Assessing the Trade and Poverty Nexus in the Philippines

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Abstract

The paper tried to measure the poverty growth in the country using selected external factors such as: Total Amount of Exports and Imports in the Philippines. Trade openness is said to be conducive to economic growth therefore alleviating poverty in the country. A notable gap exists between trade integration and poverty. This study attempts to assess their relevance for the Philippines and concentrates on specific quantitative empirical evidence available on the country. However, the impact of trade on poverty is generally small and the causes of indigence are to be found elsewhere.

Key words and phrases: Exports, foreign trade, gross domestic product per capita, imports.

1. Introduction

There are two standard methods of measuring the wealth of countries and how rich or poor its inhabitants are. The measure most often used is Gross Domestic Product (GDP), which represents the size of country's economy. A refinement of this is per-capita GDP, which is a measure of the average welfare and affluence, or poverty, of residents of a country. The link between trade and poverty reduction would depend in the first place on the implications for income levels and economic growth, which have been a major concern of empirical studies of the welfare implication of trade reforms. However, the poverty implications will further depend on whether trade policies will also change the distribution of income.

There is a difference between the concept of GDP and GDP per capita even though both serve as a barometer of a nation's economic strength. GDP on one hand is defined as the total market value of all final goods and services produced in a country in a given year, equal to total consumer, investment, and government spending, plus the value of exports, minus the value of imports. GDP per capita on the other hand, is the share of individual members of the population to the annual GDP.

GDP per capita is viewed to be important as it give out figures regarding the average standard of living of an individual member of the society. It signifies economic growth when there is an increase in the nation's GDP per capita, and a decline in the economy if it follows a decreasing trend. It is also believed to aid the government, together with its economic experts, to measure impact of intervention, be able to come up with policies, and devise contingency plans that supports economic growth. GDP per capita serves as a benchmark in categorizing countries as poor, developing, or rich under the conditions of economic growth, standard and quality of living, and many other essential factors. And, with the constant monitoring of a nation's GDP per capita, a country can prevent having inflation, or at least caution its effect which is a product of an increasing purchasing power of the population.

2. The Relationship between Poverty and Trade

Poverty refers to the condition, in which the basic needs of human beings are not being met and people lack the necessary food, clothing, or shelter to survive, can be distinguished from relative poverty, which has been defined as the inability of a citizen to participate fully in economic terms in the society in which he or she lives.

A country properly utilizes its scarce resources it enhances its productive capacity. Increase in production of goods and services generate employment thus more people will earn income therefore increasing average household income. When everyone average household income increase it decreases the number of poor people. Goods and Services that a country produced can be traded internationally and locally thus stimulating the economy.

Bhagwati and Srinivasan (2002) and Berg and Krueger (2003) assess the importance of trade policy for poverty reduction from a macro perspective. The latter literature focuses mainly on the links between trade and growth to determine the changes in poverty by evaluating the variations in per capita income. They compile evidence from a variety of empirical sources to conclude that, generally, openness to trade is an important contributor to growth and that growth associated with trade liberalization is as pro-poor as growth in general.

Winters (2000) developed a conceptual framework decomposing the links between trade policy and poverty through changes in relative prices, wages, public finance, and other general equilibrium effects.

The overview of literature reviews on trade and poverty at the global and regional levels reveals a gap in the knowledge base used by policymakers to address this emerging priority. To elucidate the trade-poverty nexus we must sketch an analytical framework that links all the variables at play.

3. Analysis of the selected variables to assess trade and poverty nexus in the Philippines.

The paper tries to assess poverty by using the Philippines total value of export and import in US dollars and using Gross Domestic Product per capita to measure poverty since GDP per capita illustrates how well the country's income is distributed among each individual. A regression model is constructed and will be analyzed using time series analysis approach. The model will be subjected to statistical diagnostics to be able to prove its validity. A thirty-two year (32) observation is used for the three variables which are from 1980 to 2011. Below are the line graph and table of the data gathered for the variables involved in the analysis.

Figure 1. Line Graph of GDP per capita, Total amount of Exports and Imports in the Philippines
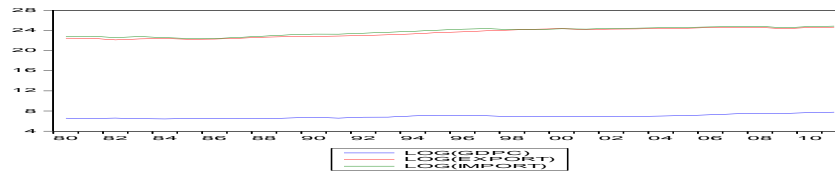

Table 1. Data for GDP per capita, Total amount of Exports and Imports in the Philippines

