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Mamoon, Dawood

University of Islamabad

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Why International Trade Cause Inequality in Developing Countries

By

Dawood Mamoon

Dean and Professor
School of Management and Economics
University of Islamabad

(Harvard Business School Affiliate: 2013-2017)
(George Mason University Affiliate: 2016-2018)
(Member World Economic Survey Expert Group)

Abstract:

The recent evidence of rising wage inequalities in developing countries in favour of skilled labor has challenged the Hecksher-Ohlin model. After providing empirical evidence by employing 28 measures of trade integration that trade significantly cause inequality, the paper carries out a theoretical discussion to suggest that wage inequality between skilled and unskilled labor has factor endowment dimension. There are significant inequalities in education attainment in developing countries that exacerbate inequality when these countries trade in international markets in predominantly capital intensive products. A more trade among developing countries might benefit the unskilled as trade in local or regional clusters within the South may enable these countries to also export more labor intensive products and thus benefitting the unskilled.

Keywords: Integration, Trade Clusters, Inequality,

The only way to globalisation is not to push it too hard
Dani Rodrik (2007:31)

1. Introduction:

The Hecksher-Ohlin model suggests that when the countries open up for international trade, skilled workers in developed countries would benefit in account of higher exports in capital intensive products where as in developing countries unskilled would benefit because they would be able to export labor intensive goods. However, international trade happens in clusters primarily within developed countries and if any the share of trade between developed and developing countries is smaller when compared to former. The countries like China, India and South Korea within developing country cluster has benefitted from international trade by exporting more capital intensive goods than labor intensive ones. International trade increases the demand for skilled labor far more than the demand of unskilled labor in developing countries and thus increasing relative wage inequality between skilled and unskilled labor.

'In (developing) countries, trade liberalisation is likely to have had conflicting effects on the distribution of earnings. On the one hand, standard trade theory implies that trade liberalisation should result in a reduction in the skill premium. On the other hand, trade flows bring in new technologies and ideas that enhance the productivity of all workers, but especially that of skilled workers. Clearly, the notion of "skilled" and "Unskilled" workers differs across countries. In less developed economies, those at the top of the earning distribution often have no more than a secondary degree. Yet, they have skills that will be enhanced by the arrival of new technologies, thus increasing their wage relative to that of uneducated workers. An empirical investigation of the evolution and the determinants of income inequality in these countries stand as a question to be tackled.' (Aghion and Penalosa, 1999; 1655)

Trade integration leads to wage inequality between workers employed in exporting sector and non exporting sector (Sampson, 2014). This is because developing countries are not able to export labor intensive good. Because there are myriad of conflicts (civil and international), trade within a regional cluster is usually dismal especially for many countries belonging to Africa and Asia. In addition, consumerism has led to adverse trade balance in most developing countries where as they import high end technology products but could not develop a robust industrial base to also be able to export more. The manufacturing plants that do exist in developing countries producing textiles or light engineering products are capital intensive and are also the ones that form the most significant portion of exporting industries. The reward for skilled labor increasing at a much higher proportion due to their penetration in international markets. (Klein et al, 2010).

The aim of this paper is to examine the impact of increased trade on inequality. High initial endowments of human capital, captured by data on average years of schooling for example, imply a more egalitarian society compared to countries with a lower human capital endowment. When societies that are more equal, open up their economies further, increased trade is likely to induce less inequality because the supply of skills better matches demand. Yet greater international exposure also brings about technological diffusion, see Winters (2004), further raising skilled labour demand. This may raise wage inequality, in contrast to the initial egalitarian level effect of human capital. An innovation of this paper is to employ a broad set of openness indicators to measure trade-liberalisation policies as well as general openness, which is an outcome, and not a policy variable. In settings of low human capital endowments, as measured by literacy or low primary school enrolment, a policy of relative neglect of primary in favour of expenditure on tertiary education may have a less than benign influence on inequality. The sample countries here exclude developed nations and economies in transition because of higher stocks of human capital in those regions.

2. Data and Methodology

2.1. Data Description

We are interested to look into the patterns of wage inequality in growth promoting Industrial sectors of developing countries. Here we would use Wage inequality index .The UTIP-UNIDO wage inequality Theil measure which is calculated by University of Texas Inequality Project (UTIP) measures the dispersion of pay across industrial categories in the manufacturing sector. The data on wages is drawn from the Industrial database published annually by United Nations Industrial Development Organisation (UNIDO). The Theil

index is decomposable. (Conceicao and Galbraith 2000) ‘If individuals are grouped in a mutually exclusive, completely exhaustive way, overall inequality can be separated into a between group component and a within group component. Thus, there is no interaction between these two components and so these measures are additively decomposable. Moreover of all entropy-based measures, the Theil index is one of only two measures for which the weights in the within groups component add to one. Therefore, overall inequality is the result of adding the two independent components: inequality between groups and inequality within groups.’ Second, pay is major source of household income. Changes in income inequality reflect changes in wage inequality. Fields (1980) offers evidence that pay inequalities in the manufacturing sector are the driving force behind the evolution of inequality. Furthermore as discussed above, processes of globalization through technological change raises the concentration of skilled workers in advanced sectors against unskilled workers in the backward sector. Since manufacturing is the sector most affected by modern technological change, income inequality would certainly have an inter-industrial feature that would show up in changing pay differentials between advanced and backward manufacturing industries. (Galbraith and Kum 2002) Third, the principal reason for using the UTIP-UNIDO wage inequality Theil measure is that the researcher is more interested in the functional distribution of income. Changes in the functional distribution between skilled and unskilled labour, will in turn affect the personal income distribution in countries that are unskilled labour abundant. Inequality will rise in developing countries as the skilled-unskilled labour wage premium increases and vice versa.

