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EMPIRICAL EVIDENCE ON THE RELATIONSHIP BETWEEN TRADE OPENNESS AND ECONOMIC GROWTH

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ABSTRACT

This paper examines the impact of trade openness on economic growth using a new measure of trade openness proposed by Squalli1 and Wilson (2011). In contrast to the vast majority of the existing literature, the new measure of trade openness accounts for not only the country trade share of its GDP but also the relative size of the country's trade compared to the world trade in a given year. Using this innovative way to measure openness, the current essay examines the impact of trade openness on economic growth. We use data set includes 182 countries and covers the period from 1971 to 2011. We employ the Common Correlated Effects Mean Group (CCEMG) estimator developed by Pesaran (2006) and applied Cavalcanti et al. (2011) which takes into consideration the heterogeneity nature of world countries.

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KEYWORDS: Trade Openness, Economic Growth, Common Correlated Effects Mean Group (CCEMG) Estimator

INTRODUCTION

The relationship between openness and the level of national growth is a highly debated topic in the empirical literature. Although some recent advances reinforce a positive impact of openness on economic growth, it is still in doubt how robust are these estimates. A possible reason for this is the lack of a clear definition of the trade openness and how to measure it. Most studies use, as a proxy for trade openness, the ratio of the sum of export and imports (both goods and services) divided by the GDP at constant or current prices, often called 'trade openness ratio'. Our intention in this paper is to address the relation between trade openness with a new measure and economic growth. The study, therefore contributes to the related growing literature on trade openness in different folds. First, it constructs and tests a new measure of trade openness. Second, the data set includes almost all countries in the world (182 countries) and covers the period from 1971 to 2011. Third, it takes into consideration the heterogeneity of the countries being examined, which has been ignored by most relevant literature. We use the Common Correlated Effects Mean Group (CCEMG) estimator to investigate the relationship and deal with the heterogeneity nature of world countries. The structure of the paper is as follows: section provides an overview of the related empirical work in the literature. Next section describes the data and methodology used in the study. The results are presented in the following section. The paper closes with some concluding comments.

LITERATURE REVIEW

Most of the empirical studies on the link between openness and growth acknowledge a positive relationship in spite of the methodologies and trade openness proxies being used. For instance, Wacziarg (2001) finds that trade openness has a positive and significant impact on economic growth in a panel of 57 countries over the period 1970-1989. Similarly, Irwin and Tervio (2002) even after controlling for endogeneity, find a positive relationship between openness and growth in the interwar and the post-war periods. Vamvakidis (2002) uses historical data for the period 1870-1990 and concludes that the positive openness-growth relationship is rather a recent phenomenon, mainly driven by the world trade expansion. No significant positive relationship was found for the period before 1970, whilst the period 1970-1990 showed a significant positive effect of trade openness on economic growth. Furthermore, Salinas and Aksoy (2006) apply multivariate fixed effects estimations to examine the link during pre and post trade liberalisation periods and conclude that the post-liberalisation period saw an increase in the economic growth of about 1.2 percentage points higher than the pre-liberalisation period. Brunner (2003) uses a dynamic panel data model to study the impact of trade openness on the level of national income and growth for a sample of 125 countries for the period 1960-1992. He concludes that trade openness has a significant large effect on the level of national income, but small and non-robust effect on income growth.

Chang *et al.* (2009) draw a similar conclusion using data for 22 developed and 60 developing countries over the period 1960-2000. The authors also reveal that the positive association can be further significantly enhanced, if trade liberalisation is combined with flexible labour markets stable inflation rates and improved public infrastructure. Addressing the potential endogeneity of trade openness, Lee et al. (2004) investigate the relationship for a sample of 100 countries during the period of 1961 to 2000. The authors conclude that trade openness has an increased economic growth impact for these countries, although the effect is found to be small in magnitude. A more recent study by Sarkar (2008) employs a panel-data from 51 less developed countries LDCs for the period 1981-2002 and concludes that countries with higher trade shares tended to experience a higher real growth. Villaverde and Maza (2011), using globalisation as an indication of trade openness, also find a positive relationship over the period 1970-2005.

