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Sarkar, Prabirjit

September 2007

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Prabirjit Sarkar*
Professor of Economics, Jadavpur University, Kolkata, India and Visiting Fellow, CBR, Judge Business School, University of Cambridge, UK.
Email: prabirjitsarkar@gmail.com

Abstract

The present study examines the relationship between openness (trade-GDP ratio) and growth. Our cross-country panel data analysis of a sample 51 countries of the South during 1981-2002 shows that for only 11 rich and highly trade-dependent countries a higher real growth is associated with a higher trade share. Time series study of individual country experiences shows that the majority of the countries covered in the sample including the East Asian countries experienced no positive long-term relationship between openness and growth during 1961-2002. Our study of the experience of various regions and groups shows that only the Middle Income group exhibited a positive long-term relationship.

JEL Codes: F43, F02, O50.

Key words: growth, opening up, liberalization, less developed countries and globalization.

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* This paper has been prepared on the basis of my presentation at SOAS (University of London) Political Economy Seminar (10 OCTOBER 2006). I am grateful to Professor Rick Adkisson for valuable suggestions. However, the usual disclaimer applies.

Is there any link between trade openness and growth? The present study seeks to answer this question. As an introduction to our study we start with a discussion of the process of evolution from the Ricardian policy prescription of free trade to 'Washington Consensus' (WC) along with almost parallel development of the idea of economic nationalism and their link with colonization and catching-up debate (Section 1). Then we survey some of the existing theoretical and empirical works in this field (Section 2). Subsequently we present our empirical findings based on both panel data and time-series analysis (Sections 3 and 4). The summary and concluding observations are presented in the last section (Section 5).

1. Ricardian Free Trade Doctrine and Neo-liberal 'Washington Consensus' vis-à-vis Economic Nationalism

The old Ricardian dictum of international division of labour according to comparative advantages provided the academic support to the nineteenth century pattern of free trade between colonies/semi-colonies and their ruling countries. The classical writers believed that the operation of the two laws of return - the law of diminishing returns in primary production and the law of increasing returns in manufactures - in a free and competitive market-economy world would lead to an improvement in the terms of trade of the primary-producing countries. In the process of the free play of international market forces these countries would enjoy the fruits of industrial revolution through favourable terms of trade. Thus the colonial pattern of trade (free flow of food and raw materials from the colonies in exchange of finished manufactures from their ruling countries) in a world of

colonisation and conquest (the nineteenth century pattern of globalisation) got its legitimacy from the-then ‘mainstream’ economics.

Almost parallel to the free trade ideology (an extension of the natural order and *laissez faire* philosophy) the idea of economic nationalism and infant-industry argument for trade restrictions came up not only in the writings of scholars such as Friedrich List but also in the policies pursued by the countries that were the late-starters in industrial revolution. Their policy makers were clever enough to understand that the free trade ideology preached by the British economists and statesmen was actually a part of the strategy of ‘ kicking away the ladder’ with which Britain reached the top (for details see Chang, 2002).

Guided by economic nationalism the late-starters of industrial revolution developed rapidly and were able to catch up with the pioneers. Analysing the industrial development of Germany and England, Veblen (1915) pointed out the 'advantages of relative backwardness'. Gerschenkron (1952) updated and extended the work of Veblen to include Russia, France and Italy. In the process developed the ‘catching-up'/convergence hypothesis: the latecomers in industrialization tend to grow faster because learning and imitation is typically cheaper and faster than is the original discovery and testing (see also Nelson and Phelps, 1966; Gomulka, 1987).

The poor colonies could not catch up as they could not follow the policy of economic nationalism (independent of their ruling countries’ national interests). In fact the

countries such as India faced de-industrialisation (decline of their artisan activities which were much advanced than their European counterpart) in the early stages of industrial revolution (see Sarkar, 1992 for details and reference). Thus the world became divided into the industrially developed North ('Centre') constituting the countries, which could catch up the pioneers (for evidence of catching up see Abramovitz, 1986; see also Sarkar, 2000) and the industrially backward primary-goods producing South (raw-material supplying 'Periphery') constituting the countries which could not catch up.

The orthodox 'mainstream' economic theory chose to ignore this history (perhaps their proponents all over the whole industrialised world were guided by the same 'kicking away the ladder' strategy) and continued to show the virtue of free trade in an articulated way of characterising a make-believe world (and mesmerised a large number of students of economics all over the globe).

However, outside the orbit of orthodox 'mainstream' economics exists a large number of sensible heterodox scholars who choose not to ignore history, and institutions in suggesting a policy prescription to a less developed region. John R Commons is one such scholar, a big name in institutional economics (see Lafayette, 1965 for an evaluation of his contribution). He provided The Theory of Reasonable Value (Commons, 1934) and advocated protectionism from a practical institutional aspect (see Ramstad, 1987 for details of this theory).

