Skilled-Unskilled Wage Asymmetries as an Outcome of Skewed International Trade Patterns in the South

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Abstract

The paper tries to find out the impact of trade liberalization on income inequality. The literature suggests that trade favors one segment of the society over other and cause uneven development. For example, one possible way through which inequality is suspected to seep into the economy through processes of liberalization is by increasing the relative wages of skilled labor as compared to the unskilled ones. Empirical evidence is provided to this effect by employing Theil Wage inequality Index and up to 28 different concepts of openness/ trade policy. OLS as well as 2SLS regressions with numerous specifications were run. It is found out that openness not only causes wage inequality but the relationship is significant for the developing countries. Additionally, the study also suggests that human capital, which is accrued from liberalization processes, is responsible for amplifying wage inequality.

"Openness *and trade liberalization are now seen almost universally as key components of the national policy cocktail required for economic growth and aggregate economic well being. They are believed to have been central to the remarkable growth of industrial countries since the mid- 20th century and to the examples of successful economic development since around 1970. The continued existence of widespread and abject poverty, on the other hand, represents perhaps the greatest failure of the contemporary global economy and the greatest challenge it faces as we enter the 21st century."*…….Alan Winters (2000).

"Comprehensive trade reform can be helpful in reducing poverty provided it is accompanied by appropriate enabling policies."…….Global Poverty report (World Bank, 2001a)

1. Introduction:

Many studies have tried to capture the relationship between trade liberalization and income inequality. A recent paper by the two well known World Bank economists, Dollar and Kraay (2004), concludes that liberalization does not carry any significant effects on income distribution and at best the relationship is of neutral nature. However their results have been challenged by many on the basis of their methodology and variable choice (i.e., see Ravallion, 2003; Amann et al, 2002;

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Srinivasam and Bhagwati, 2002). Murshed (2003) pointed out that Dollar and Kraay only considered successful globalizers, mainly from Asia, in their analysis and excluded the unsuccessful globalizers from their sample in order to capture trade and poverty relationships.

Furthermore there is ample empirical evidence in the literature which rejects the notion that trade is insignificantly related with inequality. For example, Behrman et al (2001) noticed that in 7 out of 18 Latin American countries that initiated market reforms in the mid 1980s, inequality has actually increased in recent times. The rest of the economies in their sample showed that inequality was approximately same in 1990s to the levels of 1980s. Jayasuriya (2002), though accepted that liberalization has reduced consumption poverty in South Asia, showed skepticism concerning neutral distributional effects of liberalization. A more clear line is adopted by single country case studies. Many suggest that the distribution of the positive effects of liberalization is some what skewed towards urban households rather than rural and wealthy households rather than poor.[1] It is further noticed in many studies[2] that liberalization process in many developing countries seems to be biased against low-skilled labor. The empirical verification in this regard comes mainly from Latin American region primarily because most of the economies in the region undertook rigorous reform policies in the mid 1980s as part of their structural adjustment plans and also witnessed grappling inequality in Post reform periods. Ligovini et al (2001) found out that inequality in Mexico rose sharply between 1984 and 1994 and rising returns to skill labor accounted for 20 percent of the increase in the inequality in household per capita income. Similarly, Hanson and Harrison (1999) found that the reduction in tariffs and the elimination in import licenses account for 23 percent increase in the relative wages of skilled labor over the period of 1986-1990 thus providing evidence for the role liberalization played in rising inequality in Mexico. Other country studies on Brazil, Chile, Colombia and Venezuela, also show that skilled workers received increased premiums after liberalization when compared to their unskilled counterparts (World Bank, 2001b). Such empirical evidence

[1] See for example, Chen and Ravallion (2003), Cockburn (2001), Friedman(2000), Lofgren (1999).
[2] i.e., Behrman et al (2001).

contradicts the basic trade theory which suggests that trade liberalization would result in an increase in demand for low-skilled in a developing country, thereby improving the relative earnings of this group compared with the more skilled. The evidence further feeds the fears of Ravallion (2003) that openness to trade can lead to the demand for relatively skilled labor, which tends to be more inequitably distributed in poor countries than rich ones. He also proposed caution regarding the results of David and Dollar (2004) paper concerning neutral inequality effects of trade reform on the base of latter's methodology and referred to his own empirical work which found that reform process do carry unequal distributional effects.

2. Trade Liberalisation and Movements in Relative Wages:

We employ the UTIP-UNIDO wage inequality 'THEIL' measure calculated by University of Texas Inequality Project (UTIP), instead of taking measures of absolute inequality which captures the personal income distribution i.e. GINI. This is because we are more interested in the functional distribution of income. Changes in the functional distribution between skilled and unskilled labour, will in turn predictably impact on the personal income distribution in countries that are unskilled labour abundant. Inequality will rise as the skilled-unskilled labour wage premium increases and vice versa. Since, the Theil Index is based on UNIDO 2001, the wages of skilled and unskilled labor represent sectoral wage rates, including manufacturing industries for which the UNIDO Industrial Statistics Database (UISDB) provides detailed time-series data for most countries in the world.

The basic formula of Theil index is as follows.

$$Theil \equiv \sum_{i=1}^{n} \underbrace{\left[\frac{x_i}{\sum_{j=1}^{n} x_j} \right]}_{\text{weight is share of aggregate income}} \cdot \ln \underbrace{\left(\frac{x_i}{\bar{x}} \right)}_{\text{income relative to mean}} \quad \text{.....(1)}$$

Whereas under perfect equality, i.e. everybody gets the mean income, the index takes the value equal to zero:

$$Theil \equiv \sum_{i=1}^{n}\left[\frac{\bar{x}}{\sum_{j=1}^{n}\bar{x}}\right]\cdot\ln\left(\frac{\bar{x}}{\bar{x}}\right)=\sum_{i=1}^{n}\left[\frac{1}{n}\right]\cdot\ln(1)=0 \quad \text{.....(2)}$$

However in the case of perfect inequality, one person takes all and everyone else gets nothing. The individuals can be ordered in the sum from *i*=1,...,*n* from lowest to highest income.