The UTIP- UNIDO wage inequality measure is the between-group component of Theil’s T statistic, an entropy measure whose functional form is defined as:

$$T = \sum \left(\frac{Y_i}{Y}\right) T_i + \sum \frac{Y_i}{Y} \log\left(\frac{Y_i/Y}{N_i/N}\right) = T^w + T^B \quad (1)$$

Where T^w and T^B indicate within-group and between-group inequality measures respectively. N and Y stand for total employment and total pay respectively, and subscript i denotes group identity. As mentioned, UTIP captures T^B as their inequality measure, where groups are defined as categories within the UNIDO industrial classification codes.

Table 1 Summary Statistics

Variables	Code	Source	Obs	Std . Dev
<u>Dependent</u>				
UTIP-UNIDO Wage Inequality THEIL Measure: Developing countries only, 1999	Theil99dev	University of Texas Inequality Project (UTIP) http://utip.gov.utexas.edu	109	(0.108)
<u>Endogenous Independent</u>				
Openness Variables				
(Exports +Imports)/GDP, 1985	Lcopen	Penn World Tables , Mark 6	170	(0.589)
Import Penetration: overall, 1985	Impnov85	Pritchett (1996)	96	(21.08)
Import Penetration: manufacturing, 1985	Impnov85m	Pritchett (1996)	96	(12.79)
Import Penetration: agriculture, 1985	Impnov85a	Pritchett (1996)	96	(3.818)
Import Penetration: resources, 1985	Impnov85r	Pritchett (1996)	96	(6.594)
Import Penetration: overall, 1982	Impnov82	Pritchett (1996)	95	(23.85)
Import Penetration: manufacturing, 1982	Impnov82m	Pritchett (1996)	95	(13.107)
Import Penetration: agriculture, 1982	Impnov82a	Pritchett (1996)	95	(3.67)
Import Penetration: resources, 1982	Impnov82r	Pritchett (1996)	95	(9.66)
TARS trade penetration: overall, 1985	Tars85	Pritchett (1996)	96	(36.91)
TARS trade penetration: manufacturing , 1985	Tars85m	Pritchett (1996)	96	(21.852)
TARS trade penetration: agriculture, 1985	Tars85a	Pritchett (1996)	96	(8.758)
TARS trade penetration: resources, 1985	Tars85r	Pritchett (1996)	96	(15.636)
TARS trade penetration: overall, 1982	Tars82	Pritchett (1996)	93	(83.10)
TARS trade penetration: manufacturing , 1982	Tars82m	Pritchett (1996)	93	(26.47)
TARS trade penetration: agriculture, 1982	Tars82a	Pritchett (1996)	93	(9.786)
TARS trade penetration: resources, 1982	Tars82r	Pritchett (1996)	93	(54.652)
Trade Policy Variables				
Tariffs				
Import duties as % imports,1985	Tariffs	World Development Indicators	99	(8.903)
Tariffs on international inputs and capital goods, 1985	Owti	Sachs and Warner (1995)	98	(0.165)
Trade taxes/ trade, 1982	Txtrdg	Edwards (1997)	54	(0.031)
Weighted average of total import charges: overall, 1985	Totimpv85	Pritchett (1996)	76	(21.30)
Weighted average of total import charges: manufacturing, 1985	Totimpv85m	Pritchett (1996)	76	(22.75)
Weighted average of total import charges: agriculture, 1985	Totimpv85a	Pritchett (1996)	76	(21.57)
Weighted average of total import charges: agriculture, 1985	Totimpv85r	Pritchett (1996)	76	(18.15)
Non Tariff Barriers				
Non trade barriers frequency on intermediate inputs, 1985	Owqi	Sachs and Warner (1995)	96	(0.242)
Non-tariff barriers Coverage: overall, 1985	Nontar85	Pritchett (1996)	76	(36.305)
Non-tariff barriers Coverage: manufacturing, 1985	Nontar85m	Pritchett (1996)	76	(37.914)
Non-tariff barriers Coverage: agriculture, 1985	Nontar85a	Pritchett (1996)	76	(35.268)
Non-tariff barriers Coverage: resources, 1985	Nontar85r	Pritchett (1996)	76	(43.111)
Composite Measures				
Sachs and Warner 1980s	Open80s	Edwards (1998)	61	(0.446)
Measures based on residuals				
Leamers Measure, 1982	Leamer82	Edwards (1997)	47	(0.527)
Gravity-residuals, basic model, 1982	Grmb	Hiscos and Kastner (2002)	77	(9.922)
Gravity-residuals, augmented model, 1982	Grma	Hiscos and Kastner (2002)	77	(9.341)
Price Based Measures				
Black market premium, 1985	Black	Haririson (1996)	61	(0.604)
<u>Independent :</u>				
Initial Skills				
Average years of schooling, 1985	Skills85	Baro and Lee (2001)	105	(2.799)
Average years of schooling, 1980	Skills80	Baro and Lee (2001)	105	(2.861)
Average years of schooling, 1975	Skills75	Baro and Lee(2001)	106	(2.703)
Average years of schooling, 1970	Skills70	Baro and Lee (2001)	101	(2.701)
Average years of schooling, 1965	Skills65	Baro and Lee (2001)	99	(2.516)
Average years of schooling, 1960	Skills60	Baro and Lee (2001)	99	(2.522)
Instruments				
Natural logarithm of predicted trade shares computed from a bilateral trade equation with 'pure geography' variables, 1999	Lfrkrom	Frankel and Romer (1999)	163	(16.75)
Drop out rate, 1980s	Drop80	Barro and Lee (1996)	125	(0.802)
Number of school days	Schday	Barro and Lee (1996)	139	(23.43)
Distance from the equator of capital city measured as abs (Latitude)/90	Disteq	Acemogolu (2001)	208	(16.65)