In the post-Second World War Period, Prebisch (1950, 1959, 1964) and Singer (1950) from the platform of United Nations and UNCTAD raised their voice against the conventional wisdom of free trade and suggested to the newly independent colonies and semi-colonies to follow the path of import-substituting industrialisation, ISI (see also Myrdal, 1956 for the same policy prescription) and tried to show that the terms of trade followed the path opposite to what was postulated by the classical writers. The Prebisch-Singer hypothesis generated much controversy (for details see Sarkar, 1986 and 2001). But through their direct and indirect influence or guided by economic nationalism (independent of the Prebisch-Singer-Myrdal thesis of autarkic development) the national governments of the newly independent colonies and semi-colonies and many Latin American countries followed the ISI.

In the process of rapid domestic industrialisation under the ISI strategy these countries required increased imports of machines and technology and pulled most new resources to import-competing activities. It resulted into more rapid growth in the demand for foreign exchange that surpassed the growth in export earnings. In the process these countries began to face acute balance of payments problems. This situation demanded increased export drive to pay for imports.

Moreover, to finance the balance of payments deficit, these countries became dependent on the rich industrially developed countries and international financial institutions such as the IMF/World Bank, dominated by the rich developed countries. The distressed Southern countries seeking their help are often advised to open up their economy to

foreign trade and investment along with many other kinds of structural adjustments (such as removal of state controls, reduction of state expenditures, public sector disinvestments to make room for private investment etc). All these 'neo-liberal' policy prescriptions were summed up as the 'Washington Consensus' (WC) by John Williamson (an economist from the Institute for International Economics, an international economic think-tank based in Washington, D.C.).

An almost universal policy response was that these countries left (by choice or per force) the course involving inward-looking ISI and started following outward-oriented development strategy. In the process, importance of foreign trade in the level of economic activities of these countries has been rising (for a discussion of the ordeal faced by the Latin American countries under the neo-liberal strategy, see Adkisson, 1998 and 2003).

The increased openness was hailed in IMF/World Bank circles. Different World Development Reports (World Bank, 1987, 1991, 1999-2000) tried to show that outward-oriented trade policies have been more successful in promoting growth than inward-oriented trade policies. Particularly, World Development Report (1987) argued that "outward oriented countries" performed better than "inward oriented countries" even under unfavourable market conditions. The success stories of East Asian countries ('East Asian Miracle') were often shown as the success of free trade and export-oriented policies.

Some scholars, however, questioned the validity of the World Development Reports (see for example, Singer, 1987; Singer and Gray, 1988). Many scholars questioned the success stories of East Asian countries as vindication of the neo-liberal paradigm of the WC (see for example Amsden, 1989; Wade, 1990; Chang, 1993 and Önis, 1995) and at least on one occasion World Bank (1993) conceded. Nevertheless the transitional economies (ex-socialist countries) are advised to follow the WC-type policy prescriptions. True to the tradition of institutional economics, many scholars (Adams, 1987, Adkisson 1998, Atkinson, 1998, Went 2000, Marangos 2001 and Bitzanis and Marangos, 2007) are expressing their concern against the neo-liberal paradigm embedded in the WC-type policy prescriptions for the less developed countries as well as for the transitional economies as the 'one-size-fit-for-all' policy ignores history, institutions and economic structures of these countries. Scholars such as Adkisson (1998) observe 're-peripherization' - bringing back the old centre-periphery division of the world, once resented by the Latin American 'structuralists' such as Raul Prebisch.

In this perspective we discuss the existing theoretical and empirical evidence in the next section and present our findings in the subsequent sections.

2. Existing Literature: Some Selected Works

Some of the 'new' endogenous growth theories suggest that trade policy affects long-run growth through its impact on technological change. In the models of this tradition (see for example Grossman and Helpman, 1992) openness to trade provides access to imported

inputs embodying new technology, increases the size of the market faced by the domestic producers raising the returns to innovation, and facilitates a country's specialisation in research-intensive production (Harrison, 1996, pp.419-420).

The endogenous growth literature, however, has been 'diverse enough to provide a different array of models in which trade restrictions can decrease or increase the worldwide rate of growth', as Yanikkaya (2003) rightly points out and refers to the works of Romer (1990), Grossman and Helpman (1990), Rivera-Batiz and Romer (1991a.b) and Matsuyama (1992). Increased competition could discourage innovation by lowering expected profits. Grossman and Helpman (1992) point out that intervention in trade could facilitate long-run growth if protection encourages investment in research-intensive sectors. The works of Lucas (1988), Grossman and Helpman (1991 a, b), Young (1991) and Rivera-Batiz and Xie (1993) show that even if the trading partners have considerably different technologies and endowments, economic integration may adversely affect individual countries even if it raises the worldwide growth rate (Yanikkaya 2003, p.59).