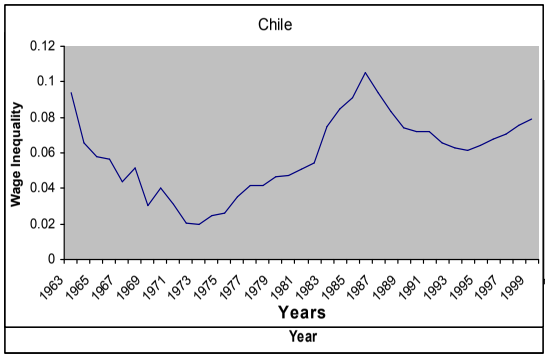
$$Theil \equiv \underbrace{\lim_{x_i\to 0}\left\{\sum_{i=1}^{n-1}\left[\frac{x_i}{\sum_{j=1}^{n}\bar{x}}\right]\cdot\ln\left(\frac{x_i}{\bar{x}}\right)\right\}}_{=0}+\left[\frac{n\cdot\bar{x}}{n\cdot\bar{x}}\right]\cdot\ln\left(\frac{n\cdot\bar{x}}{\bar{x}}\right)=\ln(n) \quad \text{.....(3)}$$

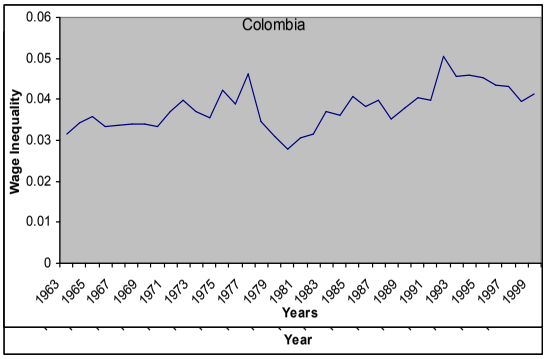
The value of Theil index depends upon the size of the population, as in (3). For example, consider a society with two people where one person has everything and compare it to a society with four people where one person has everything, also. Which society is more unequal? There are more poor persons per rich person in the society of four people, so the Theil index will be greater in that case. The UTIP dataset provides the Theil index for nearly 160 developing and developed countries, and the time series spans 40 years, from the early 1960s to the late 1990s.

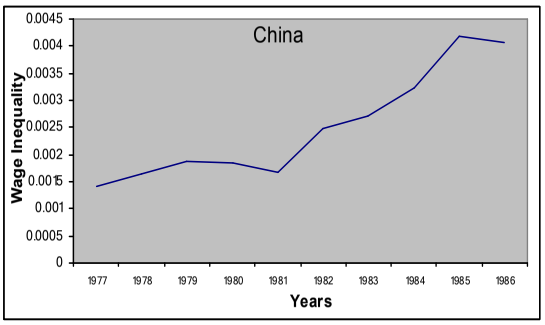
Figure 1 illustrates trends in wage inequality over time in selected developing countries and is representative of different regions. All the country graphs, except one, show that wage inequality has been on the rise in 1980s and 1990s. The only exception is Singapore which belongs to group associated with the “East Asian Miracle” of the 1980s. This miracle, however, is confined to a few countries, and is not representative of the developing world, as is evident from above graphs. Since 1980s and 1990s are associated with ‘Structural Adjustment Policies’ under which

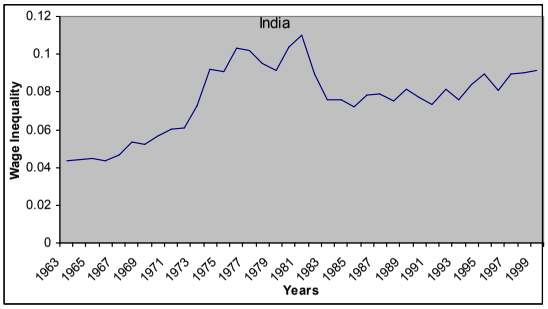
many developing countries embraced liberalization, it is safe to imply that the above trends in wage inequality is related to these market reforms.

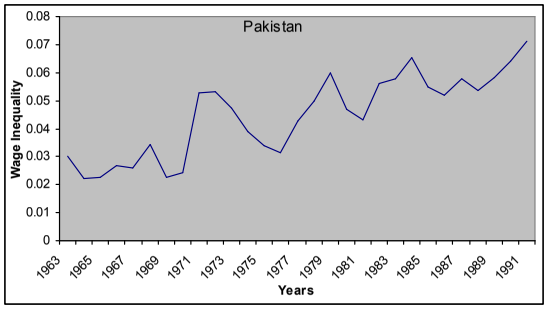
Figure 1:

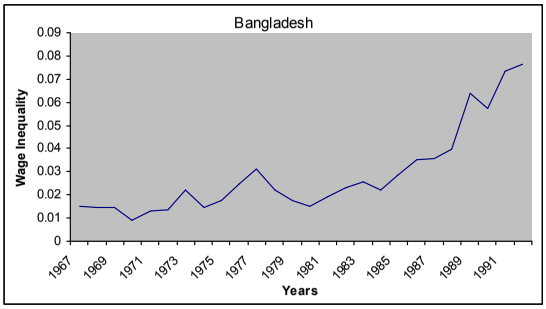


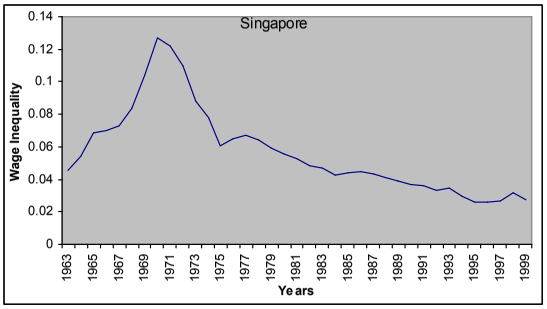












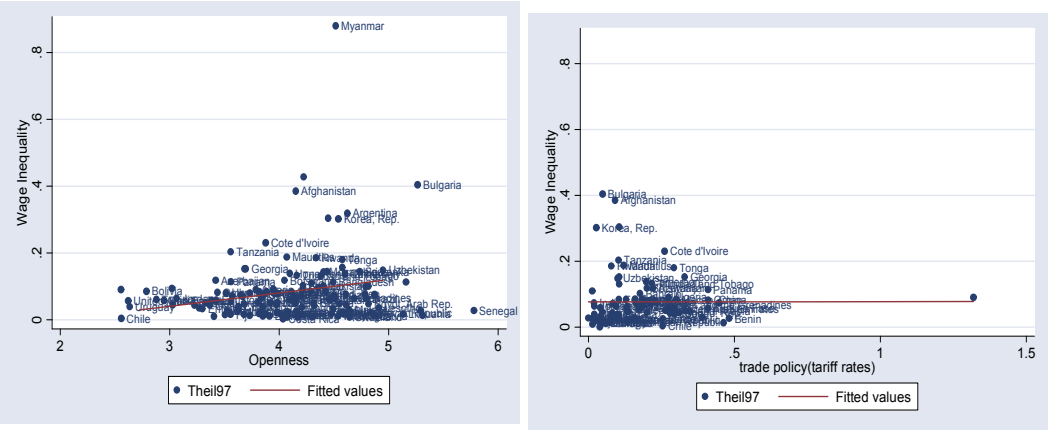
The object of this paper is to see whether this proposition holds across some 124 developing countries and economies in transition. Appendix 3 lists these countries, and the latest year for which the Theil wage inequality index was available for them.

