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Income Inequality, Redistribution of Income and Trade Openness

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1. INTRODUCTION

Literature on nexus between trade openness and government spending is impressive [Atif, *et al.* (2012), Rudra (2004), Dani (1997) and McGuire (1999)]. The literature is growing rapidly. Analysts have documented the positive effects of government social spending [see for example Mesa-Lago (1994); Huber (1996); Weyland (1996); McGuire (1999)]. Unfortunately, Pakistan lacks empirical evidences on the impact of government social spending. Although Government of Pakistan has taken number of initiatives to have some form of redistribution policies, however, inequality in Pakistan is higher as compared to other Least Developed Countries that are open to trade. This situation is alarming. This paper therefore tries to identify the nexus between trade openness and social spending for the period 1975–2012.

International evidence suggests that government social spending influences poverty and distribution of income. Pakistan's low level achievement in terms of reducing inequality, given the likely adverse economic impact of trade openness, point towards the fact that government has to design the policy in such a way that it affects the distribution of income. Thus, exploring the effect of social spending on income inequality is necessary for the concerned policy makers.

Literature exploring nexus between trade openness and social spending provides mixed results. For example, Dani (1997) and Quinn (1997) have reported positive impact of trade on welfare. However, Garrett (1998, 2001), Rudra and Haggard (2001) stress that increasing the trade will result in unequal distribution of income only when government does not influence the income distribution t through social spending.

Literature exploring such effects provides ambiguous evidences. For example, Dollar and Kraay (2002) found out that openness affects income inequality while Lundberg and Squire (2003) and Barro (2000) predict no impact. Furthermore, using the data of developed countries Edwards (1997), Higgins and Williamson (1999), and Calderón and Chong (2001), found no support for the argument. Barro (2000) and

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Ravallion (2001) point out that openness affects inequality, but in developed countries openness appeared to be decreasing inequality.

Most recently, Atif, *et al.* (2012) have tested the causal effect of globalisation on income inequality for 68 developing countries and found that developed countries show support for the hypothesis. Jaumotte, *et al.* (2013) assessed the impact of the financial globalisation and trade openness on income inequality, the former decreases the inequality while the latter does not. Whereas Faustino and Vali (2011) showed that trade openness, among OECD countries reduces income inequality but FDI causes inequality.

Moreover, literature also hypothesised that when a country opens up to trade its factor endowments affect inequality. However, very few researchers found support for this hypothesis. For example, Dollar and Kraay (2002) found no effect but Spilimbergo, *et al.* (1999) and Fischer (2001) found significant effect. Their study argues that countries that are more open to trade and are relatively skill abundant have high inequality, while countries, which are more open to trade but are capital abundant have lower inequality.

In view of the findings of earlier studies, this study has developed a simple model to investigate the relationship among openness, government social spending and income inequality. In formulating the model, this study has also considered two more factors; economic development, and population. These factors have been included in the model as the important determinants of inequality. Using the Johansen Co-integration approach, the study analyses the short run and long run effects of openness on income inequality.

The rest of the paper proceeds as follows. Next section provides the model specification. Third section discusses the estimation technique and presents the data explanation. The fourth section reports the results. Final section provides overall conclusions.

2. MODEL ESTIMATION TECHNIQUE AND DATA EMPLOYED

2.1. Model

To test the relationship among income inequality, provision of social services (income redistribution) and trade openness (globalisation), we first develop relationship between income inequality and trade openness.

$$GINI = f(OP) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

Here, 'GINI' stands for GINI-coefficient, it is a standard measure of income inequality. Higher GINI represents higher level of inequality. 'OP' in Equation (1) stands for trade openness. Openness affects inequality through different channels.

Anderson (2005) discussed the channels through which trade may affect inequality. First, relative factor returns—when a country opens to trade the demand for its abundant factors increases, this increase the returns of that factor. Second, if openness benefits the poor by increasing their income, it would increase asset accumulation and thus investment. In the long-run, this will contribute in reducing inequality. Third, openness may expand employment and wages in selected regions, which in turn would affect income distribution. Finally, Anderson (2005) suggests that countries more open to trade implement redistribution policies more effectively as particular group in a society suffers a loss of income due to trade.

Previous research has documented that state sponsored social assistance programme diminishes the disruptive effects of trade by compensating the losers of trade openness. Hence, if people can easily access social services (redistribution of income) it will help in reducing income inequality.

$$GINI = f(OP, LSS) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (2)$$

Where, *SS* represents provision of social services and *LSS* is the log of social services. Government commitment for the provision of social service is captured here by the government expenditure on health, education, and social safety nets. If this expenditure is redistributive, then LSS will be negative and significant or vice versa.

In exploring the nexus between trade openness and welfare, one cannot ignore other factors that are considered as important determinants of income inequality. Among such factors, economic development, and population are important ones [Kuznets (1955); Crenshaw (1992); Burkhart (1997); Sheahan and Iglesias (1998); Boschi (1987); Vanhanen (1997)].