Ocampo and Taylor (1998) point out that 'the preferred defence of trade liberalisation' as found in Krueger (1997) and others, 'invokes a general equilibrium model with constant or decreasing returns to scale' and the theory of static comparative advantages; against that they remind the old infant industry argument which formed the basis of state intervention in many countries in the past. They further mention the works of Young (1928) and Kaldor (1978) which 'emphasised how increasing returns and cross firm externalities can lead to cumulative growth processes and different patterns of

specialisation across economies' and criticized the neoclassical argument of trade intervention based on 'convexity' assumption.

In view of the ambiguities in the theoretical literature, a number of empirical studies were undertaken to examine the relationship between trade liberalisation and growth. Due to the difficulty of measuring openness, different studies have used different measures to examine the effects of trade openness on economic growth. Anderson and Neary (1992) have developed a 'trade restrictiveness index' which tries to incorporate the effects of both tariffs and non-tariffs barriers; it is available for a small sample of countries. So many cross-country studies used trade shares in GDP and found a positive and strong relationship with growth (as reviewed in Harrison, 1996).

Frankel and Romer (1999) tried to control for endogeneity of trade with the geographical variables and found a stronger favourable effect of trade on growth. Rodriguez and Rodrik (1999) and Irwin and Tervio (2002) questioned their higher instrument-variable (IV) estimates of the impact of trade shares on growth.

A number of studies have looked at the relationship between average tariff rates and growth. Lee (1993), Harrison (1996) and Edwards (1998) found a negative relationship between the tariff rates and growth. The studies of Edwards (1992), Sala-i-Martin (1997) and Clemens and Williamson (2001) concluded that the relationship is weak. Rodriguez and Rodrik (1999) tried to replicate the result of Edwards (1998) and found that average

tariff rates had a positive and significant relationship with total factor productivity (TFP) growth for a sample of 43 countries over the period 1980-1990.

Studies of Harrison (1996), Edwards (1998) and Sala-i-Martin (1997) used black market premium (BMP) as a measure of the severity of trade restrictions and reported a significant and negative relationship between the BMP and growth. However, Levine and Renelt (1992) and Rodriguez and Rodrik (1999) pointed out that the BMP is highly correlated with a number of 'bad' policies and outcomes such as high inflation, severe external debt problems, ineffective law enforcements etc and so using BMP for a measure of trade restrictions gives a misleading picture.

Some authors constructed different indices of trade orientation such as openness index by Leamer (1988), price distortion and variability index by Dollar (1992) and openness index of Sach and Warner (1995) and argued that outward-oriented countries out-performed inward-oriented countries. These measures of trade barriers are often correlated with other sources of poor economic performance, as Rodriguez and Rodrik (1999) rightly pointed out.

In a recent study Yanikkaya (2003) used a large number of openness measures for a cross-section of countries over the last three decades. His analysis found a significant positive correlation between trade shares and growth. However, this study observed that different measures of trade barriers are positively associated with growth in the less developed countries.

In this perspective of confusion and contradiction, our study presented in the next two sections seeks to examine the relationship between trade openness and economic growth not only at the cross-country level but also at the levels of different regions and countries over time since the 1960s.

3. Relationship between Trade Openness and Growth: Panel Data Analysis, 1981-2002

Increased trade openness is often considered in the sense of an increase in the size of the country's traded sector in relation to total production; it is an acceptable proxy for trade liberalisation. In fact increasing trade openness often reflects the success of trade liberalisation policies. So we shall use trade (export plus import) as percentage of GDP (TRDGDP) as the measure of trade openness. The relevant data are collected from World Development Indicators (WDI) published by World Bank. On the basis of availability of data we choose a sample of 51 less developed countries (LDCs). The list of countries and the relevant data averages (over the period 1981-2002) are presented in Table 1.

The sample of 51 countries is divided into different groups on the basis of the two rules of thumb. One is the average share of trade in GDP, TRDGDP, and the other is the average GDP per capita (measured in purchasing power parity 2000 dollar, PPP 2000 $), PCGDPP (over the period 1981-2002). On the basis of TRDGDP 17 countries are categorized as Closed Economy (with average TRDGDP < 50 per cent) and 34 countries as highly trade-dependent Open Economy countries (with average TRDGDP > or = 50

per cent). On the basis of PCGDPP the countries are further classified as Rich (PCGDPP > $5000) – 16 countries belong to this group (countries belonging to this group are marked by an asterisk, '*') and Poor (other 35 countries).

We have considered three alternative models between the rate of growth of real GDP per capita (PCGDPG) and trade openness index (TRDGDP): between-effects model (BE), the country-fixed effect model (FE) and the random-effect model (RE).