To this effect the paper initially proposes a simple OLS regression model:

$$THEIL_i = \alpha + \beta OPEN_i + \gamma HK_i + \chi Disteq_i + \varepsilon_i \text{ .....(4)}$$

Where $THEIL_i$ is wage inequality in country i, $OPEN_i$ and HK_i are respectively measures for openness/trade policy and human capital and ε_i is the random error term, whereas $Disteq_i$ (distance from the equator) is a proxy for geography. Inclusion of human capital and geography variables will enhance the explanatory power of our model because on the one hand human capital plays important role in inequality in a post liberalization period since international trade favors skilled labor over unskilled and on the other hand country locations determine patterns of trade subsequently affecting inequality.

Figure 2



Openness (Exports+Imports/GDP, 1985) , Tariffs (Import Duties as a % Imports, 1985) and Wage Inequality (Theil Index, 1997)

Before undertaking any regression analysis, let us take a look at simple graphs (figure 2) showing bi-variate relationship between openness and inequality. The first graph in the figure shows that trade shares are positively related with increases in

inequality and confirms our hypothesis that international trade is biased towards the wages of skilled labor in developing countries. However interestingly, the second graph in figure 2 fails to develop any definite association between tariffs[3] and inequality substantiates the findings of Dollar and Kraay (2004) that the relationship between integration and inequality is at best insignificant. Well the lesson which can be drawn from figure 2 is that the choice of openness/trade policy variable matters apropos its relation with inequality. This calls for a robustness check.

To this effect the OLS regression analysis (Appendix 1) utilizes several concepts of openness and trade policy in addition to trade shares and tariff rates. Here a study by Rose (2004) has been of great use because his paper identifies nearly 60 different measures of openness/trade policy. 28 of these measures, which suit the data requirements, are employed in this paper (Please refer to Appendix 2 which gives detailed information about these measures). Nevertheless our core openness variable remains to be overall trade share (the ratio of nominal imports plus exports to GDP).

As far as the signs of the coefficients of 28 openness/trade policy variables are concerned, Tables 1a and 1b show that they have been overwhelmingly positive under all specifications satisfying the assertion that openness is positively associated with increased wage inequality. However the coefficients have very small values suggesting limited role they play in explaining inequality. Small R^2 values with any of the specifications of Eq (4) suggest the same. Additionally only 7 out of 28 openess/trade policy concepts have turned out to be significant which suggest that the relationship between trade and inequality is weak in nature. In the light of these results we cannot confidently claim that openness cause increased relative wage inequality by favoring skilled labor.

The OLS regression though useful is always suspected to suffer from econometric problems such as endogeneity among variables especially under cross section

[3] Movement in tariffs captures country's trade policy and also shows its level of openness.

analysis. Though Geography is a pure exogenous variable here, the level of integration of an economy depends upon its location in the world map (Rodrik et al, 2004). Similarly, human capital depends on the fact how open a country is. Though simple Stolper-Samuelson theory would suggest that the returns to skill would decline and with them incentives for education when a skilled-scarce developing country opens up (see Wood and Ridao-Cano, 1999), in a multidimensional Stolper Simuelson model which is nearer to real life, endogenous growth with constant returns to R & D or skills-bias in tradables as oppose to non tradables could very well lead to increase in returns to education upon openness (Arbache et al, 2004). Openness can also lead to more efficient education technologies thus improving the level of human capital in a country (Winters, 2004). Here we have to extract the dependency of trade policy/openness on human capital by finding a right instrument for the former variable.

The literature clearly establishes that predicted trade shares following Frankel and Romer (FR) (1999) from the gravity equation is the most appropriate instrument for openness/ trade policy (see, Dollar and Kraay, 2002; Rodrik et al, 2004; Acemolgu, Johnson and Robinson, 2001; Hall and Jones, 1999). Furthermore, following the likes of Rodrik et al (2004), distance from the equator has been chosen as the second instrument for openness/trade policy variables.

Our Instrumental Variable (IV) Regression (or 2 Stage Least Square) model has two equations

$$THEIL_i = \sigma + \kappa OPEN_i + \nu HK_i + \varepsilon_{1i} \text{ ……(5)}$$

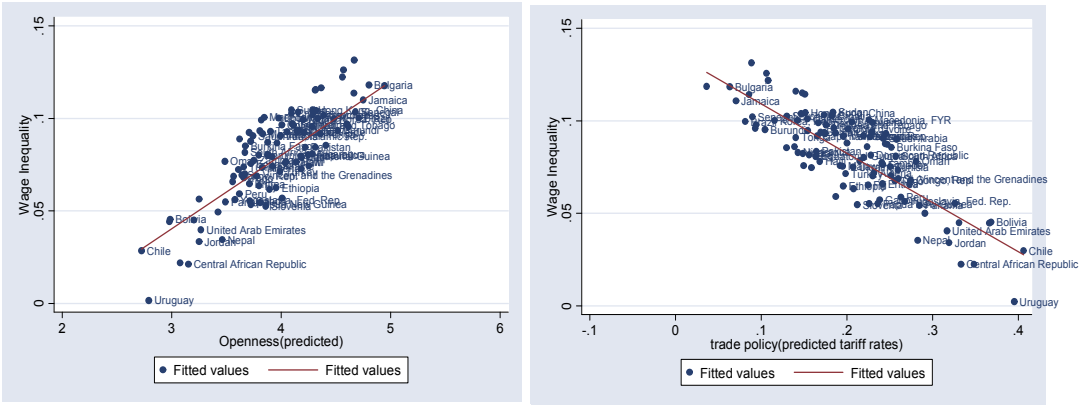
$$OPEN_i = \varsigma + \tau FR_i + \psi Disteq_i + \varepsilon_{2i} \text{ ……(6)}$$

Here FR_i stands for predicted trade shares from gravity equations computed by Frankel and Romer (1999).

In the 1st stage, equation (6) has been used to generate predicted values of openness/ trade policy variables by regressing them on the two instruments. The predicted openness/trade policy variables are then employed in equation (5) as the second and final stage of IV regression analysis. Please note that the only difference between eq (5) and equation (4) is that the former does not carry $Disteq_i$ variable which is instead used as an instrument in eq (6).

Before we carry out the IV analysis, let us look at simple bivariate graphs between predicted trade shares and predicted tariff rates with Theil index to see whether this time we can get a clearer picture regarding openness inequality relationship. Figure 3 visibly shows that inequality moves positively with openness. The predicted values of openness/trade policy provide a much clear trends in openness-inequality movements. On the one hand the first graph of figure 3 shows that increase in trade shares after liberalization leads to higher inequality and on the other hand the second graph suggests that decrease in tariffs carries unequal distributional effects on wages. One of the reasons for decrease in relative wages of unskilled labor, as tariffs fall, is that the heavily protected sectors in many developing countries tend to be the sectors that employ a high proportion of unskilled workers (Goldberg and Pavcnik, 2004).