Theil is not a measure with a closed scale between 0 and 1 (or 0% and 100%), like in case of the Gini index. For resource distributions described by only two quantiles, the Theil index is 0 for 50:50 distributions, 0.5 for 74: 26 distributions, 1 for 82:18 distributions, 2 for 92:8 distributions and 4 at 98:2 distributions. Theil at 1 is close to an 80:20 distribution, which is very close to a distribution often referred to as "Pareto Principle"¹. The UNIDO-UTIP Theil Index provides inequality between groups (One being skilled and other being unskilled). There may also be rise in inequality within skilled labor. For example if skills are captured by education level, rising within group inequality would mean that returns to higher levels of education and returns to lower levels of education do not change at the same proportion. Here, we want to capture the effect of education (skilled) versus no education (unskilled) on relative wages. We would also analyze effect of higher skills within the framework to check if wage inequality between skilled and unskilled labor are rising also because of returns to higher education are rising at higher proportion when compared with overall levels of education. In other words, is wage inequality also pushed by favoring higher skills in developing countries, or presence of skills (having education) a factor decisive enough to explain rise in wage gaps between skilled labor and unskilled labor? There is already some evidence that secondary education is more important in alleviating wage inequality than higher levels of education suggesting close correlation between higher levels of education and wage dispersion (Acemoglu, 2001). Investing in higher education alone is less effective in alleviating wage inequality. Since Theil captures wage inequality and not wage equality, we can easily test the positive effect of higher education in wage inequality. We are not saying that decreasing higher levels of education would then decrease wage inequality as is generally true with interpretations upon getting a positive sign (say between Theil Index and higher levels of education). If there is a positive correlation, then the only way to minimize the education bias of inequality is to raise the overall education levels of the population, which in turn would distribute skills homogenously within the population.

The between group inequality, T^B , ranges from 0 to less than 1 (0.36 for the current UNIDO data set). On the hind sight, this suggests that adding within group inequality T^w would further add up to increase the value of T closer to 1 meaning that over all wage inequality between skilled and unskilled is steeper than what is captured by T^B only. As suggested; by checking the relationship between higher levels of education and 'between group wage inequality' T^B , we would be able to see whether between group inequality is also present. It is possible if higher levels of education are more sensitive to wage inequality than average levels of education which include primary, secondary and higher.

The UTIP data set provides Theil inequality measures for nearly 3,200 country/year observations, covering more than 150 countries during the period 1963 to 1999. Firstly, we would like to know whether trade liberalisation is significantly related with these trends of rising wage inequality in developing countries. If so, then there would be an evidence of

¹ This is a special case of the wider phenomenon of Pareto distributions. If the parameters in the Pareto distribution are suitably chosen, then one would have not only 80% of effects coming from 20% of causes, but also 80% of that top 80% of effects coming from 20% of that top 20% of causes, and so on (80% of 80% is 64%; 20% of 20% is 4%, so this implies a "64-4 law")

<http://management.about.com/cs/generalmanagement/a/Pareto081202.htm>

skilled bias technical change. If technical change is indeed skilled biased then for those developing countries where initial levels of skills were higher (population has been on average more educated relative to other developing countries), wage inequality should not rise. Instead the returns to labour should be relatively equally distributed after liberalisation.

In other words, we have to establish two kinds of relationships between rising wage inequality in developing countries and the economies of developing countries. Developing countries that started out post 1980; with an over all educated population, they are better off today with respect to wage dispersion. Other developing countries which did not invest in 'education for all', on average, 'more' are uneducated. For such countries there are rising trends in wage inequality.

Singapore is one such country which invested heavily on social development and raised the average education levels of its population. Is this the reasons why wage inequality is falling in Singapore post liberalisation? Singapore is the good side of the story. The other side of the story is more applicable to developing countries where larger segments of the population are un-educated. The over all trend in developing countries post liberalisation should be a rise in wage dispersion.