The BE model is equivalent to taking the average (mean) of each variable for each country across time and running a regression on the data set of averages (for a sample of 51 countries 51 observations of TRDGDP and PCGDPG). This averaging procedure results in loss of information (one observation per country rather than 22 observations per country over the period 1981-2002). Nevertheless we have estimated this BE model and observed that across the countries, the higher the TRDGDP, the higher is the growth rate (both averaged over the period, 1981-2002). But if we use dummies for different groups as defined above – rich and poor or closed and open, we get no significant impact of these factors (Table 2).

Keeping in mind this result we consider two other models: FE and BE. The FE is designed to control for omitted variables that differ across countries but are constant over time. This is equivalent to generating dummy variables for each country-cases and including them in a standard linear regression to control for these fixed country-effects. The RE is used if there is a reason to believe that some omitted variables may be constant

over time but vary between cases, and others may be fixed between cases but vary over time. The Breusch-Pagan Lagrange multiplier test (LM) has been done to choose the appropriate model. It strongly supports the RE model in all the cases. That means the standard regression analysis with country dummies (the FE model) is not appropriate (the residual variance across the countries is not zero in the panel regression).

The estimates show that the positive relationship between trade openness and growth at the cross-country average level (the BE model) holds good also in our panel data analysis over the period 1981-2002 across the same sample of 51 countries. None of the coefficients of intercept and slope dummies for 'rich' and 'open' economies are significant. As an initial condition, we have considered the log of GDP per capita, 1981 (measured in purchasing power parity 2000 dollar) in the panel regression (It is often used in the literature following the tradition of so-called 'Barro' regression of examining the old Veblen (1915)-Gerschenkron (1952) convergence hypothesis in the new context of convergence implication of the Solow-Swan neoclassical growth theory vis-à-vis the divergence implication of the new growth theory –for details see Sarkar 2000). It has no effect implying that there is no sign of convergence (the higher the initial per capita GDP, the lower is the growth rate of per capita GDP) of the standard of living across the countries (this is true for the both BE and RE models).

Running separate panel regressions for the groups of 16 'rich' countries and 35 'poor' countries we find that the positive relationship between openness and growth holds for the 'rich' group. But following the same procedure for the groups of 34 'open' and 17

'closed' countries, we find the positive relationship only for the 'open' group. Finally we run a panel regression for the 11 countries belonging to both the groups, 'open' and 'rich'. In this group we get a significant positive relationship between openness and growth. There is also a strong evidence of convergence.

For the remaining 40 countries (neither 'open' nor 'rich') we get neither a relationship between growth and openness nor an evidence of convergence or divergence.

4. Relationship between Trade Openness and Growth: Time Series Study of Individual Country Experiences, 1961-2002

The utility of cross-section studies lies in the fact that the lack of enough observations per country can be overcome by increasing the number of countries in the study – even one single observation of a country can be utilised. But it is often doubtful how far it gives a causal relationship among the variables under study. Moreover a cross-section panel regression analysis often tries to include as many countries as possible – some studies cover (say) 60 countries, some covers 80 countries and all the countries covered in the study are implicitly given the same weight (it is also difficult to devise a weighting system). It is difficult to justify how far one can treat a country such as Papua New Guinea or Ghana at par with a country such as Brazil or India. There always remains a scope for proving or disproving anything through a suitable choice of sample.

It is also doubtful how far a general result based on a cross-section study can be used to provide a policy prescription for a particular country. In this respect time-series analysis gives better insight since it deals with individual country cases. When enough data are available for a single country it is better to carry forward a case study. But we conducted the above panel regression analysis in the tradition of the existing literature, which provides strong support for growth-promoting effects of different kinds of trade and financial liberalisation. For the relationship between trade openness and growth our study finds a positive relationship in a group of 11 highly open and rich countries. In the following time-series analysis we shall examine the individual country cases to examine whether there exists a meaningful relationship between growth and trade openness over a long period, 1961-2002 (in some cases shorter periods are considered due to non-availability of data).

The study of long-run relationships between two time-series variables require a test of unit root – the test for the integration of the series - how many times the series are to be differenced to attain the stationarity property needed to carry forward a meaningful (as against spurious) regression analysis (the residuals of the regression are to be stationary to apply the standard t-tests of significance). Once Nelson and Plosser (1982) argued that all the macroeconomic variables have unit root – they are long-memory series. In simple language this observation implies that a temporary shock has a permanent effect (an econometric counterpart of the so-called real business cycle models of the 'modern' macroeconomics). The standard regression analysis is usually based on the assumption that the series are short-memory series – a temporary shock creates a transitory deviation

from the path of the series. So instead of using the standard regression analysis one has to use cointegration approach. Subsequently the observation of Nelson and Plosser (1982) was questioned but it became a standard practice to conduct unit root tests before conducting any analysis of relationship between two variables.