To overcome the shortcomings related to the choice of the econometric methodology especially when the sample sizes are small, several empirical works have used panel approaches, which are cited to provide more reliable estimates than the time series and cross-section regressions do. Within this context, Felbermayr (2005) examines the link between incomes per capita and trade openness measured by 'trade openness ratio' based on Blundell and Bond's system-Generalized Method of Moments (GMM) method. The results indicate that openness strongly influences income for the considered set of countries. The emerging conclusion from the reviewed studies is that trade tends to have a positive impact on income. A few papers doubt about the relationship between trade openness, growth, and development, and in some cases indirect impact has been found, citing productivity or investment as a prerequisite for economic development. However, most of these studies do not capture the potential heterogeneity in the relationship between trade and income across countries, assuming implicitly that the effect of trade on income is the same for all countries.

DATA AND METHODOLOGY

To perform a broad panel analysis of a large number of countries and over a long period, we use a balanced annual panel dataset containing 182 countries over the period 1971-2010. Our analysis is based on two variables extracted from the Penn World Table 8.0 provided by Heston et al. (2013). Trade openness is measured by the CTS as proposed by SW(2011). The per capita GDP measured in constant prices and in international dollar per person. In order to examine the growth-openness nexus, the current study follows an augmented neoclassical production function, which is adopted in similar studies such as Frankel

and Romer (1999), Thomas G.(2012), Herzer, D. (2013) and Sakyi D. et. al. (2012). In this context, we employ a bivariate model in which we regress the per capita growth of income on trade openness measured by the CTS. We start off with the following equation.

$$\ln Y_{it} = \alpha_i + \beta \ln x_{it} + \varepsilon_{it} \quad (1)$$

Where t=1,2…T and i=1,2…N, Y real gross domestic product per capita, x denotes openness trade measured by the CTS, both variables are log-transformed, α_i the country-specific fixed effects, β parameter related to trade openness and ε_{it} an error term. Two estimation issues arise from the above model, namely parameter heterogeneity and cross-section dependence. In order to cope with these econometric issues, Pesaran (2006) proposed a new technique called Common Correlated Effects Mean Group (CCEMG). The CCEMG assumes random slope coefficients, which are independent and identically deviate from their respective averages. According to Pesaran (2006), the core idea here is to filter the individual specific regressors with the help of cross-section aggregates and as the number of cross sections goes to infinity the differential effects of unobserved common factors will be trivial. To elaborate more on the CCEMG estimator, consider the following linear heterogeneous panel specification:

$$y_{it} = \alpha_i + \beta_i x_{it} + \varepsilon_{it} \quad (2)$$

Where β_i is country-specific parameter for country i. In order to address the cross-sectional dependencies, Pesaran (2006) assumes that the error term in Eq. (2) follows a multifactor structure defined as follows.

$$\varepsilon_{it} = \acute{\gamma}_i f_t + u_{it} \quad (3)$$

Where f_t is a m x 1 vector of unobserved common effects, which are allowed to be serially correlated. In addition, Kapetanios et al., 2011 show that the f_t in the above equation could be stationary or non-stationary. They could even be correlated with trade openness, see Holly et al., 2010; Cavalcantiet al., 2011. The u_{it} term represents a country specific error and allowed to be weekly dependent across i and serially correlated over t. Since x_{it} are assumed to be correlated with unobserved effectsf_t, it follows that

$$x_{it} = \eta_i + \acute{\xi}_i f_t + \upsilon_{it} \quad (4)$$

Where $\acute{\xi}_i$ is a k x 1 vector of factor loadings, and υ_{it} is the error term, which is assumed to be identically and distributed independently of $f_t$andu_{it}. Finally, to obtain the CCEMG, one needs to have N country regression equations, each of which contains the cross-section average terms for y and x as follows.

$$y_{it} = \alpha_i + \beta_i x_{it} + b_{i0}\bar{y}_{it} + b_{i1}\bar{x}_{it} + \varepsilon_{it} \quad (5)$$

Where $\bar{y}_{it}$ and $\bar{x}_{it}$ are the cross-sectional averages and only serve as proxies for the common factors and may not have any interpretable meaning (see Pesaran, 2006). The coefficient of interest is computed as the simple average of the N countries:

$$\hat{\beta}_{CCEMG} = N^{-1} \sum_{i=1}^{N} \hat{\beta}_i \quad (6)$$

Thus, our estimator is just the average value of the country-specific slopes, which reflects the long-run relationship between trade openness and per capita income. According to Pesaran (2006), the short-run dynamics and their adjustment to the long run across countries are accommodated through the error termε_{it}, which has a multifactor error structure as explained in Eq (3). Our model specification in Eq(2) can now be expressed with the multifactor error structure as follows:

$$\ln Y_{it} = \alpha_i + \beta_i \ln OPEN_{it} + b_{i0}\overline{\ln Y_{it}} + b_{i1}\overline{\ln\ OPEN}_{it} + \varepsilon_{it} \quad (7)$$

Where $\overline{\ln Y_{it}}$ and $\overline{\ln OPEN_{it}}$ are proxies for the unobserved common factors.