First, considering argument given by Kuznets (1955) study a negative and significant relationship is expected between economic development and income inequality. Kuznets hypothesised an inverse U-shaped (means, non-linear relation) relationship between development and inequality. According to this, inequality in an economy first increases but as countries develop it begins to decrease. Hence Per-capita GDP variable is included in the model to represent level of economic development. To capture the non-linearity, square of per-capita GDP variable is included in the model.

$$GINI = f(OP, LSS, PGDP, PGDP^2) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (3)$$

Further, population growth has also been hypothesised to have an inverse relationship with inequality. The reason is that growth in population increases burden on the country's economic resources and therefore on the shares of income among the population. Thus, including population growth, our model becomes:

$$GINI = f(OP, LSS, PGDP, PGDP^2, POP) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (4)$$

To test the relationship among the variables included in Equation (4) the study estimates the following baseline equation:

$$GINI_t = \alpha_0 + \beta_1 GINI_{t-1} + \beta_2 OP_t + \beta_3 LSS_t + \beta_4 PGDP_t + \beta_5 PGDP^2{}_t + \beta_6 POP_t + \mu_t \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (5)$$

Where subscript '*t*' denotes time period

2.2. The Data

For empirical estimation, this study has employed the data on Gini coefficient (GINI), representing the income inequality (income distribution). The interpolated series has been constructed from the UN-WIDER dataset. A quadratic curve was fitted on the actual observations by regressing log of poverty measure (or log of Gini Coefficient) on time and time square variables [see Jamal (2006) for more detail]. LSS represents provision of social services; comprised of government spending on Health, Education and Social safety nets. The data for social services 'SS' has been taken out from Budget

Documents, Government of Pakistan and 50 years of Pakistan. Economic development has been taken as the per capita GDP (PGDP), population growth (POP), and openness (OP)- imports plus exports as percent of GDP, a common measure of trade openness, taken from World Bank's World Development Indicators dataset [WDI (2013)]. This study performs the analysis using the annual data spanning the period from 1975 to 2012. The empirical estimation is done using the VAR approach proposed by Johansen and Juselius (1990). The econometric approach will help in detecting the long run and short run relationship among the variables of interest. Though both Cointegration and Vector Error Correction models have been used usually but recently scholars are applying Auto regressive Distributed Lag model (ARDL) to detect the long run and short run relation among the variable as well. ARDL is usually adopted when the variables under consideration have different order of integrations (i.e. a mix of I(0) and I(1)). As in our case the variables under consideration are all integrated of order 1 I(1) we have applied Johansen and Juselius (1990) method to identify the long run co-integrating vectors and short run effect of the variable of interest on income inequality.

3. EMPIRICAL ANALYSIS

The study first examined the long-run relationship among the said variables using Johansen approach [Johansen (1988) and Johansen and Juselius (1990)]. However, before applying the co-integration test, this study has also examined whether the series are stationary or non-stationary. For further analysis, ADF test has been applied, which includes a trend term. This is a common practice in the literature. Table 1 reports the ADF test results. The results show that all variables are integrated of order one, i.e., I(1)

Table 1

UNIT ROOT—Augmented Dickey-Fuller (ADF)

Variables	LEVEL INTERCEPT & TREND	1ST DIFFERENCE INTERCEPT& TREND
GINI	–3.07	–91.04*
OP	–2.84	–7.24*
PGDP	4.91	–4.23*
LSS	–2.48	–6.69*
POP	–2.56	–6.03*

After examining order of integration, we have applied Johansen cointegration test. To determine the number of cointegrating vectors, the study has computed the Johansen trace statistic and Eigen-values. Before that, AIC and SIC values have been analysed to determine the lag length. These values indicate one lag in the system (AIC=1.487 &SIC=3.315). Thus, the study performs Johansen's test by employing one lag. The results of co-integration based on the trace and Eigen-vales are reported in Table 2.

Table 2

Johansen Co-integration Test

	Maximal-Eigen Test	5 Percent Critical Value	Trace Test	5 Percent Critical Value
R=0	309.1877*	44.4972	574.7456*	117.7082
R<=1	113.9585*	38.33101	265.5579*	88.8038
R<=2	97.23964*	32.11832	151.5994*	63.8761
R<=3	27.31337*	25.82321	54.35977*	42.91525
R<=4	19.08776	19.38704	27.0464*	25.87211
R<=5	7.95864	12.51798	7.95864	12.51798

Note: * denotes rejection of the hypothesis at 5 percent significance level.
L.R. test indicates 5 co integrating equation(s) at 5 percent significance level.