But the problem is that different tests of unit root often give different results and the lower the length of the series the lower is the power of the standard tests. The Autoregressive Distributive Lag (ARDL) approach to cointegration developed by Pesaran and Shin (1999) does not require such pre-testing and 'data-mining'. This technique can be used to test for the existence of a long run relationship between two variables irrespective of whether they are stationary or not (having unit root or not). We shall use Autoregressive Distributive Lag (ARDL) approach to cointegration developed by Pesaran and Shin (1999) to ascertain the existence of a long run equilibrium relationship between trade openness and growth. This approach does not require any pre-testing of the variables to determine the order of their integration (how many times the data are to be differenced to achieve the stationarity property of the data).

In the ARDL approach the following equation is fitted:

$$Y_t = a + \sum_{i=1}^{p} b_i Y_{t-i} + \sum_{j=0}^{q} c_j X_{t-j} \quad (1)$$

where Y_t is the growth rate of real GDP per capita (PCGDPG) in period t, X_t is the trade openness index – share of total trade in GDP (TRDGDP) in period t and p, q are unknown lags to be determined by various criteria.

We have used four alternative criteria for choosing the values of the lags (p and q) of the ARDL (p, q) model: R Bar Square Criterion (RBSQ), Akaike Information Criterion (AIC), Schwarz Bayesian criterion (SBC) and Hannan-Quinn (H-Q) criterion. The estimates of the long-term coefficient of TRDGDP are reported in Table 3.

First we consider the long-term relationship for different regions and groups for which WDI data are available: Low Income, Middle Income, High Income non-OECD countries, Least Developed Countries, East Asia and the Pacific, Latin America and the Caribbean, Middle East and North Africa, Sub-Saharan Africa and World. Only for the group, Middle Income, we observe a clear positive long-term relationship between trade openness and growth. For all other categories and for the World as a whole we observe no relationship of statistical significance.

Next we consider the individual country experiences. There is some confusion as the different criteria of choosing the ARDL models in many cases give different lag structures and conclusion varies accordingly. If we rely on the SBC criterion as recommended by Pesaran and Shin (1999), we get statistically significant positive long-term relationships between growth and trade openness for twelve countries (Algeria*, Botswana*, Burkina Faso, Chile*, Dominican Republic, Fiji, Guatemala, Haiti, Nigeria, Rwanda, Sierra Leon and Trinidad* - 'rich' countries are marked by *) and negative relationship for nine countries (Argentina*, Bolivia, Cote d'Ivoire, Ecuador, El Salvador, India, Indonesia, Korea* and Tunisia -'rich' countries are marked by *).

Uses of other criteria will add four more countries (Malawi, Panama*, Singapore* and Uruguay*) to the list of positive relationship and one country (Gabon*) to the list of negative relationship. So altogether there are sixteen cases which some way or other favour the hypothesis of positive relationship between trade openness and growth and seven of them (marked by *) belong to the category, 'rich'. There are ten cases of negative relationship and three of them (marked by *) belong to the category, 'rich'.

There are only six clear cases (Algeria, Chile, Dominican Republic, Fiji, Nigeria and Trinidad) where the statistically significant positive relationship can be found in all the four ARDL models. Out of these six, only two countries (Chile and Trinidad) belong to the group (of 11) 'open' economy 'rich' countries for which the panel data analysis has observed a positive relationship between openness and growth.

There are six clear cases (Argentina, Cote d'Ivoire, India, El Salvador, Korea and Tunisia) of negative relationship. The negative relationship for Korea is, however, a manifestation of the 1997 crisis. By adding intercept and time-slope dummies to the ARDL equation (1) it can be seen that there is no relationship between trade openness and growth for Korea. Including Korea there are 26 clear cases of no relationship. Thailand and Malaysia also belong to this category (even if we take into account the 1997 crisis by using dummies). Taking negative relationship as evidence against the positive relationship we get 35 clear cases against the hypothesis of positive relationship. Use of the SBC criterion for choosing the lag structure of the ARDL equation will put the

number as 39. There is no clear picture. A large number of LDCs experienced no long-term positive relationship between trade share and growth irrespective of whether they are highly trade-dependent or not and poor or rich.

5. Concluding Observations

The present study examines the relationship between trade liberalisation/trade openness and real growth rates. The share of total trade (exports plus imports) in GDP (trade-share) is taken as the measure of trade openness. Data on trade-shares and growth rates in GDP per capita are collected from World Bank data on World Development Indicators. For our cross-country study of averages and panel regression analysis we have considered the relevant data for a sample of 51 less-developed countries (LDCs) over a uniform time period 1981-2002. Like many other works in this field, our study shows that a country with a higher trade share tends to experience a higher real growth. For further investigation of this result, we have divided the sample into various overlapping groups on the basis of (1981-2002) average GDP per capita (2000 $ PPP) and trade shares – 'rich' and 'poor' and 'open' and 'closed'. Running separate regressions for all these groups shows that for only 11 rich and highly trade-dependent LDCs a higher real growth is associated with a higher trade share.