Education captures the relative factor supply effect. Trade on the other hand captures the relative factor demand effect through skill bias technical change as suggested by Acemoglu (1999; 2001). Other than the initial levels of education, trade becomes the second variable of interest. In view of this, the basic model for wage inequality between skilled and unskilled workers, based on integration is as follows

$$WageInequality = f[Integration(Integration, Skills_0)] \quad (2)$$

Skills represent education levels through out this manuscript. Average years of schooling is a better measure of education among the several available. It has been referred to as human capital (skills). Here average schooling years obtained in years 1960, 1965, 1970 and 1980 can all be considered as human capital formation pre-liberalisation. Thus initial skills $Skills_0$ represent average years of schooling obtained before 1980s. There are outcome based measures (openness) and incidence based (trade policy) measures. The literature often ignores the latter effect, which only employs openness indicators. Take note however, that openness is an outcome of trade and industrial policies and not a policy indicator *per se*. Our formal empirical model would have 2 separate identifications then:

$$Inequality = f[Integration(Openness), Skills_0] \quad (3)$$

(+) (-)

$$Inequality = f[Integration(TradePolicy), Skills_0] \quad (4)$$

(+) (-)

Here wage inequality is a positive function of integration, which in turn relates positively to the degree of the openness of the economy in Eq. (3), or trade policies that promote greater openness in Eq. (4). Wage inequality negatively relates to the initial stock of skills in the economy as discussed.

A simple Heckscher-Ohlin or Stolper-Samuelson model would suggest that the overall return to skills would decline, and with it incentives for education, when a skill-scarce developing country opens up. (Wood and Riddo-Cano 1999) However in a multi-dimensional Stolper-Samuelson model approximating reality, endogenous growth with increasing returns to R & D, a skill-bias in tradables, skill shortages or unlimited supplies of unskilled labour could all lead to an increase in returns to skill following greater integration. (Arbache et al. 2004) Integration can also lead to the diffusion of more efficient education technologies, which would further augment the level of skills in the economy. (Winters 2004) Thus, the expected effect of openness and trade policy on wage inequality is positive in developing countries where a majority of the population is unskilled and uneducated.

The econometric form of the wage inequality model based on openness and trade policy is as follows:

$$THEIL_{1i} = \sigma_1 + \kappa_1 OPEN_i + \nu_1 skill65_i + \varepsilon_{1i} \quad (5)$$

$$THEIL_{2i} = \sigma_2 + \kappa_2 TP_i + \nu_2 skill65_i + \varepsilon_{2i} \quad (6)$$

Where $THEIL_i$ is wage inequality in a country i for the 1990s (employing the latest value available for the Theil index for every country: see table 5, end of the paper for the exact year), ε_i is the random error term, $OPEN_i$ captures openness and TP_i is the indicator for the trade policy stance in the 1980s respectively. Also $skill65_i$ measures initial skill levels proxied by average years of schooling for the population aged 25 in 1965. Note that the skill acquisition parameter refers to a period well before the trade liberalisation episodes post-1980.

This analysis has a specific focus on trade and education. It employs 34 measures of openness and trade policy to carry out multiple regression analysis for Eqs (5) and (6), respectively. Average years of schooling for 1960, 1970, 1975 and 1985 are also employed for further robustness checks of the model with repeated specifications.

Following is the taxonomy for outcome based and incidence based measures of trade following the grouping offered by Rose (2004):

1. openness (e.g. the ratio of trade or imports to GDP), an outcome based measure,
2. trade flows, adjusted for country-characteristics (outcome based),
3. tariffs (policy incidence-based)
4. non-tariff barriers (NTBs) (incidence based),
5. informal or qualitative measures,
6. composite indices, and,
7. Measures based on price on price outcomes.

Here the author briefly introduces all these variables, all of which have already been used in studies. The details of the data and their exact definitions are provided in the appendix at

the end of the manuscript. Rose (2004) provides a nice summary of all these variables. For the readers comfort, the author provides a brief nevertheless:

The core openness variable remains the overall trade share (the ratio of nominal imports plus exports to GDP), which has been extensively used in the literature. (Frankel and Romer 1999; Acemoglu, Johnson and Robinson 2001; Alcalá and Ciccone 2002; Dollar and Kraay 2002; Rodrik et al. 2004)

Pritchett (1996) uses 16 cross-sectional measures of trade penetration for developing countries. These are provided for two different years (1982 and 1985) and four different categories (overall, manufacturing, agriculture and resources sectors). Trade penetration measures are only available for imports alone. According to Pritchett (1996), import data may be preferred over total data because adequate information is available on barriers to imports. Two other measures of openness are trade penetration (tars) derived from the World Bank's TARS system and overall import penetration (*Impen*) respectively. See table 5.2 for further yearly and sectoral decomposition of these variables.

There are many indicators of trade restrictiveness (incidence based) acting as measures of trade policy. (Edwards 1998; Greenaway et al. 2001; Rose 2002) Literature recommends using simple averages of taxes on imports and exports (Rodríguez and Rodrik, 2000). Simple import duties as a percentage of imports (*Tariffs*) are available from World Development Indicators (WDI) from 1970 to the end of the sample in 1998. We select it for 1985, like in other measures of trade, capturing the start of the end of relative protection among many developing countries. Sachs and Warner provide (1995) constructed a composite measure of openness by using tariffs on intermediate inputs and capital goods (*Owti*). Edwards (1997) collected data on total revenues from taxes on international trade as a proportion of total trade (*Txtrdg*). Pritchett(1996) provides weighted average of total import charges (*Totimpov*), as well as sectoral categories of import charges (manufacturing, agriculture and resources). They can all be considered good proxies of trade restrictiveness and have been employed in the analysis.