Table 2 reveals that the null hypothesis of no cointegration is rejected at 5 percent significant level by both trace and Eigen-value. Cointegration test indicates five co-integrating vectors (rank =5) in the system. Our results, therefore, confirm that provision of social service, trade openness, per-capita GDP, per capita GDP Square and population growth are cointegrated. The results therefore provide the strong evidence of the long run relationship among the variables under study.

These results imply that, in general, all variables (except openness) included in our analysis adjust in a significant fashion to clear any short-run disequilibrium.

Although both trace test and Eigen-value have indicated the presence of cointegrating vectors in the model, yet there is a further need to explore the issue concerning impact of explanatory variables on income inequality in long run. Table 3 reports the cointegrating coefficients normalised on $GINI_t$.

Table 3

Co-integrating Coefficients Normalised on GINI

	LSS	OP	PGDP	$PGDP^2$	POP	Trend	C
	–0.115171	0.005956	–46.51904	0.000156	0.95587	0.089119	
GINI	(0.05636)	(0.00408)	(5.15783)	(4.60E–05)	(0.04856)	(0.02227)	30.78963
	[– 2.04342]*	[1.45842]	[–9.01910]**	[3.42296]**	[19.6835]**	[4.00100]**	

Note: ** (*) denotes significant at 5 percent (1 percent). Standard errors in ( ) and t-statistics in [ ].

Variables in the model have yielded statistically significant coefficients with expected signs except for OP. The implied long run significant and positive elasticity (0.00015) of $PGDP^2$ in the model also provides support for Kuznets's hypothesis.

The long run elasticity of social spending (–0.0115) is also significant indicating that increase in the government spending for the provision of social services will enable Pakistan to reduce the income inequality in the long run. Moreover, PGDP has a negative and significant impact on GINI in the long-run whereas $PGDP^2$ has positive and significant impact on GINI hence our results supported by Kuznets's Hypothesis. Finally, POP has a positive and significant impact on GINI, which shows that in the long-run, as the population increases, GINI will also increase.

Evidence of co-integrating relation among these variables has several implications. First, it rules out 'spurious' correlations and also the possibility of Granger non-causality. Second, the actual number of cointegrating (or equilibrium) relationships(s), found to be 5 percent, will result in a corresponding number of residual series. The residual series measures the speed of adjustment back to the long run. These are termed in literature as error-correction terms (ECTs). ECTs are exogenous variables and appear as lagged variable as part of the vector error-correction model (VECM).

Table 4

VECM Model

	D(GINI(-1))	D(LSS(-1))	D(OP(-1))	D(PGDP(-1))	D(PGDP2(-1))	D(POP(-1))	ECT(-1)	C
		0.000671	4.04E-05	0.388682	–3.49E-06	–0.004905	–0.007691	–0.063598
D(GINI)	–	(0.00102)	(6.20E-05)	(0.19217)	(9.80E-07)	(0.00253)	(7.00E-05)	(0.00036)
		[0.65945]	[0.64968]	[2.02256]*	[–3.56882]*	[–1.93546]**	[-109.875]*	[–175.312]

*Note:*** (*) denotes significant at 5 percent(1 percent). Standard errors in ( ) and t-statistics in [ ].

Table 4 reports the results of VECM. As discussed above the ECT_{t-1} generates a force that cause the variables to return to the long run equilibrium when it deviates from it. Thus, the longer the deviation, the greater would be the force tending to correct the deviation [Banerjee, *et al.* (1993)]. The coefficients of the lagged values of ΔLSS_t, ΔOP_t, $\Delta PGDP_t$, $\Delta PGDP^2_t$ and ΔPOP_t are short run parameters, which measure the immediate impact of independent variables on the dependent variable.

The results indicate that the sign of coefficient of lagged ECM term is negative and significant at 5 percent level of significance. This further confirms that there exists stable long run relationship among the variables. The value of lagged ECT term shows that changes in GINI from short run to long run A are adjusted by almost 0.7 percent every year with high significance.

Table 4 also reports that Social Spending and openness are insignificant in explaining the inequality in the short run. Moreover, the coefficient of $\Delta PGDP_t$, $\Delta PGDP^2_t$ and ΔPOP_t are found to be Granger causing $\Delta GINI_t$ in the short run.

Based on the empirical findings, the study indicates that Per Capita GDP, Per Capita GDP Square and Population are effective in explaining income inequality. The Study draws following conclusions based on the findings:

- Although results do not provide support for the hypothesis that openness, create income inequality in Pakistan but still in the long-run, negative and significant impact of government commitment for the provision of social services points out that government policies e aimed at redistribution are important to maintain a favorable distribution of income. Thus for this variable study draws the conclusion that state sponsored social assistance is helping in reducing the income inequality prevailing in Pakistan.
- For economic development, our study supports Kuznets Hypothesis i.e.(significance of Per capita GDP variables) in the presence of social spending. Many scholars have also focused on the curvilinear relationship of wealth to inequality, establishing Kuznets Curve as both a stylised fact and economic law.