Furthermore we resort to time series study of individual country experiences. We do not have a fully specified model of growth with all the major variables affecting growth of the individual LDCs. Rather we try to estimate the gross relationship between trade share

and growth by relating the present real growth rate of individual LDCs with its past values and the present and past values of trade shares under the ARDL approach to co-integration. We expect this study to provide the first hand information. The comparatively new ARDL approach frees the study of long-term relationship from the clutches of pre-testing the stationarity property of the variables.

Our time series study of individual country experiences shows that the majority of LDCs including the East Asian countries experienced no positive long-term relationship between openness and growth during 1961-2002. Extending this study to cover various regions and groups shows that only the Middle Income group experienced a positive long-term relationship. This casts serious doubt on one aspect of neo-liberal paradigm of the Washington Consensus (WC) – the policy of trade-openness to promote growth (for evidence against other aspects, see Sarkar, 2007a, b). The ever-increasing body of literature in the 'mainstream' journals, however, continues to provide strong (?) empirical evidence in favor of WC. It actually reflects the general editorial bias in favour of WC-the works producing the contrary evidence are often summarily rejected without proper refereeing (these editors often calculate the probability of success of a paper depending on its conclusion presented in the abstract and rejects anti-WC paper without wasting time and money for refereeing). Thus a 'mainstream' academic consensus is being built in favor of WC. This paper questions this 'mainstream' consensus and supports the heterodox position.

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Table 1.Trade Openness, GDP Per Capita and Its Growth Rate, 1981-2002: Selected Southern Countries

Groups/Countries	PCGDPP[1] (1981)	PCGDPP[1] (1981-2002 averages)	PCGDPG[2] (1981-2002 averages)	TRDGDP[3] (1981-2002 averages)
CLOSEDECONOMY[4]				
Argentina*	10804	10941	-0.38	19
Bangladesh	1065	1266	2.15	24
Bolivia	2272	2242	-0.22	48
Brazil*	6413	6794	0.47	19
Burkina Faso	813	925	1.4	36
Cameroon	2396	2091	0.01	49
Guatemala	3962	3647	-0.1	40
Haiti	2985	2243	-2.71	41
India	1229	1807	3.55	19
Madagascar	1009	884	-2.01	43
Mexico*	8304	7934	0.63	43
Pakistan	1121	1599	2.25	35
Peru	5522	4700	-0.14	32
Rwanda	1339	1162	0.1	31
Sierra Leon	1056	808	-3.13	43
Uruguay*	7512	7695	0.16	41
Venezuela*	6504	5955	-1.23	48
OPEN ECONOMY[4]				
Algeria*	5528	5532	-0.01	51
Botswana*	2793	5557	4.69	104
Chile*	4825	6757	3.41	57
Congo	840	968	0.13	113

Costa Rica*	6904	7120	1.16	79
Cote d'Ivoire	2220	1763	-1.76	70
Dominican Republic	3964	4683	2.28	71
Ecuador	3415	3385	0.00	55
Egypt	2335	2974	2.49	51
El Salvador	3772	4016	0.59	54
Fiji	4704	4637	0.77	110
Gabon*	7026	6258	-0.72	92
Gambia	1724	1699	-0.28	113
Ghana	1681	1703	0.57	54
Honduras	2628	2518	-0.12	75
Indonesia	1536	2445	3.55	55
Jamaica	3288	3583	0.7	99
Jordan	4307	4196	-0.21	120
Kenya	1049	1051	-0.19	60
Korea*	4798	10282	6.19	65
Malawi	552	550	0.03	60
Malaysia*	4217	6430	3.52	157
Mauritius*	4256	7017	4.59	120
Nigeria	840	829	-0.83	64
Panama*	5640	5327	1.25	156
Paraguay	5082	4727	-0.41	62
Philippines	4207	3845	0.21	72
Senegal	1325	1405	0.58	66
Singapore*	10163	16206	4.29	290
Sri Lanka	1826	2578	3.15	73
Thailand	2602	4805	4.7	79

Trinidad & Tobago*	9571	7832	-0.05	83
Tunisia	4211	4998	2.1	86
Zimbabwe	2726	2639	-0.58	57

* 'Rich' countries with 1981-2002 average per capita GDP > $5000 (internationally comparable purchasing power parity 2000 dollar).

1 PCGDPP = Per capita GDP in purchasing power parity constant (2000) international US $;

2 PCGDPG = Growth in real GDP per capita;

3 TRDGDP = Trade (exports plus imports) as percentage of GDP, Trade openness index;

4 Countries are categorised as 'Closed Economy' if their Trade (Exports + Imports) as a percentage of GDP, TRDGDP (1981-2002 average) < 50 per cent. All others are considered as Open Economy countries.