'The coverage of NTBs in terms of total imports is another widely used measure of trade policy.' (Rose 2004; 215) Sachs and Warner (1995) include frequency of non trade barriers on intermediate inputs (*Owqi*) in his index. Pritchett (1996) collects data on non-tariff barrier coverage for developing countries from UNCTAD (United Nations Conference on Trade and Development). They are available for four different categories —manufacturing, agriculture and resources respectively. Edwards (1997) provides several composite measures of countries extent of liberalisation. Sachs and Warner (1995) composite measure of openness (*Open80*) has already been utilised in chapters 2 and 4. '(However), it provides only a binary classification —a country is open or closed. As are result, countries with different degrees of trade intervention are equally classified as open.' (Edwards 1998; 385) 'Leamer (1988) used an empirical Heckscher-Ohlin model with nine factors to estimate net trade flows and trade intensity ratios for 183 commodities at the three digit SITC (Standard International Trade Classification) level for 53 countries. He took the differences between predicted and actual trade intensity ratios as indicators of trade barriers (*Leamer82*).' (Ibid; 386) 'A less structural approach is taken by Hiscox and Kastner (2002). They use fixed country-year residual effects from two gravity models of trade (*Grmb* and *Grma*) (a simple version which links imports to GDP and distance, and an augmented one which adds measures of wealth, land and capital) to derive

measures of trade policy orientation' (Rose 2004; 216) Sachs and Warner (1995) and Harrison (1996) have utilised a number of price-based measures of trade policy. The black market foreign exchange premium (*Black*) is one of them.

These 34 measures of integration would separately enter equations (5) and (6) along with initial skills to determine wage inequality in at least 34 different regression equations.

There could be potential endogeneity problems associated with the dependent variable, wage inequality and the explanatory variable, openness/trade policy. First, openness when measured by the trade share of national income is not truly exogenous, but an outcome of other factors. Second, the degree of wage inequality between skilled and unskilled workers, or the country's relative factor endowments (Tavares 1998) may determine a country's trade policy choices. Even though gradual and under the aegis of structural adjustment policies, decisions regarding openness were taken. It may be that more egalitarian labour abundant nations may choose to open up faster than less equal land (or mineral) abundant nations.

An instrument is required for the openness and trade policy variables' potential endogeneity with wage inequality. As in previous chapters, this chapter uses the predicted trade share following Frankel and Romer (1999) from a gravity equation as an appropriate instrument for openness/trade policy. (Dollar and Kraay 2002; Rodrik et al. 2004; Acemolgu, Johnson and Robinson 2001; Hall and Jones 1999) Following Rodrik et al. (2004), distance from the equator is the second instrument for openness/trade policy variables because the level of integration of an economy also depends upon its location on the world map. The Instrumental Variable (IV) regression model is a two stage least squares (2SLS) estimate beginning with

$$OPEN_{li} = \zeta_1 + \tau_1 FR_i + \psi_1 Disteq_i + \varepsilon_{3i} \quad (7)$$

$$TP_{li} = \zeta_2 + \tau_2 FR_i + \psi_2 Disteq_i + \varepsilon_{4i} \quad (8)$$

Here FR_i stands for predicted trade shares from gravity equations computed by Frankel and Romer (1999), whereas $Disteq_i$ (distance from the equator) is a proxy for geography. In the first stage, Eqs (7) and (8) generate predicted values of openness and trade policy variables by regressing them on the two instruments. The second and final stage of the regression analysis involves employing the predicted openness and trade policy variables in Eqs (5) and (6) respectively.

Table 2 Inequality Trade Nexus (A Robustness Check)

<i>Endogenous Independent: Openness/Trade Policy</i>	<i>(dependent variable) Theil99Dev*</i>				
	1	2	3	4	5
(Exports +Imports)/GDP, 1985	Significant	Significant	Significant	Significant	Significant
Import Penetration: overall, 1985	Significant	Significant	Significant	Significant	Significant
Import Penetration: manufacturing, 1985	Significant	Significant	Significant	Significant	Significant
Import Penetration: agriculture, 1985	Significant	Significant	Significant	Significant	Significant
Import Penetration: resources, 1985	Significant	×	Significant	Significant	Significant
Import Penetration: overall, 1982	Significant	Significant	Significant	Significant	Significant
Import Penetration: manufacturing, 1982	Significant	Significant	Significant	Significant	Significant
Import Penetration: agriculture, 1982	Significant	Significant	Significant	Significant	Significant
Import Penetration: resources, 1982	Significant	Significant	Significant	Significant	Significant
TARS trade penetration: overall, 1985	Significant	Significant	Significant	Significant	Significant
TARS trade penetration: manufacturing , 1985	Significant	Significant	Significant	Significant	Significant
TARS trade penetration: agriculture, 1985	×	×	×	×	Significant
TARS trade penetration: resources, 1985	Significant	Significant	Significant	Significant	Significant
TARS trade penetration,: overall, 1982	Significant	Significant	Significant	Significant	Significant
TARS trade penetration: manufacturing , 1982	Significant	Significant	Significant	Significant	Significant
TARS trade penetration: agriculture, 1982	×	×	×	×	×
TARS trade penetration: resources, 1982	Significant	Significant	Significant	Significant	Significant
Import duties as % imports,1985	×	×	×	×	×
Tariffs on international inputs and capital goods, 1985	Significant	Significant	Significant	Significant	Significant
Trade taxes/ trade, 1982	×	×	×	×	×
Weighted average of total import charges: overall, 1985	Significant	Significant	Significant	Significant	Significant
Weighted average of total import charges: manufacturing, 1985	Significant	Significant	Significant	Significant	Significant
Weighted average of total import charges: agriculture, 1985	Significant	Significant	Significant	Significant	Significant
Weighted average of total import charges: agriculture, 1985	Significant	Significant	Significant	Significant	Significant
Non trade barriers frequency on intermediate inputs, 1985	×	×	×	×	×
Non-tariff barriers Coverage: overall, 1985	Significant	×	Significant	Significant	Significant
Non-tariff barriers Coverage: manufacturing, 1985	Significant	×	Significant	Significant	×
Non-tariff barriers Coverage: agriculture, 1985	×	×	×	×	×
Non-tariff barriers Coverage: resourses, 1985	Significant	Significant	Significant	Significant	Significant
Control Variables	When with Average Years of Schooling, 1960 (Sch60)	When with Average Years of Schooling, 1970 (Sch70)	When with Average Years of Schooling, 1975 (Sch75)	When with Average Years of Schooling, 1980 (Sch80)	When with Average Years of Schooling, 1985 (Sch85)