Measuring Trade Openness

The new trade measure, which this paper uses to address the relation between trade openness and economic growth, is the Composite Trade Share CTS, which is introduced by Squalli and Wilson (2011). The CTS include more information about the country's contribution to the global economy and its influential impact on the world economy. That is, the current study constructs and tests the CTS as a new measure of trade openness, and uses such a measure to re-examine the trade-growth nexus. The CTS can be presented as follows.

$$CTS_i = \frac{(X+M)_i}{\frac{1}{n}\sum_{j=1}^{n}(X+M)_j}\frac{(X+M)_i}{GDP_i} \quad (8)$$

The innovation in the CTS measure of trade openness arises from the fact that coherently incorporates two dimensions of a country's ties with the outside world. In particular, SW have considered not only the country's trade to GDP ratio but also its substantial interaction and interconnectedness with the rest of the world. More specifically, the CST includes two factors; the proportion of a given country's total income generated by international trade and the relative importance of that country's contribution in the world trade. According to SW, the CTS, in contradiction with the conventional measures of trade openness is able to capture the actual, rather than potential, trade flows.

RESULTS

For the comparison of the results, we also compute the traditional mean group (MG) estimates of Eq. (2), which does not take account of cross-section dependence by assuming independent errors. Table (1) contains the results from CCEMG estimation accounting for both heterogeneity and cross section dependence present in the data. As the table shows these results indicate that trade openness has a significant and positive impact on GDP per capita. According to the results presented in Table (1), the long-run relationship between trade openness and the level of income is positive and highly significant in both estimators. However, we observe, on the one hand, that the mean coefficient β is much bigger in the CCEMG estimate than in the MG.

Table(1): Estimates of the Long Run Impact of OPENNESS on GDP Per Capita Using Panel Heterogeneous Estimator MG And CCEMG

Dependent Variable : GDP Per Capita				
	MG	MG	CCEMG	CCEMG
openness	0.03** (0.008)	0.02** (0.01)	0.415*** (0.021)	0.403*** (0.02)
Trend	No	Yes	No	Yes
No. of Obs	7462	7462	7462	7462
No. of countries	182	182	182	182
CDtest statistic	151.4***		18.23***	

*This table shows the long run impact of trade openness on GDP per capita using panel heterogeneous estimator MG and CCEMG, the coefficient that estimated by CCEMG is positive and statistically significant. An increase in the CTS on average, lead to an increase in per capita income about 0.41 per cent. Note: Standard errors are reported in parenthesis. ***,**,*denote rejection of the null hypothesis at the 1%, 5% and 10% significance level, respectively. The CD test statistics are Pesaran (2004) CD test on the residuals of MG and CCEMG estimates.*

Moreover, the CCEMG estimator has led to a significant reduction of cross-section dependence inherent in Eq. (2), and thus provides us with the true mean coefficient β. According to Table (1), the coefficient of openness that estimated by CCEMG is positive and statistically significant, which means a one percent increase in the CTS on average, a statistically significant increase in per capita income about 0.41 per cent.

CONCLUSION

The present paper investigates the dynamic relationship between Trade Openness and economic growth of 182 countries over the period 1970-2010. A new measure of trade openness is constructed following the approach developed by Squalli and Wilson (2011). For estimation purposes, we have employed heterogeneous panel cointegration techniques namely Common Correlated Effects Mean Group (CCEMG) estimator to investigate the relationship and deal with the heterogeneity nature of world countries .This estimator is robust in the presence of non-stationarity, endogeneity and cross- section dependence, which offers more reliable results than conventional approaches. Employing data for 182 developed and developing countries over the period from 1971-2010, we found that trade has, on average, a statistically significant effect on income. Although our estimation strategy accounts for cross-country differences, it might be informative if future research examines the trade-growth nexus by grouping countries according to their structural characteristics; such as oil exporter compared to oil importer countries.

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