Source: World Bank, World Development Indicators, available on-line.

Table 2. Trade Openness and Growth of the Southern Countries, 1981-2002: Panel Data Analysis[1]

Regressors	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**
I. Cross-country BE Model							
Whole Sample *(51 countries)*							
a (intercept)	-0.13	-0.41	-0.48	-0.33	-0.22	0.53	3.18
TRDGDP	0.01*	0.01*	0.006	0.01	0.01	0.00	-0.09
LPCY81		0.04					
Intercept Dummy-rich (Dr)			1.01		0.88	-0.24	
Slope Dummy-rich (SDr)						0.02	
Intercept Dummy-openness (Dt)			0.94	0.76			-2.96
Slope Dummy-openness (SDt)							0.1*
R Sq.	0.11		0.18	0.13	0.15	0.17	0.22
F-stat.	6.12		3.54	3.72	4.24	3.28	4.35
II. Panel Data RE Model							
Whole Sample *(51 countries)*							
a (intercept)	-0.61	0.03	-0.05	-1.08	-6.9	-0.72	-0.83
TRDGDP	0.02**	0.02**	0.02*	0.03	0.02**	0.02**	0.02
LPCY81		-0.08					
Intercept Dummy-rich (Dr)			0.27			0.66	0.69
Slope Dummy-rich (SDr)			0.01				
Intercept Dummy-openness (Dt)				-0.01	0.23		0.31
Slope Dummy-openness (SDt)				-1.08			
R Sq.	0.03	0.03	0.04	0.03	0.03	0.03	0.04
LM-stat.[2]	175.73	175.73	149.03	140.78	165.63	158.03	143.8

Rich *(16 countries)*[3]							
a (intercept)	-0.32	31.27					
TRDGDP	0.02**	0.02**					
LPCY81		-3.57					
R Sq.	0.06	0.13					
LM-stat.	66.3	16.35					
Poor *(35 countries)*[3]							
a (intercept)	-0.45	0.65					
TRDGDP	0.02	0.02*					
LPCY81		-0.15					
R Sq.	0.002	0.002					
LM-stat.[2]	84.06	84.17					
Open *(34 countries)*[4]							
a (intercept)	0.49	-1.49					
TRDGDP	0.02**	0.02**					
LPCY81		0.13					
R Sq.	0.03	0.03					
LM-stat.[2]	176.42	170.48					
Closed *(17 countries)*[4]							
a (intercept)	-0.22	2.46					
TRDGDP	0.007	0.007					
LPCY81		-0.34					
R Sq.	0.004	0.001					
LM-stat.[2]	10.1	8.61					
Open & Rich *(11 countries)*							
a (intercept)	-0.16	39.51					
TRDGDP	0.02**	0.03**					
LPCY81		-4.63**					
R Sq.	0.03	0.12					
LM-stat.[2]	86.38	27.62					
Others (40 countries)							
a (intercept)	-0.41	0.56					
TRDGDP	0.01	0.01					
LPCY81		-0.12					
R Sq.	0.002	0.003					
LM-stat.[2]	66.54	65.86					

* Significant at 5 per cent level

** Significant at 1 per cent level.

1 The following equation is fitted:

Growth of Per Capita GDP (PCGDPG)

= a + b. TRDGDP + c log (PCY91) + d.D + e.SD

where D is intercept dummy – it is either Dr [= 1 for 16 'rich' countries with 1981-2002 average GDP per capita > $ 5000 (purchasing power parity dollar) and = 0 otherwise] or Dt [= 1 for 34 highly trade-dependent 'open' countries with 1981-2002 average trade share (TRDGDP) > 50 per cent and = 0 otherwise] and SDr =Dr.TRDGDP and SDt = Dt.TRDGDP are the slope dummies.

Setting one or more parameters (c to e) equal to zero, we have fitted alternative regression equations.

2 The Breusch-Pagan Lagrange Multiplier (LM) test statistic is reported here. It supports the random-effect model (RE) model in every case.

3 'Rich': Countries with 1981-2002 average per capita GDP > $5000 (internationally comparable purchasing power parity 2000 dollar). 'Poor': Others

4 Countries are categorised as ‘Closed Economy’ if their Trade (Exports + Imports) as a percentage of GDP, TRDGDP (1981-2002 average) < 50 per cent. All others are considered as Open Economy countries.