- Significant at 1%, 5% and 10% level. -Control Variables are in the parenthesis (last Row),

* All variables enter the equation with the right sign.

3. Results

A robustness test was conducted to check further the role of trade in increasing wage inequality by regressing 28 selected proxies of openness and trade policy on the Theil index (*Theil99dev*) in Eqs (5) and (6) with five more proxies of skilled labour (i.e., *skills60*, *skills70*, *skills75*, *skills80*, *skills85*). As Table 2 shows, in all 150 cases, trade exacerbates inequality; the relationship is significant in 112 out of 150 cases. Not only average years of schooling, but secondary years of schooling for all initial years 1960, 1965, 1970 and 1975 have been found to be negatively related with wage inequality. (see Mamoon and Murshed, 2008 for details)

The results have established that trade liberalisation has significantly increased wage inequality in developing countries. We have also checked the effect of relative factor supply for initial periods when they have been exogenous to trade reforms. Countries who start out with homogenous supply of skills (average years of schooling) do better when countries liberalise. For example, in countries like China and India, who have also been successful in international markets because of a significant number of educated people (China also has a trade surplus), the over all effect of trade on labour markets is not same as North East Asia. Wages inequality is actually rising. It may be due to education bias of international trade which favours educated (good jobs) more than uneducated (bad jobs). In most developing countries, low levels of education also represent their under-developed industrial sector where demands for skills increase at a much unequal rate when compared to demand for unskilled workers. Another reason for the rise in the relative wage gap in developing countries with low levels of education would be an effort towards import substitution by protecting the industrial sector. Import substitutions leads to higher premiums to skilled labour. Furthermore, developing countries protect unskilled-labour intensive goods prior to liberalisation. So after liberalisation, the producers of unskilled intensive goods face increased costs amid more outside competition, and their real wages and living standards decline in the absence of government subsidies.

Table 3 Budget allocated to higher education, 1990-94

EAST ASIA	% of Overall Education Budget
Malaysia	17
Thailand	17
Indonesia	18
Korea, Rep.	8
Average (simple)	15
LATIN AMERICA	
Argentina	17
Brazil	26
Chile	20
Colombia	17
Costa Rica	31
Dominican Republic	11
Ecuador	23
Honduras	20
Mexico	14
Uruguay	25
Venezuela	35
Average (simple)	22

Source: UNDP (1997) citing Birdsall, Nancy, 'Education: the People's Asset', CSED Working Paper No. 5, 1999

Yet there is another factor which can cause a rise of wage inequality. Does wage inequality also follow the 'Pareto principle' where a rise in wages of 'higher educated' would be more than 'only educated'? Are we capturing an element of within group inequality also when we say that wage inequality between skilled and unskilled is rising? Because a rise in within group inequality can also capture a rise in wages of skilled labor disproportional to not only less educated (low skilled) but also uneducated (unskilled). Is technical bias affecting the wages of highly skilled or "the proportional rise in returns to skills is across the board (for all education levels)"? By answering these questions, we can know 'how much education matters' and 'what level of education matters most'.

Within the education sector, there is evidence of uneven development. To chase good jobs, most developing countries have opted for a short cut. There is evidence that developing countries invest on higher levels of education more than all levels of education. As shown in Table 3, the share of public spending on education in Latin America allocated to higher education has tended to be high—more than 20 per cent on average, compared to 15 per cent on average in East Asia. Venezuela and South Korea are extreme examples of this phenomenon. While in the early 1990s Venezuela allocated 35 per cent of its public

education budget to higher education, South Korea allocated just eight per cent of its budget to post-secondary schooling. Public expenditure on education as a percentage of GNP was actually higher in Venezuela (5.1%) than in Korea (4.5%). However, after subtracting the share going to higher education, public expenditure available for basic education as a proportion of GNP was considerably higher in Korea (3.6%) than in Venezuela (1.3%).