Figure 3



Openness (Predicted values of 'Exports+Imports/GDP', 1985), Tariffs (Predicted values of 'Import Duties as a % Imports', 1985) and Wage Inequality (Theil Index, 1997)

Table 2 (Appendix 1) gives IV regression results with 58 different specifications. The results confirm the findings of figure 3. All openness/ trade policy variables carry expected signs and nearly all of them are significantly related with wage inequality. Under the light of these results it can be safely suggested that trade liberalization significantly worsens the distribution of wages among skilled and unskilled labor in developing countries. Further more, human capital is negatively related to inequality showing that the countries which start out with relatively developed human capital do well apropos wage inequality. This is an expected result and in line with theory that the countries, where human capital is evenly distributed, are less prone to adverse wage distributions among labor (Fisher, 2001; Tuelings and Van Rens, 2002; Eiche, 2001; and Bourguignon and Morrisson, 1990; Tilak, 1989).

3. Human Capital, Trade and Unequal Wages:

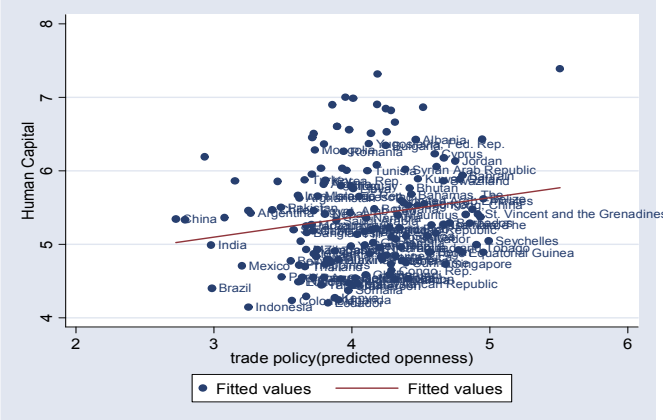
According to Tinbergen (1975) inequality is determined by the opposing effects that technology (skilled labor demand) and education (skilled labor supply) exerted on the relative wages. Following the line proposed by Tinbergen, the role of human capital vis-à-vis inequality becomes complex once we bring trade liberalization into the picture as trade effects the demand of skilled labor through technology transfer and processes of learning by doing. For example, human capital under liberalization can cause wage inequality in a developing country, where there is unequal distribution of skilled and unskilled labor, because global integration cause upward pressure on the wages of the skilled labor as demand of skilled labor exceeds its supply

Recently, Eiche et al (2001: 19) accepted this fact and suggested that human capital plays a dual role in development because the stock of educated workers in an economy determine both the degree of income inequality and the rate of growth, and the parameters of the demand for and supply of labor are crucial determinants of whether inequality increases or decreases as an economy accumulates human capital. Arbache et al (2004) also confirms this assertion as they found out that

imported technology has raised the relative demand for highly skilled labor in Brazil and thus lowered the wages of low level education groups.

Figure 4, below shows that trade liberalization improves human capital in developing countries. This is true because as explained above, increased international trade is followed by technology transfer which in turn improves the general skill level in a developing country as learning by doing takes place and skilled labor supply tries to adjust with its excess demand. This means that part of human capital is endogenous to the processes of openness as hinted by many endogenous growth models. Here the part of skilled human capital which is endogenous to integration will have its own effect on relative wages and inequality. And this effect is expected to be different from the one which is attributed to the initial human capital endowments in a country.

Figure 4

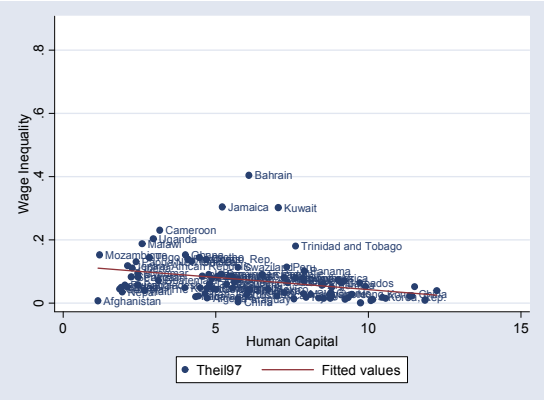


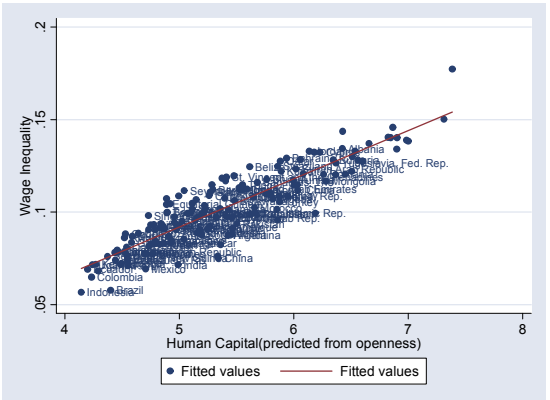
Openness (Predicted values of 'Exports+Imports/GDP', 1985) and HK.

We know from above discussion that wage inequality in many developing countries has deteriorated amid more international trade. In order to know whether human capital accumulation, which is directly accrued through processes of trade, is guilty of aggravating wage inequality in developing countries, the paper generates predicted values of human capital by regressing them on FR (1999) predicted trade shares. Figure 5 shows two graphs. First one illustrates a simple relation ship between human capital and wage inequality and suggests that countries with better

human capital do well apropos inequality. The second graph, where we predicted human capital on FR trade shares, follows the opposite line and confirms that human capital accumulation which is owed to global integration, carry augmented effects on wage inequality. Now this leads to another question as to why would human capital under liberalized trade work against wage equality in developing countries? The answer is simple. Generally in most developing countries human capital is unevenly distributed (Ravallion, 2003). Thomas, Wang and Fan (2000) and Domenech and Castello (2002) have found out that Gini coefficient of the distribution of human capital in Sub Saharan Africa and South Asia respectively, is the highest in the world. Berthelemy (2004) came up with the same conclusion not only for Sub Saharan Africa and South Asia but also for Middle East and North Africa (MENA). According to Berthelemy (2004), the unequal distribution of income in these regions are due to inequitable education policies of their respective governments who pay on average much more attention to secondary and tertiary education than primary education.

Figure 5





One of the reasons for this biasness in education policies in these developing countries towards higher education is the fact that elementary education has a very limited direct role in determining growth rates. According to Barro (1999) the rate of economic growth responds more to secondary or higher education levels rather than elementary schooling. This is true because processes of growth are deeply linked with higher education instead of primary education. For example, in developing countries international trade, which is one of the key determinants of growth, favors

either highly qualified university graduates or those who have at least finished their high school. The sole reason that India and China have been the haven for international outsourcing and trade in contemporary times is because they have managed to accumulate relatively educated and skilled human capital by investing on higher education. It is expected that over the next five years, 3.3 million services and industry jobs and $ 136 billion in wages will be outsourced only from United States, while most of them finding their way to the Indian or Chinese Shores. Only in India, on any given day in New Delhi, Bombay and Bangalore, the call goes for a new call center recruits who are sufficiently educated to communicate in English and have at least acquired a high school diploma. At least, as far as international trade is concerned, it is quite evident that the Southern countries which are benefiting today and which will benefit the most in near future are those who have transformed a portion of their labor force into relatively skilled intensive by investing generously on its higher education programs. Well, these countries are also the ones which have been the fastest growing economies of recent times.