Year	Gross Domestic Product per capita (in US dollars)[1]	Total Amount of Exports (in US dollars)[1]	Total Amount of Imports (in US dollars)[1]
1980	$718.92	$5,787,784,192.00	$8,295,143,424.00
1981	$676.38	$5,722,145,280.00	$8,478,664,704.00
1982	$731.43	$4,107,078,912.00	$6,610,036,736.00
1983	$648.88	$5,005,287,424.00	$7,977,369,600.00
1984	$618.59	$5,390,642,688.00	$6,427,902,464.00
1985	$666.14	$4,628,951,552.00	$5,445,445,632.00
1986	$654.02	$4,841,777,152.00	$5,394,289,152.00
1987	$690.76	$5,720,226,499.00	$6,800,625,106.00
1988	$648.77	$7,074,185,216.00	$8,729,137,152.00
1989	$740.81	$7,820,708,352.00	$11,170,834,432.00
1990	$845.51	$8,186,017,265.00	$13,041,728,851.00
1991	$722.21	$8,838,284,288.00	$12,845,217,792.00
1992	$879.57	$9,824,308,224.00	$15,465,242,624.00
1993	$883.71	$11,374,798,848.00	$18,772,647,936.00
1994	$1,118.88	$13,482,889,216.00	$22,737,969,152.00
1995	$1,275.88	$17,447,178,240.00	$28,487,344,128.00
1996	$1,266.34	$20,327,559,168.00	$34,701,185,024.00
1997	$1,151.55	$25,227,692,032.00	$38,580,924,416.00
1998	$973.96	$29,294,118,912.00	$31,529,863,168.00
1999	$986.15	$34,870,648,832.00	$32,568,125,440.00
2000	$1,004.21	$38,078,249,794.00	$37,007,401,766.00
2001	$966.55	$32,150,202,592.00	$34,943,391,304.00
2002	$1,015.34	$35,208,158,692.00	$41,091,962,443.00
2003	$1,022.58	$36,231,205,444.00	$42,575,743,276.00
2004	$1,092.60	$39,680,520,434.00	$45,988,858,626.00
2005	$1,209.56	$41,254,683,469.00	$49,487,422,030.00
2006	$1,405.93	$47,410,117,340.00	$54,077,989,752.00
2007	$1,686.69	$50,465,711,125.00	$57,770,990,193.00
2008	$1,918.87	$49,077,539,969.00	$60,419,667,297.00
2009	$1,853.87	$38,217,206,399.00	$45,877,737,439.00
2010	$2,156.88	$48,042,128,759.00	$58,467,803,681.00
2011	$2,386.63	$51,995,223,994.00	$63,692,684,211.00

[1]Source: United Nations Commodity Trade Database (http://comtrade.un.org)

The Philippine export and import follows upward movement over a period of time. Preparing the dataset, all data were transformed to its natural logarithm values. Next, variable Multiple forecast models were built and only one of them succeeded in following regression assumptions and that all explanatory variables are significant. The model is corrected for any presence of first order serial correlation and the regression

results; consequently the regression model has been freed from positive and negative correlation. Regression results shown in Table 2 reveal that GDP per capita decreases by 0.39 percent when the total amount of exports in the Philippines increases by 1 percent while GDP per capita increases by 0.43 percent when the total amount of imports increased by 1 percent. The overall goodness of fit resulted to an R^2 of 0.95 which indicates that 95% of the variations in Gross Domestic Product per capita is explained by the Philippines Total amount of Export and Import. The remaining 5% could be explained by other variables that were not included in the model and by error term. The model is significant since the calculated F-statistic value exceeds the critical value of 3.34 (2, 28) at 5% level of significance.

Table 2. Regression Results

Dependent Variable: LOG(GDPC)
Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.013481	0.335877	17.90380	0.0000
TIME	0.050663	0.014734	3.438505	0.0022
DLOG(EXPORT,1)	-0.392683	0.150022	-2.617499	0.0154
DLOG(IMPORT,1)	0.435391	0.130212	3.343702	0.0028
AR(1)	1.127981	0.196515	5.739928	0.0000
AR(2)	-0.314449	0.204382	-1.538536	0.0076

R-squared	0.954670	Mean dependent var	6.947717
Adjusted R-squared	0.944815	S.D. dependent var	0.379562
S.E. of regression	0.089165	Akaike info criterion	-1.814674
Sum squared resid	0.182858	Schwarz criterion	-1.531785
Log likelihood	32.31277	Hannan-Quinn criter.	-1.726076
F-statistic	96.87702	Durbin-Watson stat	2.068212
Prob(F-statistic)	0.000000		

Inverted AR Roots	.62	.50

To find evidence of heteroskedasticity in the residuals, White's Heteroskedasticity Test (Table 3) was used and the results showed that the variance of the regression coefficient is constant over time since the F-statistics exceeds the critical value at 5% level of significance. This means that the variability of the error terms remain constant over time.

