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RESEARCH BRIEF

Causality Between Economic Openness, Income Inequality, and Welfare Spending in India

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The inquiry into the effects of globalization has centred around many socio-economic and political aspects. One such aspect of interest to the researchers has been the steady rise in global income inequality since the 1980s. It is generally argued that, besides the domestic factors, this has been the result of "globalization" (Cornia, 1999; Palma, 2006; Naranpanawa & Bandara, 2012).

The impact of globalization on inequality is attributed in the literature to various channels, like skill biased technical change (SBTC) or neo-liberal policies which are used to integrate with the world economy. It is, however, often argued that mechanisms through which globalization affects inequality are country-specific and time-specific, reflecting a great heterogeneity of countries and the nature and timing of their trade reforms (World Economic Outlook, 2007, Chapter 4). The examination of various mechanisms seems to suggest that one of the possible solutions to offset the adverse effect of globalization on income inequality is the government intervention through fiscal measures. This has two different explanations in the literature in terms of "compensation" principle and "efficiency" theory. While the former advocates an increased welfare spending by the government to compensate for risks and negative economic externalities such as job losses and increased income inequality that emerged from the competitive nature of the global economy, the latter view recognizes the budgetary constraints of the government under conditions of increased global economic integration and, thus, advocates a negative relationship between increasing level of global economic integration and welfare spending.

The empirical investigations of these two seemingly opposing and competing hypotheses are diverse in their findings (see, for example, Borcherding, Ferris, & Garzoni, 2004; Avelino, Brown, & Hunter, 2005; Benarroch & Pandey, 2008; Rivas, Sort, & Rodriguez, 2009; Shahbaz, Rehman, & Amir, 2010; Dixit, 2014). The research on the subject goes a step further to investigate some other related questions: Is social expenditure of the government redistributive, especially in the era of expanding markets? Which categories of social spending are more redistributive? Is the pattern the same for developed and developing economies? How vulnerable is welfare politics to the international market conditions in two types of economies? The empirical attempts to answer such questions have been made in the literature by examining the impact of social spending (by type and aggregate) and globalization (various proxies) on income inequality or some related indicators such as poverty head count ratio, life expectancy, literacy rate, and lowest quintile of income distribution. However, studies on this subject are mostly cross-country

analyses and do not capture country-specific issues. Some of the valuable contributions in this area include, among others, Clements (1997), Jao (2000), Rudra (2004), de Mello and Tiongson (2006), Martinez-Vazquez, Vulovic, and Dodson (2012), Wong (2016).

This brief note, therefore, makes a preliminary attempt to investigate the causal link between economic openness, income inequality, and welfare spending in India over the period 1980–81 to 2012–13. This kind of analysis is interesting because India, like other relatively open less developed countries, continues to have high levels of inequality, in spite of the fact that most of these countries have attempted to implement some form of redistribution policies. Here it should be noted that although the process of liberalization and globalization started formally in India in the year 1991, its early signs were witnessed since the late 1970s or early 1980s.

The rest of the paper is organised as follows: Having set out the introductory and motivational background, the following section provides a description of the variables used, their data sources, and the methodology employed for testing causality among variables. This is followed by a discussion of the non-causality test results. The paper concludes with the summed-up observations.

Methods

For the purpose of present analysis, inequality in income distribution is measured by Gini coefficient. The lower the Gini coefficient, the more equitable is the distribution of income and vice versa. However, income inequality, as represented by the Gini coefficient in this paper, does not necessarily show whether social spending is directly benefiting the poor. To check this, the causality analysis is replicated using the concentration of income in the lowest 20% quintile (Q1). The economic openness is proxied by two measures—trade openness and capital openness. Trade openness (TRO) is defined as the sum of exports and imports of goods and services, a percentage of gross domestic product (GDP). Capital openness (FDI) is measured by the foreign direct investment, a percentage of GDP. Lastly, four categories of welfare spending of the general government (Centre and States combined) have been considered, namely, education, art, and culture (PEDU); medical, public health, sanitation, and water supply (PMED); labour and employment (PLAB); and social security and welfare (PSSW). All these four categories of welfare spending have been converted into real per capita terms using implicit GDP price deflator (2004-05=100).

The data on income Gini and concentration of income in the lowest 20% quintile are collected from the United Nations University's World Institute for Development Economics Research (2014). Data on all welfare spending categories are compiled from Government of India (various years). Reserve Bank of India (2015) is relied upon for data on exports, imports and GDP series, whereas consistent FDI series (as per cent of GDP) for the entire study period is obtained from World Bank (2014).