So it is no surprise that in order to be competitive in a race to the top, developing countries generally have a tendency to invest in higher education at the cost of primary education to achieve greater growth. Recently, Pakistan has also fallen for this trap as its current education policy is skewed towards higher education, whereas primary education is being overlooked. Only last year the government increased its higher education budget to Rs 5 billion from a meager amount of Rs 800 million five years ago - an increase of nearly 400 percent. For this year the government has allocated double the amount of last year for higher education. Such a focus on higher education is unprecedented in the history of this country. However allocation of funds to primary education is in contrast with such heavy investments in higher education since the budget for primary education has been increased by a meager average of 4 percent for the last few years. Though, in coming years Pakistan will definitely reap the fruits of its higher education focus and compete with other developing countries in international markets for its cheap and skilled human capital, it should also get ready for increased distortions in domestic labor markets as the

relative wages of unskilled labor would decline amid increased international trade. This apparent pro growth higher education policy of Pakistan at the cost of primary education may very well be good for income generation but it definitely excludes the poor and unskilled and will subsequently lead to increased wage and income inequalities in the country.

In order to show how income inequalities increase with education inequality Gregorio and Lee (1999) worked with a traditional model of human capital where the level of earnings (Y) is accrued by an individual with S years of schooling:

$$\log Y_s = \log Y_o + \sum_{j=1}^{s} \log(1 + r_j) + u \quad \text{.....(9)}$$

where r_j is the rate of return to the *j*th year of schooling. The function can be approximated by:

$$\log Y_s = \log Y_o + rS + u. \quad \text{.....(10)}$$

Whereas the distribution of earnings can be written as:

$$Var(\log Y_s) = Var(rS) = \bar{r}^2 Var(S) + \bar{S}^2 Var(r) + 2\bar{r}\bar{S}Cov(r, S). \quad \text{.....(11)}$$

A sharp rise in educational inequalities Var(S) would unambiguously lead to higher wage inequality in equation (11) if other variables are held constant. On the same account, rise in wage inequality is a clear outcome if Var(r) is high. Here we know that returns to higher education are greater than returns to primary education in developing countries because of excess demand of skilled labor as rapid technology diffusion amid trade liberalization takes place and skilled labor supply lags behind.

However, equation (11) also suggests that under the assumption of other things as constant, if the covariance between the return to education and the level of education is negative, an increase in schooling can reduce wage inequality. Well there is some empirical evidence that there is a negative relationship between the

return to education and average years of schooling (Teulings and Van Rens, 2002). The negative value of Cov (r, S) suggest that as the relative supply of high skilled workers go up and that of unskilled workers go down, the relative wages of skilled labor decreases. Though Cov(r, S) gives some useful information apropos wage inequality, the information can very well be misleading because movements in relative wages are as much a function of 'skilled labor demand' as it is of skilled labor supply. For example, through trade liberalization, there is a constant transfer of technology in developing countries which increase the demand for skilled labor as learning by doing takes place. If this increased demand for skilled labor is more than its supply, there is a good possibility that wages of skilled labor rise instead of plummeting. And if the wages of unskilled labor fail to rise simultaneously because unskilled labor are in excess supply in developing countries, the wage inequality will very well increase and the negative relationship between level of schooling and returns to education Cov (r, S) might not hold at all. This fact is recognized by Dur and Tuelings(2002) when they admitted that in the Tinbergen's (1975) famous race between technology (skilled labor demand) and education (skilled labor supply), technology has been a clear winner of recent times.

In short the key to equality of relative wages in developing countries do not lie as much in Cov (r, S) but in the value of Var(S). Our discussion suggests that the inequalities, which we witness today in developing countries, have two important determinants. First there are significant inequalities in educational attainments. Second, the processes of international trade transform these education inequalities into wage inequalities by favoring the skilled labor.

Well to this effect, in order to solve for wage inequality in developing countries, the respective governments need to increase the mean level of human capital through a balanced education policy whereby primary education is given as much importance as higher education. An equitable education policy will not only decrease Var(S), it will also lead to a negative value of Cov(r, S) as the overall supply of low skilled and uneducated workers go down and supply of educated work force increases. Dur and

Tuelings (2002) have called for subsidies to all levels of education as they argue that the mean level of education gives rise to general equilibrium effects that reduce wage inequality.

4. CONCLUSIONS:

The paper has found out that contrary to the claims of neo-classical paradigm, openness does have significant effects on wage inequality. The empirical evidence provided in the paper supports the argument that international trade is biased towards skilled workers in developing countries and with an increase of trade after liberalization, the wages of skilled workers are most likely to increase in South, where as poor who are largely unskilled shall increasingly become the hostage of such process.

This conclusion has some serious implications for the success of poverty reduction strategies in developing countries because inequality is one of the two channels through which poverty is affected. The newly adopted common wisdom that growth always trickles down to decrease poverty if supplemented by certain relevant development strategies e.g. micro finance schemes etc may be true but ignoring the inequality part vis-a-vis poverty is a fatal mistake especially when pro poor growth policies e.g. liberalization or opening up leads to increases in the formal variable (inequality). The general perception among the right that inequality is never that significant to offset pro poor growth effects is not true and has to be re-evaluated also.

Recently, the World Bank has accepted this fact since its webpage[4] on "Poverty" advices policy makers that poverty reduction and social development cannot be achieved by focusing on growth strategies with out any understanding of their effects on the distribution of income and wealth: "*The benefits of growth for the poor may be eroded if the distribution of income worsens. But policies that promote*

[4] Web address: http://www.worldbank.org/poverty/mission/rp1.htm

better income distribution are not well understood; learning more about the impact of policies on distribution should be high on the agenda"

All in all, it is apposite to conclude that more and more people might be able to live above poverty line with increases in growth attributed to the so-called reform process - thus showing some improvements regarding extreme poverty, but if inequality is on rise more and more people are worse off and an increase of the gap between have and have nots can not be defended with any academic jargon and is definite welfare loss. Thus it becomes all more important to understand inequality and its determinants. If free trade is guilty of increasing inequality among people or societies, the process has to be sterilized against such a phenomenon.

The paper makes some suggestions to this effect. It tries to find those channels through which liberalization causes wage inequality. In line with previous studies we have found out that education is the key to explain the increasing gap in relative wages. Though the paper supports the argument that those countries which starts out with higher level of human capital do well on inequality front, it also suggests that human capital which is accrued through the liberalization process is guilty of unequal distribution of wages among skilled and unskilled labor. One explanation is that governments in the developing countries invest in higher education at the cost of primary education in order to accrue quicker benefits from processes of growth and thus become prone to wage inequality after trade liberalisation.