Table 3. Test for Heteroskedasticity

Heteroskedasticity Test: White

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F-statistic	0.955529	Prob. F(5,25)	0.4634
Obs*R-squared	4.973764	Prob. Chi-Square(5)	0.4191
Scaled explained SS	3.126543	Prob. Chi-Square(5)	0.6805

Table 4. Test for Structural Change between the selected variables

Equation Sample: 1983 2011

F-statistic	0.667576	Prob. F(6,17)	0.6770
Log likelihood ratio	6.135498	Prob. Chi-Square(6)	0.4082
Wald Statistic	9.493432	Prob. Chi-Square(6)	0.1477

Based on the results of Chow Breakpoint test (Table 4), computed F-ratio of 0.66 less than the critical value of 3.34 at 5% level of significance. This purports that over time, there is no structural change between GDP per capita and Total amount Exports and Imports.

Figure 5. Jarque-Bera test for the normality of the residuals
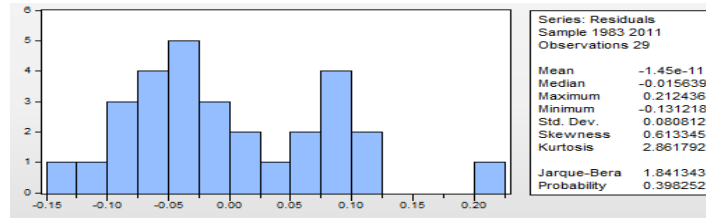
To verify the normality of distribution of the residuals, the Jarque-Bera test was used and the computed Jarque-Bera of 1.84 indicates that the residuals are normally distributed.

Table 5. Test for Model Specification

Specification: LOG(GDPC) C TIME DLOG(EXPORT,1)
      DLOG(IMPORT,1) AR(1) AR(2)
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	2.252545	22	0.0346
F-statistic	5.073960	(1, 22)	0.0346
Likelihood ratio	6.018368	1	0.0142

Ramsey Regression Specification Error Test (RESET) was applied to test the regression model for specification error. The F-statistics value of 5.07 is higher than the F-critical value of 3.34. This means that the model is not misspecified.

Table 7. Test for Long-term relationship among the selected variables

Trend assumption: Linear deterministic trend
Series: LOG(GDPC) DLOG(EXPORT,1) DLOG(IMPORT,1)
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.533256	36.63985	29.79707	0.0070
At most 1	0.390592	14.54260	15.49471	0.0692
At most 2	0.006183	0.179853	3.841466	0.6715

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level

The Johansen-Juselius Co-integration test was applied to determine whether the group of non-stationary series are co-integrated and to verify the long-term relationship of the chosen variables. The trace statistic exceeds the critical value at 5% level of significance.

It shows that there is one co-integrating equation. Therefore, the chosen variables have a long-term relationship and the regression model is not spurious.

4. Conclusion

From 1980 to 2011, Total amount of Exports and Imports in the Philippines were all in upward trend, but Gross Domestic Product per capita has showed no trend in the long-run. Individually and collectively, total values of exports and imports in the Philippines have significant effects to the Gross Domestic Product per capita. The estimated parameters of the model are structurally stable. A long-term relationship between Gross Domestic Product per capita and Total amount of Exports and Imports in the Philippines exists.

5. Recommendation

Annual tracking of trade data should be done since exports and imports in the Philippines have a significant effect on measuring poverty, but the problem of poverty requires a comprehensive, "multi-pronged and multi-sectoral solution" involving many stakeholders. The paper suggests that Gross Domestic Product per capita is only one of the many potential variables in measuring poverty. Poverty is said to be a rural phenomenon. Many studies linked poverty to educational attainment of an individual and the Government and Institutions of a country. Poverty is a chronic social problem therefore further research on chronic poverty is needed. In the immediate and short term period, there is a need to enhance government's poverty reduction strategy and involve these factors for a collective and coordinated response to the problem. In the medium and long term the government should continue to pursue key economic reforms for sustained and inclusive growth.

6. References

Asian Development Bank (2000) "Asian Development Outlook", (2000), Asian Development Bank.

Balisacan A. and Ducanes G., (2011) "Multidimensional Poverty in the Philippines: Trend, Patterns, and Determinants", UP Press, Philippines

Bhagwati J. and Srinivasan T.N. (2002) "Trade and Poverty in the Poor Countries", Yale University.

Berg A. and Krueger A (2003) "Trade, Growth and Poverty: A selective survey", IMF Working paper.

Winters L.A. (2000) "Trade, Policy and Poverty: What are the links?", Centre for Economic Policy Research, University of Sussex, Goswell Road, London.

Balisacan A. (2012) "What Has Really Happened to Poverty in the Philippines? New Measures, Evidence, and Policy Implications", UP Press, Philippines.

Winters L.A. (2009) "Trade and Poverty: Is There a Connection?" Centre for Economic Policy Research, University of Sussex, Goswell Road, London.