All variables under analysis have been tested for a unit root in their level and first difference using Augmented Dickey-Fuller (ADF) unit root test (Dickey & Fuller, 1979) to test the null hypothesis that the variable has a unit root; and KPSS test of stationarity (Kwiatkowski, Phillips, Schmidt, & Shin, 1992) to test the null hypothesis that the variable is stationary.

No matter what is concluded from the unit root tests results, being quite aware of the varied performance of different unit root tests and hence, the uncertainty about the exact order of integration of variables in question, non-causality test will be performed using Lag-Augmented VAR (LA-VAR) procedure proposed by Toda and Yamamoto (1995) and Dolado and Lutkepohl (1996; referred to as TYDL methodology hereafter). The TYDL methodology avoids pre-test biases, being particularly useful when there is uncertainty concerning the order of integration/ cointegration of the variables. Under this methodology, the null hypothesis of non-causality is tested using Wald test statistic. Dolado and Lutkepohl (1996) showed that Wald tests have asymptotic X2-distributions under general conditions. This method basically employs a VAR model with an order p exceeding the true lag order k by the maximum order of integration d of the variables in the system. Thus, a VAR of order p=k+d is constructed in such a way that the coefficients of d lagged variables are assumed to be zeros, and the Wald test is carried out

only on coefficients of k lagged variables. We have selected the true lag order k for each of the fitted VAR based on Schwarz Bayesian Criterion (Schwarz, 1978).

Results

Table 1 presents the results of ADF and KPSS unit root tests. This table shows that whereas ADF test indicates a unit root in level, but no unit root in first difference of all variables at reasonable level of significance, KPSS test indicates that Gini Q1 and FDI are stationary in level, while PEDU, PMED, PLAB, PSSW, and TRO are stationary in their first difference. These variations in the unit root tests results justify our choice of TYDL test of non-causality over Granger causality test (Granger 1969).

Table 2 presents the results of non-causality test. It may be observed from Panels A and B of this table that two bidirectional causalities and one unidirectional causality exist between TRO and GINI and so between TRO and Q1. However, in three out of four bidirectional causal links, causality running from income distribution/income concentration variable to trade openness is more pronounced than that in the opposite direction. Likewise, for both unidirectional causalities (each between TRO and GINI and TRO and Q1), causality is found to run from GINI and Q1 to TRO. On the other hand, two causal links are observed, one of which is uni-directional between FDI and GINI with causality running from the former to the latter, while the other link is bi-directional between FDI and Q1 with causality being more pronounced from FDI to Q1.

This observed causality pattern seems to indicate that if India's income inequality is the result of its greater economic openness, it is primarily through capital openness, and not due to trade openness. One channel, which may explain this causal link between FDI and GINI or Q1, is through SBTC. With the increase in FDI inflows, the demand for skilled workers would tend to rise. This would, in turn, cause inequality in the wages, and hence, in the consumption of skilled and unskilled workers in the country. Contrary to this, almost opposite causality pattern is observed in case of trade openness (TRO) and measures of income distribution (GINI)/income concentration (Q1). The causality links between TRO and GINI/Q1 seem to suggest that income inequality has a bearing on economic openness. But how? Here it may be of interest to mention that in the literature on inequality, a distinction is made between "inequality of outcomes" (as measured by income, wealth, or expenditure) and "inequality of opportunities" (attributed to

Table 1
Unit Root Test Results

Variable	ADF Test Statistic	ADF Test Statistic	KPSS Test Statistic	KPSS Test Statistic
	Level	1st Dif.	Level	1st Dif.
GINI	-2.15	-3.41 ***	0.10	#
Q1	-2.97	-3.96 **	0.09	#
PEDU	3.10	-3.58 **	0.17 **	0.13 ***
PMED	0.24	-4.13 **	0.18 **	0.10
PLAB	-0.74	-6.80 *	0.18 **	0.10
PSSW	0.76	-4.35 *	0.16 **	0.09
TRO	-1.86	-7.80 *	0.19 **	0.05
FDI	-2.80	-6.08 *	0.13 ***	0.07

Notes: 1. Unit root tests are conducted with intercept and trend. 2. Test Statistics are rounded off without affecting the results. 3. *, ** and *** indicate the rejection of null hypothesis of a unit root for ADF test, and of stationary for KPSS test at p≤.01, p>.01 but ≤.05 and p>.05 but ≤.10 respectively. 4. # means the underlying series is I(0) in level, and so test is not conducted in 1st difference. 5. For ADF test, lag length is selected based on Schwarz Information Criterion (SIC), and for KPSS test, bandwidth is selected based on Newey-West using Bartlett kernel.