The paper carries very important guide lines for policy makers. In order to neutralize the unequal effects of trade, the focus of policy makers should be on education. The countries, which have greater frequency of educated people, are in a better position to benefit from international trade. However there is a caveat. Generally the governments in developing countries tend to focus their education policy on higher education in the anticipation that investments in higher education would accrue faster dividends by exploiting the international business environment. Though they are right, they need to realize that they should not promote higher education at the

cost of primary education. Since literature suggests that many developing countries are guilty of promoting higher education at the cost of primary education, only a limited segment of the society participates in activities emanating from international trade, whereas the majority which is excluded is also be barred from the benefits of growth and its processes (i.e., trade) at least in the short term. The cases in point are China and India who have been the most prominent beneficiaries of international trade. Though, both the countries are able to achieve high growth rates as their relatively skilled and cheaper human capital (a direct outcome of their higher education focus) has utilized the recent surge of international outsourcing by multinationals, they have suffered from increasing inequality because large portions of the population are left out because they were illiterate and unskilled.

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APPENDIX 1.

Table 1a: OLS Regression Results with different Specifications^

Theil Indx	1	2	3	4	Theil Indx	1	2	3	4
lcopen	0.04	0.035	0.003	0.03	Impen2a	-0.0003	-0.0003	-0.001	-0.001
	(2.58)*	(2.6)*	(1.8)**	(1.82)***		(-0.15)	(-0.12)	(-0.5)	(-0.49)
hk	-0.009	-0.008			hk	-0.003	-0.004		
	(-2.1)**	(-2.1)**				(-0.7)	(-0.8)		
disteq	0.0002		0.0002		disteq	-0.0002		-0.0003	
	(0.35)		(0.23)			(-0.3)		(-0.34)	
n	70	70	114	114	n	58	58	72	72
R^2	0.11	0.11	0.03	0.02	R^2	0.01	0.01	0.005	0.0035
impen1o	0.0004	0.0004	0.0001	0.0001	Impen2r	0.002	0.002	0.0015	0.001
	(0.8)	(0.95)	(0.28)	(0.27)		(2.6)*	(2.67)*	(1.5)	(1.5)
hk	-0.005	-0.005			hk	-0.007	-0.007		
	(-0.9)	(-1.13)				(-1.5)	(-1.5)		
disteq	-0.0003		-0.0005		disteq	0.00009		-0.0003	
	(-0.4)		(-0.59)			(0.1)		(-0.3)	
n	59	59	73	73	n	58	58	72	72
R^2	0.03	0.02	0.006	0.001	R^2	0.12	0.12	0.03	0.03
impen1m	0.0009	0.001	0.0005	0.0005	Tars1o	0.0005	0.0005	0.0005	0.0005
	(1.2)	(1.34)	(0.69)	(0.71)		(1.8)***	(1.9)***	(1.7)***	(1.7)***
hk	-0.005	-0.006			hk	-0.007	-0.007		
	(-1.1)	(-1.3)				(-1.39)	(-1.5)		
disteq	-0.0003		-0.0005		disteq	-0.0001		-0.0004	
	(-0.3)		(-0.6)			(-0.04)		(0.4)	
n	59	59	73	73	n	59	59	73	73
R^2	0.04	0.04	0.011	0.007	R^2	0.07	0.07	0.04	0.04
Impen1a	0.001	0.001	0.00001	-0.00001	Tars1m	-0.001	0.0002	0.0001	-0.0001
	(0.46)	(0.48)	(0.01)	(0.001)		(-0.27)	(0.36)	(-0.17)	(-0.18)
Hk	-0.003	-0.004	-0.0005		Hk	-0.004	-0.005		
	(-0.71)	(-0.9)	(-0.6)			(-0.73)	(-0.36)		
disteq	-0.003				disteq	-0.0004		-0.0005	
	(-0.71)					(-0.48)		(-0.59)	
n	59	59	73	73	n	59	59	73	73
R^2	0.02	0.01	0.18	0.0000	R^2	0.02	0.015	0.005	0.0005
Impen1r	0.0003	0.0002	-0.0007	-0.0007	Tars1a	-0.0008	-0.0004	-0.0009	-0.0006
	(0.02)	(0.09)	(-0.45)	(-0.5)		(-0.5)	(-0.29)	(-0.7)	(-0.5)
Hk	-0.0033	-0.004			Hk	-0.003	-0.004		
	(-0.65)	(-0.9)				(-0.6)	(-0.9)		
disteq	-0.0005		-0.0005		disteq	-0.0007		-0.0007	
	(-0.5)		(-0.6)			(-0.7)		(-0.8)	
n	59	59	73	73	n	59	59	73	73
R^2	0.02	0.01	0.007	0.003	R^2	0.02	0.43	0.01	0.003
Impen2o	0.0004	0.0005	0.0003	0.0003	Tars1r	0.002	0.003	0.003	0.003
	(1.3)	(1.3)	(0.7)	(0.75)		(4.8)*	(4.9)*	(5.2)*	(5.3)*
hk	-0.006	-0.005			hk	-0.009	-0.01		
	(-1.1)	(-1.19)				(-2.2)**	(2.3)**		
disteq	0.00001		-0.0002		disteq	0.0002		-0.0004	
	(0.01)		(-0.3)			(0.35)		(-0.6)	
n	58	58	72	72	n	59	59	73	73
R^2	0.04	0.04	0.009	0.008	R^2	0.31	0.31	0.28	0.28
Impen2m	0.0002	0.0003	0.0002	0.0002	Tars2o	0.0003	0.0003	0.00006	0.00006
	(0.4)	(0.46)	(0.31)	(0.35)		(1.3)	(1.4)	(0.61)	(0.6)
hk	-0.004	-0.004			hk	-0.006	-0.006		
	(-0.81)	(-0.94)				(-1.2)	(-1.3)		
disteq	-0.001		-0.0002		disteq	0.0001		-0.0007	
	(-0.81)		(-0.29)			(0.1)		(-0.8)	
n	58	58	72	72	n	57	57	70	70
R^2	0.01	0.01	0.003	0.001	R^2	0.04	0.05	0.01	0.005

-*, ** and *** denotes 1%, 5% and 10% level of significance respectively. ^ For variable descriptions please refer to appendix 1.