Birdsall (1999) summarises the debate on education and inequality with reference to Latin America and East Asia:

‘By giving priority to expanding the quantity of education and improving quality at the base of the educational pyramid, East Asian governments stimulated the demand for higher education, while relying to a large extent on the private sector to satisfy that demand. In Latin America, government subsidies have disproportionately benefited high-income families whose children are much more likely to attend university. At the same time, low public funding of secondary education has resulted in poorly qualified children from low-income backgrounds being forced into private universities or opting out of the education system at higher levels.’ (11)

Table 4 Public expenditure per student as a % of per- capita GNP by region (circa 1980)

Region	Primary	Secondary	Higher
Anglophone Africa	18	50	920
Francophone Africa	29	143	804
South Asia	8	18	119
East Asian and Pacific	11	20	118
Latin America	9	26	88
Middle East and North Africa	2	28	150
Africa	14	41	370
Developing Countries	22	24	49

Source: Mingat and Tan (1985) cited in Chowdhury (1994).

The unequal education policies have resulted in rising social inequalities. The literature suggests that in most developing countries skills are unevenly distributed. (Ravallion 2003) Thomas, Wang and Fan (2000) and Domenech and Castello (2002) find that Gini coefficients of the distribution of human capital in sub-Saharan Africa and South Asia are the highest (most unequal) in the world. Berthelemy (2004) arrives at the same conclusion not only for sub-Saharan Africa and South Asia, but also for the Middle East and North Africa (MENA). The distribution of public resources on education is highly unequal, as shown in Table 4 based on Chowdhury (1994). The higher education bias widens disparities in incomes among different skill levels, following greater trade liberalisation. In many countries a considerable proportion of public expenditures for education benefits middle and upper-income families, because richer groups are overrepresented at all levels of education, particularly at the university level. Table 4 illustrates that in African countries, public expenditure per student on higher education is 28 (Francophone Africa) and 50 (Anglophone Africa) times greater than the level on primary education. For developing countries as a whole, only seven per cent of the relevant population enrol in higher education.

The author already finds evidence that by ignoring ‘education for all’, developing countries have increased the wage gap among the labour force based on skill differentials. Here the author examines whether skill biased technical change benefits higher levels of education.

The above finding can also be extended to social returns to education and its potentially dual role which is caused by dynamic reactions of different levels of education to economic activity. Social returns to education also cover skilled bias technological change other than its positive effects on outcomes like rule of law and political stability. The different effects of different levels of education on economic development in this context are quite nicely stated by Krueger and Lindhal) ‘The social return (to education) can be higher because of externalities from education, which could occur, for example, if higher education leads to technological progress that is not captured by in the private return to that education, or if more education produces positive externalities, such as a reduction in crime and welfare participation or more informed political decisions. The former is more like if human capital is expanded at higher levels of education while the latter is more likely if human capital is expanded at lower levels’ (1107)

Developing countries invest in higher levels of education to exploit social externalities which can generate and sustain technical progress amid globalization. However, social returns to education by raising overall education level may carry more deep rooted positive effects in the economy. The results strongly support in favor of raising over all education levels in the society which are not only good for the labor market returns but ‘education for all’ has a strong correlation with larger economic development of the country. Human development precedes or accompanies economic growth in order for development to occur. (Ranis and Stewart, 2001)

The education bias of trade liberalization can be exploited in favor of the poor in a country through investments in all levels of education. That is one way to make trade induced growth good for the poor. The unequal returns to education in a dynamic trade framework may partly explain why initial levels of education (captured by endogenously determined average years of schooling) are more closely related with good economic outcomes than education attainment (endogenously determined improved level of schooling) in developing countries as also pointed out by other studies (see i.e., Krueger and Lindahl, 2001).

To address this distortion, investing in higher education may not be as effective as investing in overall education levels of the population. This is not to say that basic education in itself as a target is enough. When the economy begins to trade more with the outside world, perhaps there is a need for a balanced education policy in the South. Providing the necessary higher/technical education should not, however compromise the achievement of primary education. Primary education is the first step towards a more skilled labour force, and it is a pro-poor policy, as the overwhelming majority of the poor remain uneducated. (Mamoon 2005). To minimise the effects of trade on wage inequality is to trade among each other, where more trade can take place in low skill intensive goods with in developing countries. Developing countries lie in a heterogeneous plain where some may be following relatively skilled intensive (in local terms) production activities. Such trade can minimise the negative effect of skill bias technical change. However investment in education sector would remain the key factor to effect wage dispersion in developing countries. More resources in education sector also needs to be channelled to secondary and primary education levels in addition to higher education as suggested by Acemoglu (2001).

4.

Conclusions

Much like North, in the South also education inequalities exist between different groups differentiated by gender, income levels, demography, cultures or ethnicities. These inequalities are much more severe and significant in developing countries than in developed countries. For example, education attainments are generally much higher among urban population, men or higher income groups in the South when compared to rural population, women or lower income groups respectively. Similarly those ethnic groups, who dominate the national or regional politics in a particular region in the South, are more likely to be the recipients of economic and social resources including education than the ones who are socially and economically marginalised.