Source: Author's computation.

Table 2
Results of TYDL Non-Causality Test

Panel A. GINI Considered					**Panel B. Q1 Considered**				
Null Hypothesis	Test Statistic a	Test Statistic b	Test Statistic c	Test Statistic d	Null Hypothesis	Test Statistic a	Test Statistic b	Test Statistic c	Test Statistic d
TRO does not cause GINI	7.89 *	4.07 **	1.36	0.02	TRO does not cause Q1	6.47 **	5.05 **	1.99	1.59
GINI does not cause TRO	6.31 **	6.50 *	6.05 **	3.20	Q1 does not cause TRO	10.60 *	8.75 *	10.13 *	3.06
FDI does not cause GINI	1.85	0.48	0.26	6.15 **	FDI does not cause Q1	0.20	0.10	1.12	12.48 *
GINI does not cause FDI	0.008	0.41	2.92	3.24	Q1 does not cause FDI	1.04	2.65	2.59	6.66 **
WELF does not cause GINI	8.45 *	4.00 **	1.88	9.43 *	WELF does not cause Q1	3.80	7.29 *	3.37	23.36 *
GINI does not cause WELF	0.13	0.53	2.50	5.02 ***	Q1 does not cause WELF	5.04 ***	1.04	5.21 ***	38.19 *
WELF does not cause TRO	5.52 **	9.28 *	4.54 ***	3.40	WELF does not cause TRO	4.01	12.16 *	5.21 ***	0.61
TRO does not cause WELF	0.36	4.65 **	8.00 **	1.95	TRO does not cause WELF	8.06 **	6.13 **	13.44 *	4.13
WELF does not cause FDI	3.79 **	0.87	8.77 **	42.06 *	WELF does not cause FDI	4.43	0.16	6.16 **	45.45 *
FDI does not cause WELF	4.89 **	8.11 *	7.10 **	5.47 ***	FDI does not cause WELF	12.64 *	6.59 *	8.10 **	0.47
TRO does not cause FDI	6.44 *	2.85 ***	5.23 ***	24.76 *	TRO does not cause FDI	6.54 **	0.99	2.34	13.90 *
FDI does not cause TRO	4.69 **	8.03 *	26.48 *	29.91 *	FDI does not cause TRO	25.36 *	8.41 *	26.43 *	24.44 *

Notes: 1. Test statistic a means that PEDU is included in its computation. Similarly, Test statistic b, Test statistic c and Test statistic d indicate that they include PMED, PLAB and PSSW respectively. It should be noted that only one measure of welfare spending (WELF) is included in a particular test statistic at a time. 2. *, ** and *** indicate the rejection of the null hypothesis of non-causality at $0 \leq P \leq .01$, $.01 < P \leq .05$ and $.05 < P \leq .10$ respectively.

Source: Author's computation.

differences in circumstances beyond the individual's control, such as gender, ethnicity, location of birth, or family background) (Dabla-Norris, Kochhar, Ricka, Suphaphiphat, & Tsounta, 2015). Inequality of outcomes arises from a combination of differences in opportunities and individual's efforts and talent. At the same time, it is not easy to separate effort from opportunity, especially in an intergenerational context. For instance, parental income, resulting from their own effort, determines the opportunity of their children to obtain an education.

I feel that in India, perhaps the route of inequality in the distribution of income (also termed as "inequality of outcomes") lies in unequal opportunities to different groups of people (referred to as "inequality of opportunities"). This may probably be the result of various kinds of discriminations prevalent in the Indian society on the basis of cast, gender, religion, and so forth. When this is the case, groups of people with less (or denied) opportunities of basic services, work, equal participation, and so forth tend to agitate any neo-liberal policy, which results in greater economic

openness. This is because groups with less or denied opportunities have the fear that greater economic openness would further make them worse off.

The channels mentioned above for the observed causality pattern for TRO and FDI with GINI and Q1 are my own observations, and do not involve any empirical support. Also how and to what extent economic openness contributes to the increase/ decrease in the inequality of income distribution for India is a matter of empirical investigation. This paper fails to do so due to the limited number of observations at hand. No matter how the observed causal links between income inequality and economic openness are explained, what is interesting to examine here is the link of these variables with welfare expenditures of the government so as to get some clue about the redistributive nature of government's welfare programmes and schemes.