Table 1b: OLS Regression Results with different Specifications^

Theil Indx	1	2	3	4	Theil Indx	1	2	3	4
Tars2m	-0.0001	-0.00006	-0.0001	-0.0001	totgvm	-0.0006	-0.0006	-0.0009	-0.0009
	(-0.21)	(-0.13)	(-0.3)	(-0.27)		(-1.3)	(-1.4)	(-1.9)***	(-1.9)**

hk	-0.003	-0.003			hk	-0.005	-0.006		
	(-0.54)	(-0.71)				(-1.00)	(-1.2)		
disteq	-0.0003		-0.001		disteq	-0.0003		-0.0004	
	(-0.34)		(-0.77)			(-0.37)		(-0.5)	
n	57	57	70	70	n	55	55	70	70
R^2	0.01	0.01	0.009	0.05	R^2	0.05	0.05	0.05	0.05
Tars2a	-0.002	-0.001	-0.0007	-0.0005	totgva	-0.0008	-0.0009	-0.001	-0.001
	(-1.3)	(-1.14)	(-0.8)	(-0.62)		(-1.8)***	(-1.91)***	(-2.4)**	(2.38)**
hk	-0.002	-0.003	-0.0008		hk	-0.006	-0.006		
	(-0.47)	(-0.77)	(-0.9)			(-1.16)	(-1.31)		
disteq	-0.0008				disteq	-0.0003		-0.0006	
	(-0.8)					(-0.39)		(-0.66)	
n	57	57	70	70	n	55	55	70	70
R^2	0.04	0.04	0.02	0.005	R^2	0.08	0.07	0.08	0.076
Tars2r	0.0017	0.0017	0.0002	0.0002	totgvr	-0.0002	-0.003	-0.0005	-0.0006
	(3.8)*	(3.9)*	(1.19)	(1.13)		(-0.48)	(-0.52)	(-1.02)	(-1.04)
Hk	-0.008	-0.008			hk	-0.004	-0.0045		
	(-1.9)***	(-1.9)***				(-0.74)	(-0.91)		
disteq	0.0003		-0.0007		disteq	-0.0005		-0.0006	
	(0.34)		(-0.86)			(-0.55)		(-0.65)	
n	57	57	70	70	n	55	55	70	70
R^2	0.228	0.227	0.029	0.018	R^2	0.02	0.018	0.022	0.015
tariffs	-0.0015	-0.0015	-0.0006	-0.0007	owqi	-0.038	-0.04	-0.049	-0.052
	(-1.2)	(-1.2)	(-0.4)	(-0.5)		(-1.03)	(-1.1)	(-1.4)	(-1.5)
Hk	-0.008	-0.008			Hk	-0.005	-0.005		
	(-1.5)	(-1.6)				(-1.1)	(-1.2)		
disteq	-0.0001		0.0003		disteq	-0.0002		-0.0005	
	(-0.1)		(0.4)			(-0.28)		(-0.66)	
n	59	59	82	82	n	59	59	72	72
R^2	0.05	0.05	0.005	0.003	R^2	0.04	0.04	0.03	0.02
owti	-0.053	-0.055	-0.075	-0.077	nontaro	-0.0003	-0.0003	-0.0003	-0.0003
	(-0.9)	(-1.0)	(-1.4)	(-1.4)		(-0.8)	(-0.9)	(-1.1)	(-1.05)
Hk	-0.005	-0.005			Hk	-0.004	-0.005		
	(-1.13)	(-1.2)				(-0.9)	(-1.1)		
disteq	-0.0003		-0.0006		disteq	-0.0004		-0.0007	
	(-1.13)		(-0.8)			(-0.5)		(-0.7)	
n	59	59	72	72	n	55	55	70	70
R^2	0.04	0.03	0.03	0.027	R^2	0.03	0.03	0.02	0.01
txtrg	0.096	0.089	0.19	0.165	nontarm	-0.0002	-0.0002	-0.0002	-0.0002
	(0.19)	(0.18)	(0.48)	(0.43)		(-0.68)	(-0.76)	(-0.89)	(-0.88)
hk	-0.002	-0.002			hk	-0.0004	-0.005		
	(-0.26)	(-0.29)				(-0.49)	(-1.02)		
disteq	0.0006		0.0005		disteq	-0.004		-0.0006	
	(0.51)		(0.54)			(-0.49)		(-0.7)	
n	40	40	46	36	n	55	55	70	70
R^2	0.01	0.006	0.01	0.005	R^2	0.03	0.024	0.018	0.011
totgvo	-0.0006	-0.0006	-0.0009	-0.0009	nontara	-0.0002	-0.0002	-0.0003	-0.0003
	(-1.3)	(-1.42)	(-1.8)**	(-1.94)		(-0.8)	(-0.85)	(-1.09)	(-1.06)
hk	-0.005	-0.0058			hk	-0.004	-0.005		
	(-1.0)	(-1.15)				(-0.8)	(-1.03)		
disteq	-0.0003		-0.0005		disteq	-0.0005		-0.0007	
	(-0.37)		(-0.53)			(-0.5)		(-0.74)	
n	55	55	70	70	n	55	55	70	70
R^2	0.05	0.05	0.05	0.05	R^2	0.03	0.027	0.024	0.016

-*, ** and *** denotes 1%, 5% and 10% level of significance respectively. ^ For variable descriptions please refer to appendix 1.

Table 2a: IV Regression Results With Different Specifications^:

	1	2		1	2		1	2
lcopen	0.037	0.027	impen2m	0.002	0.003	tars1r	0.003	0.004

	(2.25)*	(1.14)		(1.7)**	(2.2)*		(2.4)*	(2.8)*
hk	-0.008 (-2.12)*		hk	-0.007 (1.4)		hk	-0.009 (-2.14)*	
F-test n R^2	3.5* 70 0.11	1.3 100 0.04	F-test n R^2	1.8 58 –	4.9* 72 –	F-test n R^2	3.4* 59 0.30	8.2* 73 0.23
impen1o	0.0014 (2.0)*	0.002 (2.2)*	impen2a	0.007 (1.7)**	0.01 (2.1)*	tars2o	0.001 (1.7)*	0.0004 (1.5)
hk	-0.008 (-1.65)**		hk	-0.006 (-1.2)		hk	-0.008 (-1.6)	
F-test n R^2	2.3** 59 –	5.1* 73 –	F-test n R^2	1.7 58 –	4.5* 72 –	F-test n R^2	1.8 57 –	2.2 70 –
impen1m	0.002 (2.1)*	0.003 (2.3)*	impen2r	0.003 (1.9)**	0.005 (2.2)*	tars2m	0.001 (1.6)	0.001 (1.5)
hk	-0.009 (-1.7)**		hk	-0.008 (-1.7)**		hk	-0.009 (-1.5)	
F-test n R^2	2.4** 59 –	4.9* 73 –	F-test n R^2	2.2 58 0.1	4.5* 72 –	F-test n R^2	1.6 57 –	2.4 70 –
impen1a	0.007 (1.91)**	0.01 (2.2)*	tars1o	0.001 (2.1)*	0.0012 (2.8)*	tars2a	0.003 (1.39)	0.003 (1.7)**
hk	-0.005 (-0.9)		hk	-0.009 (-1.8)**		hk	-0.004 (0.87)	
F-test N R^2	2.2 59 –	4.9* 73	F-test n R^2	2.5* 59 0.03	6.16* 73 –	F-test n R^2	1.2 57 –	2.8** 70 –
impen1r	0.009 (1.7)**	0.009 (1.9)**	tars1m	0.002 (1.9)**	0.002 (2.1)*	tars2r	0.002 (1.96)*	0.001 (1.2)
hk	-0.012 (-1.6)**		hk	-0.012 (-1.8)**		hk	-0.009 (1.85)**	
F-test n R^2	1.7 59 –	3.6** 73	F-test n R^2	2.09 59 –	4.5* 73 –	F-test n R^2	2.3** 57 0.21	1.5 70 –
impen2o	0.001 (1.8)**	0.002 (2.3)*	tars1a	0.005 (1.7)**	0.005 (2.1)*	tariffs	-0.005 (-0.72)	-0.016 (-1.1)
hk	-0.007 (-1.5)		hk	-0.003 (-0.5)		hk	-0.014 (-1.12)	
F-test n R^2	1.9 58 0.006	5.1* 72 –	F-test n R^2	1.7 59 –	4.31* 73 –	F-test n R^2	0.92 59 –	1.38 78 –

- * and ** denote significance at 5% and 10% level. ^ For variable descriptions please refer to appendix 1.