These education inequalities have been one of the significant determinants of unequal development in the South which is raising alarms in national and international platforms. The recent report published by UN on 24 August 2005 entitled “The Inequality Predicament”, the UN Department of Economic and Social Affairs (DESA) warned of growing “violence associated with national and international acts of terrorism,” which are the result of stark economic and social inequalities, and competition over scarce resources. Solutions to inequality outlined in the report include addressing economic asymmetries not just within countries but also between them: 80 per cent of the world’s domestic product belongs to 1 billion people living in the developed world, while the remaining 20 per cent is shared by 5 billion people living in developing countries.

In this background where resources are unequally distributed among different strata of the population within the South and between the North and the South, there is an increasing need to make education an equally available resource, especially if we consider that education plays a key role in economic and social development of a country and has been identified as one of the important sustainable development goals. North has a key role to play to help Southern economies carry out effective education policies through not only more direct aid in the education sector but also through increased cooperation between Northern and Southern education institutions, be it education ministries, higher education centres, vocational training institutes or informal education institutes.

However it is the governments of the South who are responsible to carry out effective education policies by not only seeking high quality but the education policies should cater to the population in a more equal manner, which is to say they should take into account the education inequalities and device the policies in a manner that this so-called ‘inequality predicament’ is addressed. The current trend to pursue higher education in an anticipation to achieve higher growth levels and to be competitive in an environment of increased international competition will be productive only if any such focus on higher education does not take away resources from primary education because poverty and inequality has increased and economic growth has remained sluggish in those countries (i.e., Latin America) where higher education has been promoted at the cost of primary education.

Furthermore, an undue concentration in the South in particular disciplines, i.e., Information Technology or Natural Sciences in general, while ignoring others, i.e., social sciences will lead to distortions in the society as the latter is the heart of any vibrant and active civil society. Here one may accept the fact that governments in the South have limited resources and they have no choice but to prioritise some disciplines over others. To this effect, active North South partnerships in social sciences can fill up this gap. However, the governments in the South also need to channel more resources to education sector by revisiting their budgetary priorities and curtailing non development expenditures which in most cases are many times outsized than

In summary, the discussion here suggests that the earning inequalities in developing countries have two important determinants. First, there are significant entrenched inequalities in educational attainment. Second, increased international trade transforms these education inequalities into wage inequalities by favouring skilled labour over unskilled labour. In line with previous studies, this analysis found that education might be central to explaining the increasing gap in relative wages between skilled and unskilled workers in developing countries. Although the analysis supports the argument that those countries with a higher initial level of human capital do well on the inequality front, it also suggests that human capital, particularly the part related to higher education, which accrues after trade liberalisation has in-egalitarian effects. Governments in developing countries tend to invest more in higher education at the cost of primary education in order to seize short-term benefits from globalisation.

Table 5 *List of Countries for Theil Index (Theil99developing)*

Afghanistan (1988)	Ecuador (1997)	Malaysia (1997)	South Africa (1997)
Algeria (1997)	Egypt, (1997)	Mauritania (1978)	Sri Lanka (1994)
Angola (1993)	El Salvador (1997)	Mauritius (1997)	St. Vincent and the Grenadines (1994)
Argentina (1996)	Equatorial Guinea (1990)	Mexico (1997)	Sudan (1972)
Bahamas, The (1990)	Eritrea (1988)	Moldova (1994)	Suriname (1993)
Bahrain (1992)	Ethiopia (1997)	Mongolia (1994)	Swaziland ((1994)
Bangladesh (1990)	Fiji (1997)	Morocco (1997)	Syria (1997)
Barbados (1997)	Gabon (1994)	Mozambique (1994)	Togo (1981)
Belize (1992)	Gambia, The (1981)	Myanmar (1997)	Thailand (1994)
Benin (1981)	Ghana (1995)	Namibia (1994)	Tonga (1994)
Bhutan (1989)	Guatemala (1997)	Nepal (1996)	Trinidad and Tobago (1994)
Bolivia (1997)	Haiti (1988)	Nicaragua (1985)	Tunisia (1997)
Botswana (1997)	Honduras (1994)	Nigeria (1994)	Turkey (1997)
Brazil (1994)	Hong Kong, China (1997)	Oman (1997)	Taiwan (1997)
Burkina Faso (1981)	India (1997)	Pakistan (1996)	Tanzania (1990)
Burundi (1990)	Indonesia (1997)	Panama (1997)	Uganda(1988)
Cameroon (1997)	Iran, Islamic Rep (1993)	Papua New Guinea (1989)	United Arab Emirates (1985)
Cape Verde (1993)	Iraq (1985)	Paraguay (1991)	Uruguay(1997)
Central African Republic (1993)	Jamaica (1990)	Peru (1994)	Venezuela (1994)
Chile (1997)	Jordan (1997)	Philippines (1997)	Western Samoa (1972)
China (1985)	Kenya (1997)	Puerto Rico (1997)	Yemen (1986)
Colombia (1997)	Korea, Rep. (1997)	Qatar (1994)	Zambia (1994)
Congo, Rep. (1988)	Kuwait (1997)	Rwanda (1985)	Zimbabwe (1997)
Costa Rica (1997)	Lesotho (1994)	Saudi Arabia (1989)	
Cote d'Ivoire (1997)	Liberia (1985)	Senegal (1997)	
Cuba (1988)	Libya (1980)	Seychelles (1988)	
Cyprus (1997)	Macao, China (1997)	Singapore (1997)	
Dominican Republic (1985)	Madagascar (1988)	Somalia (1986)	
	Malawi (1997)		

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