Panel A of Table 2 shows two unidirectional causalities running from PEDU to GINI and from PMED to GINI, and a bidirectional causality between PSSW and GINI (with causality being stronger from the former to the latter). On the other hand, Panel B indicates three unidirectional causalities running from Q1 to PEDU, from PMED to Q1 and from Q1 to PLAB. A bidirectional causality is observed between PSSW and Q1, where the causality is stronger from Q1 to PSSW. The observed causal links are generally explained in the literature in terms of the redistributive nature of various welfare expenditure categories; that as the inequality in the distribution of income worsens, the government increases its spending on welfare schemes to mitigate the adverse effects of rising income inequality. Another possible explanation of these observed causal links where causality runs (or is stronger) from income concentration variable (Q1) to welfare expenditure measures (PEDU, PLAB, and PSSW) may be that as the income share of the lowest quintile of the population goes up, this would ease some pressure on the government to curtail a bit of its welfare spending and divert these resources to some other areas.

Our next interest lies in examining the causal linkage between welfare spending categories and measures of economic openness. It is found from Table 2 that two unidirectional causal links exists between PEDU and TRO, and the causality runs from PEDU to TRO (Panel A) and from TRO to PEDU (Panel B). On the other hand, bidirectional causalities are observed between PMED and TRO as well as between PLAB and TRO in both Panels of Table 2, and the causality from PMED to TRO and from TRO to PLAB are more pronounced than in reverse directions. The causal links between FDI and welfare spending categories are also evident from Table 2 which shows three bidirectional causalities and a unidirectional causality in Panel A, while three unidirectional and one bidirectional causalities in Panel B. In three out of four, such causal links under Panel B, causality is found to run (or is more pronounced) from FDI to welfare expenditure category. Two such patterns are observed in Panel A in which causality runs/is more pronounced from FDI to welfare spending. Here it should be noted that in the present analysis of causality, capital openness, as represented by FDI relative to GDP, appears to be an important openness variable causing both income inequality as well as welfare spending. This finding has a straightforward interpretation for India in terms of well-known compensation hypothesis, that greater foreign direct investments into India carry risks like increased income inequality and thus, demand more government expenditure on welfare programmes.

Finally, the causal links are also well established between TRO and FDI, and in most cases, causality runs (or is strongly pronounced) from FDI to TRO. These causal links between TRO and FDI (bidirectional in most cases) seem to support the strong interrelationship between trade openness and capital openness for a country like India.

Although the results discussed in this section provide enough evidence of causality between important variables of interest, all these results should, however, be interpreted with great caution. In case, where the null hypothesis of non-causality could not be rejected at a reasonable level, it should be kept in mind that we cannot altogether avoid the possibility of Type 2 error. Moreover, the test of non-causality applied here relates to the small sample size used for this study and that the test itself suffers from the drawback of the loss of power and efficiency due to the overfit of the VAR model.

Conclusion

The objective of this brief note was to examine possible causal links between economic openness, income inequality, and welfare spending for India over the period 1980–81 to 2012–13. Guided by the small sample observations at hand, no formal model of time series analysis was employed and estimated for any impact assessment of selected factors on income distribution; rather, the robust TYDL non-causality test was employed to observe the possible direction of causality among important variables. The main findings that emerge from the preliminary empirical exercise of this note may be summed up as under:

Whereas income inequality is found to cause trade openness in most of the tested relationships, the opposite causality running from capital openness to income inequality is observed, thereby indicating that for India, greater foreign direct investments do have important implications for inequality in income/wage distribution in view of large demand for skilled workers. However, in view of the observed causality results in this analysis and the fact that trade liberalization in India started even before capital account liberalization, it may be worth arguing that the primary cause of income inequality in India lies in some indigenous factors, rather than in the openness of the economy. To me, the observed income inequality may be the result of inequality of opportunities; and people with less or denied opportunities of education, healthcare, equal participation, and so forth may oppose any kind of neo-liberal policy having the fear that it would further ruin their fortunes.

An evidence of compensation hypothesis is found in the causal links between FDI and welfare spending categories, where the causality results seem to suggest that greater FDI inflows into India cause increased demand for government expenditure on welfare programmes.

The causal links between income inequality measures and welfare spending categories are also established in this analysis, suggesting the redistributive nature of these expenditure categories.

Lastly, the interrelationship between trade openness and capital openness is indicated from the causality results, which reveal capital openness (FDI) to be the cause (or stronger cause) of trade openness in most of the tested relationships.

In light of the results of non-causality test, it may be said that government redistribution policies must be geared to harness the potential of the abundant labour in the country by providing them with better opportunities to work and live and enhance their work efficiency by enriching their skills through professional training programmes.

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