Table 2b: IV Regression Results With Different Specifications^:

	1	2		1	2
owti	-0.31 (-234)*	-0.26 (-1.7)**	totgvr	-0.004 (-1.7)**	-0.004 (-2.1)*
hk	-0.004 (-1.56)		hk	-0.008 (-1.2)	
F-test n R^2	3.3* 73 0.08	3.4* 109 0.01	F-test n R^2	1.7 55 –	4.4* 70 –
txtrg	3.34 (1.40)	3.05 (1.38)	owqi	-0.23 (-0.88)	-0.39 (-1.3)
hk	0.014 (0.74)		hk	-0.008 (-1.3)	
F-test n R^2	2.2 49 –	3.9 66 –	F-test n R^2	0.8 59 –	1.5 72 –
totgvo	-0.002 (2.1)**	-0.002 (-2.5)**	nontaro	-0.002 (-1.6)**	-0.002 (2.1)*
hk	-0.009 (-1.5)		hk	-0.013 (-1.5)	
F-test n R^2	2.6*** 55 –	6.6* 70 –	F-test n R^2	1.6 55 –	4.5* 70 –
totgvm	0.002 (-2.1)*	-0.002 (-2.6)*	nontarm	-0.002 (-1.6)	-0.002 (2.02)*
hk	-0.009 (-1.5)		hk	-0.015 (-1.5)	
F-test n R^2	2.6** 55 –	6.6* 70 –	F-test n R^2	1.42 55 –	4.1* 70 –
totgva	-0.002 (-2.2)*	-0.002 (-2.6)*	nontara	-0.003 (-1.2)	-0.002 (-1.9)**
hk	-0.009 (-1.7)**		hk	-0.018 (-1.3)	
F-test n R^2	2.7** 55 –	6.8* 70 –	F-test n R^2	0.9 55 –	3.5** 70 –

- * and ** denote significance at 5% and 10% level. ^ For variable descriptions please refer to appendix 1.

APPENDIX 2

DATA AND SOURCES:

Black: Black Market Premium, Year: 1985. Source: Rose (2002).

Disteq: Distance from Equator of capital city measured as abs (Latitude)/90. Source: Rodrik, Subramanian & Trebbi (2002)

heritage: Heritage Foundation Index, Source: Rose (2002).

hk: Average Schooling Years in the total population at 25,Year: 1999. Source: Barro R & J. W. Lee data set, http://post.economics.harvard.edu/faculty/barro/data.html

hyr: Average Years of Higher Schooling in the Total Population at 25, Year: 1999. Source: Barro R & J. W. Lee data set, http://post.economics.harvard.edu/faculty/barro/data.html

Impen1o: Import Penetration: overall, 1985. Source: Rose (2002).

Impen1m: Import penetration: Manufacturing, 1985. Source: Rose (2002).

Impen1a: Import Penetration: Agriculture, 1985. Source: Rose (2002).

Impen1r: Import Penetration: Resources, 1985. Source: Rose (2002).

Impen2o: Import Penetration: overall, 1982. Source: Rose (2002).

Impen2m: Import penetration: Manufacturing, 1982. Source: Rose (2002).

Impen2a: : Import Penetration: Agriculture, 1982. Source: Rose (2002).

Impen2r: Import Penetration: Resources, 1982. Source: Rose (2002).

Lcopen: Natural logarithm of openness. Openness is given by the ratio of (nomnal) imports plus exports to GDP (in nominal US dollars), Year: 1985. Source: Penn World Tables, Mark 6.

Logfrankrom: Natural logarithm of predicted trade shares computed following Frankel and Romer (1999) from a bilateral trade equation with 'pure geography' variables. Source: Frankel and Romer (1999).

Nontaro: Non- Taiff Barriers Coverage: Overall, 1987. Source: Rose (2002).

Nontarm: Non- Taiff Barriers Coverage: manufacturing, 1987. Source: Rose (2002).

Nontara: Non- Taiff Barriers Coverage: agriculture, 1987. Source: Rose (2002).

Nontarr: Non- Taiff Barriers Coverage: resources, 1987. Source: Rose (2002).

Open80: Sachs and Warners (1995) composite openness index. Source: Rose (2002).

Owqi: Non Trade barriers Frequency on intermediate inputs, Capital goods, 1985. Source: Rose (2002).

Owti: Tariffs on Intermediate and Capital Goods, 1985. Source: Rose (2002)

Tars1o: TARS Trade Penetration: overall, 1985. Source: Rose (2002).

Tars1m: TARS Trade Penetration: manufacturing, 1985. Source: Rose (2002).

Tars1a: TARS Trade Penetration: agriculture, 1985. Source: Rose (2002).

Tars1r: TARS Trade Penetration: resources, 1985. Source: Rose (2002).

Tars2o: TARS Trade Penetration: overall, 1982. Source: Rose (2002).

Tars2m: TARS Trade Penetration: manufacturing, 1982. Source: Rose (2002).

Tars2a: TARS Trade Penetration: agriculture, 1982. Rose (2002).

Tars2r: TARS Trade Penetration: resourses, 1982. Rose (2002).

Tariffs: Import Duties as percentage imports, Year:1985. Source: World Development Indicators (WDI), 2002.

Theil97: UTIP-UNIDO Wage Inequality THEIL Measure - calculated based on UNIDO2001 by UTIP, Year: 1997. Source: University of Texas Inequality Project (UTIP) http://utip.gov.utexas.edu.

Totgvo: Weighted Average of Total Import Charges: overall, 1985. Source: Rose (2002)

Totgvm: Weighted Average of Total Import Charges: manufacturing, 1985. Source: Rose (2002)

Totgva: Weighted Average of Total Import Charges: agriculture, 1985. Source: Rose (2002)

Totgvr: Weighted Average of Total Import Charges: resourses, 1985. Source: Rose (2002)

Txtrg: Trade taxes / trade, 1982. Source: rose (2002)

APPENDIX 3:

LIST OF COUNTRIES

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