- For population growth, study concludes that it is a burden on the country's economic resources thus increases inequality in the long-run but in the short run population growth, by providing more employment and modern work force, reduces income inequality in Pakistan.
- Trade Openness is not found to affect income inequality. Our result is consistent with Lundberg and Squire (2003), Barro (2000) and others.

To summarise, trade openness though may promote economic development but it does not affect income distribution in Pakistan. However, the negative and significant results for the social spending point out that government policies aimed at redistribution are important to maintain a favourable distribution of income.

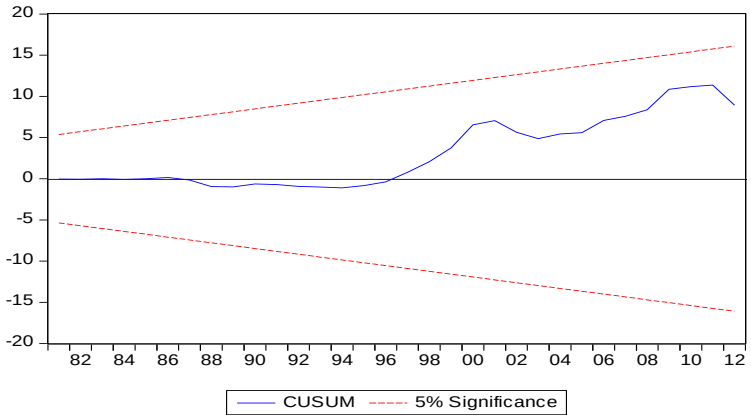
4. CONCLUSIONS

A number of researchers have explored the nexus between trade openness and the welfare but unfortunately, there have not been enough empirical evidences on the distributional impact of government spending in Pakistan. In this paper, we have explored the relationship among trade openness, social spending, and income distribution for Pakistan economy using long-run and short-run tests.

Although our results do not provide support for the hypothesis that openness affects income inequality but still negative and significant impact of government commitment for the provision of social service on the income inequality points towards the fact that government policies with respect to social spending to are important to maintain a favourable distribution of income. In addition, this study also found that population growth increases income inequality in the long-run while in short-run, tends to reduce it by providing employment opportunities and modern work force that leads to greater productivity and income for the poor.

ANNEXURE

Fig. 1.



Furthermore, CUSUM stability test is also conducted for the estimated model. If the plot of the CUSUM sample path moves outside the critical region, and in this case at 5 percent significance level, the null hypothesis of stability over time of the intercept and

slope parameters is rejected (assuming the model is correctly specified). The plot of the CUSUM in Figure 1 reveals that the null hypothesis of parameter stability is not rejected at the 5 percent level of significance.

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Comments

The paper titled "Income Inequality and Redistribution of Income in the Era of Globalisation" is an interesting paper in the where the authors explore the income inequality situation for Pakistan with the advent of more globalisation.

Following are some of the observations which if incorporated may improve the quality of paper and in terms of contribution to the academic knowledge on the subject.

(i) The title uses the name globalisation, which in my opinion is a very broad concept and many dimensions to it are possible to study. This particular study uses the trade liberalisation, so better use that in the title also.

(ii) Theoretical discussion of the variable selection is appropriate. However inclusion of population (assuming more population would put more pressure on the existing resources, which may be wrong as population is the necessary ingredient for economic growth through skilled labour force) and urban population are highly correlated.

(iii) In the estimation portion, for the data on government spending on health, social safety net and education are taken to be federal only, it should be consolidated. Data on Gini is interpolated, but no information as to how many values have been interpolated.

(iv) Now once it was observed that all the variables ate I(1). Then a simple cointegration method like Johanson and Jusilus or Engle and Granger was more appropriate leaving these two, as the ARDL is adopted if the variables under consideration have different order of integrations (i.e. a mix of I(0) and I(1)).

(v) While comparing the wald-F test for existence of cointegration Pesaran, *et al*. (2001) tables are used, which were for large samples (500-1000), for our case where the total observations are around 37 we have to use the tables provided by Naryan (2005) other wise it may get non-parsimonious results as the F-test used here has a non-standard distribution and depends on the (1) Variables being I(0) or I(1), (2) No of repressors, (3) Intercept and/or trends and the (4) sample size. So we cannot use the old tables for exploring the critical bound.

(vi) The Cusum and Cusum Square tests are not used in the paper.

(vii) The results are some what unexpected also not validated with the help of other studies, e.g. insignificance of almost all the variables and the one variable which is significant has an opposite sign (Government expenditure on health, education and social sector). Provide economics of the results. Further there may be need to rethink about the model being used.

(viii) There is a strong possibility of multicollinearity in the estimation, such as Trade openness and GDP, then urban population and total population, so may be variable used need to be considered.

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