{---------- (7)}$$

where

$GLEB_{it}$ = Gender Equity Sensitive Indicator (GESI) of Life Expectancy at Birth

α_i = country-specific intercepts

$\log (PUB_H)_{it}$ = log of per capita expenditure on health in US $

EG_{it} = economic growth rate

$$\mathbf{TLEB_{it} = \alpha_i + \beta \log (PUB_H)_{it} + \gamma EG_{it} + u_{it}} \quad \text{---------- (8)}$$

where

$TLEB_{it}$ = Life Expectancy at Birth (Total)

α_i = country-specific intercepts

$\log(PUB_H)_{it}$ = log of per capita expenditure on health in US $

EG_{it} = economic growth rate

$$\mathbf{GLEB_{it} = \alpha_i + \beta \log (PUB_H)_{it} + \gamma EG_{it} + LR_{it} + u_{it}} \quad \text{---------- (9)}$$

where

GLR_{it} = Gender Equity Sensitive Indicator of Life Expectancy at Birth

α_i = country-specific intercepts

$\log (PUB)_{it}$ = log of per capita expenditure on health in US $

EG_{it} = economic growth rate

LR_{it} = Total Literacy Rate.

$$\mathbf{TLEB_{it} = \alpha_i + \beta \log (PUB_H)_{it} + \gamma EG_{it} + LR_{it} + u_{it}} \quad \text{---------- (10)}$$

where

$TLEB_{it}$ = Total Life Expectancy at Birth

α_i = country-specific intercepts

$\log (PUB_H)_{it}$ = log of per capita expenditure on health in US $

EG_{it} = economic growth rate

LR_{it} = Total Literacy Rate.

In the period I, the effect of public expenditure on health on life expectancy at birth was found to be positive and significant for the gender equity adjusted indicator (GESI life expectancy at birth) but not so for general life expectancy. Economic growth was found to be a significant variable only in Model 9 with positive impact on gender-equity sensitive life expectancy at birth, when literacy rate is added to the equation.

Table 7: Effect of Per-capita Public Expenditure on Health and Economic Growth on Health Indicators: Period I

Dependent Variable	1992-95 Model 7 Life Expectancy at Birth (GESI)	1992-95 Model 8 Total Life Expectancy	1992-95 Model 9 Life Expectancy at Birth (GESI)	1992-95 Model 10 Total Life Expectancy
Log of Public Health Expenditure	0.017790	0.545147	0.004689	-0.235709
	(0.003051)*	(0.483336)	(0.002500) *	(0.474164)
	[0.001]	[0.2638]	[0.0754]	[0.6211]
Economic Growth	-1.45E-05	-0.057835	0.000467	-0.024541
	(0.000440)	(0.030441)*	(0.000245) *	(0.027927)
	[0.8524]	[0.0622]	[0.0709]	[0.3834]
Literacy Rate			0.736993	50.21799
			(0.081813) *	(13.25726) *
			[0.000]	[0.004]
	Fixed Effects			
BR—C	0.731677	71.90933	0.160226	32.36381
BT—C	0.519575	54.31654		
BD—C	0.513974	56.41088	0.279651	40.33806
CD—C	0.448673	53.52816	-0.004311	22.48235
CH—C	0.699271	68.69294	0.131851	29.75787
FJ—C	0.632593	67.57576	0.019054	25.36474
HK—C	0.778647	75.08514	0.187104	34.11361
IN—C	0.609060	63.05169	0.024862	23.03666
ID—C	0.577599	60.93077	0.226039	36.87860
KR—C	0.685027	69.19846	0.034949	24.30950
LA—C	0.420103	51.35014	0.013044	23.69149
ML—C	0.706703	69.91664	0.142360	31.02239
MG—C	0.610082	63.21411	-0.084381	15.84822
NP—C	0.498929	55.69239	0.307192	42.50108
PP—C	0.464258	55.10953	0.074714	28.19360
PH—C	0.658924	65.97449	0.005309	21.15052
PK—C	0.560626	60.85710	0.341461	45.76357
SG—C	0.750856	73.76406	0.155777	32.54416
SL—C	0.703489	70.00612	0.085533	27.62141
TH—C	0.679606	68.12378	0.032280	23.53832
VN—C	0.623331	64.19681		
VT—C	0.675069	66.33592	0.010682	20.94828
Adj R squared	0.992201	0.972054	0.996592	0.986087

Note: The figures in brackets and square parentheses are standard error and probability respectively

Table 8: Effect of Per-capita Public Expenditure on Health and Economic Growth on Health Indicators: Period II

	1997-2000 Life Expectancy at Birth (GESI)	1997-2000 Total Life Expectancy	1997-2000 Life Expectancy at Birth (GESI)	1997-2000 Total Life Expectancy
Log of Public Health Expenditure	0.004329	-0.531454	0.006790	-0.420137
	(0.010508)	(0.689696)	(0.006619)	(0.657478)
	[0.6840]	[0.4439]		[0.5255]
Economic Growth	-0.000114	-0.008619	-0.000515	-0.020415
			(0.000288)	
	(0.000318)	(0.017041)		(0.017078)
	[0.7229]	[0.6148]		[0.2370]
Literacy Rate			0.662291	36.33676
			(0.069664)	
				(9.203452)*
				[0.002]
BR--C	0.820659	78.86933	0.214672	45.57464
BT--C	0.595740	63.23868		
BD--C	0.584559	60.72901	0.340085	47.26770
CD--C	0.473410	55.37851	0.038319	31.54458
CH--C	0.739427	71.65057	0.182478	41.07292
FJ--C	0.711727	71.01770	0.089772	37.07168
IN--C	0.670003	66.59721	0.101040	35.32213
ID--C	0.619638	63.57256	0.263364	44.02193
KR--C	0.774659	76.67322	0.118389	40.70770
LA--C	0.462444	53.97529	0.055214	31.61659
ML--C	0.770848	74.35297	0.191069	42.60120
MG--C	0.652664	65.24931	-0.004355	29.24077
MD--C	0.690850	69.54426	0.042216	33.96190
NP--C	0.546307	58.67895	0.330766	46.79966
PP--C	0.522541	58.58439	0.102189	35.65701
PH--C	0.721030	70.52446	0.090059	35.91175
PK--C	0.616213	61.85159	0.371473	48.44561
SG--C	0.851269	80.62616	0.232828	46.76730
SL--C	0.774082	74.11506	0.158276	40.51217
TH--C	0.709913	71.31426	0.071854	36.35577
VN--C	0.699570	69.62498		
VT--C	0.720903	69.19929	0.109128	35.58445
Adj R squared	0.991736	0.985562	0.997208	0.987618

Note: The figures in brackets and square parentheses are standard error and probability respectively.

When literacy rate was included to the health (GESI) equation, the coefficients of log of public expenditure on health, economic growth and literacy rates were all positive and significant. However when literacy rate was included to the health

(general) equation, only literacy rate was found to be significant. (Table 7). This conforms to earlier studies that showed that non-health factors have a substantial impact on health indicators. In period II, both log of public expenditure on health and economic growth turned out to be insignificant in all equations.

Conclusion

The paper examined the impact of public expenditure on human development across Asian countries (and Pacific). Using fixed effects model of pooled least squares for the period 1992-2000, the link between per capita combined expenditure on health and education and Human Development Index (HDI) and Gender Development Index (GDI) has been analyzed. The results revealed that public expenditure on both health and education has generally got a positive impact on HDI and GDI. Economic growth has been generally found to have a negative (but not significant) impact on sectoral (health and education) variables. However, for the period 1992-95, economic growth is seen to have a positive and significant impact on HDI and GDI. In other words, the public policy stance plays a crucial role in human development. The widely explored link between economic growth captured in terms of per capita income and the human development has been refuted by the results maybe due to widespread inequality in command over resources. In sector-specific equations also, the same results hold. In health equation, non-health factors have a substantial impact on health indicators. The result broadly conforms to the proposition that public expenditure on human capital formation gets transformed to the end results of better human development indicators and gender-sensitive indicators, despite the constraints of intra-household disparities in resource allocation.

Selected References

Anand, S and Ravallion, M (1993): 'Human Development in Poor Countries: On the Role of Private Incomes and Public Services', Journal of Economic Perspectives, 7 (Winter).

Chakraborty, Lekha (2004), Public Policy and Gender Development: An Empirical Investigation, paper funded by Ford for IAFFE presentation in August 5-7th 2004, at St. Hilda's College, Oxford, England

Dreze, J and Sen, A (1995): India: Economic Development and Social Opportunity", Oxford India Paperbacks.

Government of India (2001): National Human Development Report, Planning Commission.

Mundle, S (1998): 'Financing Human Development: Some Lessons from Advanced Asian Countries', World Development, 26(4), 659-672.

Noorbakhsh, F (1998): 'A Modified Human Development Index', World Development, 26 (3), 517-528.

Rao, M G (1998): 'Accomodating Public Expenditure Policies: the Case of fast Growing Asian Economies', World Development, 26(4), 673-694.

United Nations Development Programme (various issues): Human Development Reports, various issues.

Van de walle, D (1998): "Assessing the Welfare Impacts of Public Spending", World Development, 26(3): 365-379.

World Bank (2000): World Development Data Base, electronic version.