Table 3.Long-term Relationship between Real Growth Rate and Trade Openness, 1961-2002: Estimates through the ARDL Method[1]

	-: Criteria (ARDL Model in Parentheses): -			
	R-Bar Sq	AIC	SBC	H-Q
Regions & Groups				
WORLD	0.22 (12,12)	0.22 (12,12)	0.22 (12,12)	0.22 (12,12)
EAST ASIA & THE PACIFIC[2, 3]	-0.17 (6,8)	-0.05 (9,9)	-0.03 (1,0)	-0.17 (6,8)
LATIN AMERICA & THE CARIBBEAN	0.03 (11,11)	0.03 (11,11)	0.02 (1,0)	0.03 (11,11)
MIDDLE EAST & NORTH AFRICA[4]	-0.04 (3,8)	-0.04 (3,8)	-0.04 (3,8)	-0.04 (3,8)
SUB-SAHARAN AFRICA	-0.14 (10,12)	0.36 (12,12)	0.36 (12,12)	0.36 (12,12)
LOW INCOME	-0.07 (0,0)	-0.07 (0,0)	-0.07 (0,0)	-0.07 (0,0)
MIDDLE INCOME	0.15** (9,9)	0.15** (9,9)	0.15** (9,9)	0.15** (9,9)
HIGH INCOME NON-OECD GROUP	0.03 (0,1)	0.03 (0,1)	0.03 (0,1)	0.03 (0,1)
LEAST DEVELOPED COUNTRIES[5]	1.26 (5,1)	-0.43 (6,6)	1.26 (5,1)	-0.43 (6,6)
Countries				
ALGERIA[R]	0.11* (12,11)	0.07 (8,0)	0.11 (1,0)	0.07 (8,0)
ARGENTINA[R, C]	-0.74** (0,0)	-0.74** (0,0)	-0.74** (0,0)	-0.74** (0,0)
BANGLADESH[C]	-0.02 (12,11)	-0.02 (12,11)	-0.02 (12,11)	-0.02 (12,11)
BOLIVIA[2 C]	-0.47 (5,9)	-0.02 (12,11)	-0.92* (0,9)	-0.02 (12,11)
BOTSWANA[R]	0.15 (11,12)	0.15 (11,12)	0.22* (2,0)	0.15 (11,12)
BRAZIL[R C]	-0.6 (0,10)	-0.48 (12,11)	0.17 (0,0)	-0.48 (12,11)
BURKINA FASO[C]	0.06* (10,11)	0.04* (12,12)	0.04* (12,12)	0.04* (12,12)
CAMEROON[6 C]	-0.43 (11,5)	2.45 (11,11)	-0.18 (7,5)	2.45 (11,11)
CHILE[R]	2.16* (11,12)	2.16* (11,12)	2.16* (11,12)	2.16* (11,12)
CONGO	0.26 (4,10)	0.26 (4,10)	0.26 (4,10)	0.26 (4,10)

COSTA RICA[R]	0.12 (12,12)	0.12 (12,12)	0.12 (12,12)	0.12 (12,12)
COTE D'IVOIRE	-0.36* (0,6)	-0.36* (0,6)	-0.36* (0,6)	-0.36* (0,6)
DOMINICAN REPUBLIC	0.47* (11,12)	0.49** (12,12)	0.47* (11,12)	0.47* (11,12)
ECUADOR	-0.99* (7,9)	-2.92 (12,11)	-0.99* (7,9)	-0.99* (7,9)
EGYPT	0.31 (12,12)	0.31 (12,12)	0.31 (12,12)	0.31 (12,12)
EL SALVADOR	-0.17** (8,9)	-0.23* (12,12)	-0.23* (2,5)	-0.17** (8,9)
FIJI	0.34** (11,12)	0.34** (12,12)	0.34** (12,12)	0.34** (12,12)
GABON[R]	-1.25** (4,10)	-1.25** (4,10)	-0.23 (0,0)	-1.25** (4,10)
GAMBIA[7]	-0.08 (8,8)	-0.07 (10,8)	-0.01 (0,0)	-0.07 (10,8)
GHANA	-0.21 (9,9)	0.07 (12,12)	0.02 (0,0)	-0.21 (9,7)
GUATEMALA[C]	4.16 (11,12)	4.16 (11,12)	0.2** (1,1)	4.16 (11,12)
HAITI[C]	0.05 (8,12)	-0.01 (12,12)	0.26** (0,0)	-0.01 (12,12)
HONDURAS	0.11 (11,11)	0.11 (11,11)	0.11 (11,11)	0.11 (11,11)
INDIA[C]	-0.13** (6,0)	-0.13** (6,0)	-0.16** (4,0)	-0.13** (6,0)
INDONESIA	-0.24** (2,1)	-1.65 (12,12)	-0.29** (0,0)	-1.65 (12,12)
JAMAICA	0.14 (12,12)	0.14 (12,12)	0.14 (12,12)	0.14 (12,12)
JORDON[8]	-0.13 (6,6)	-0.42 (7,7)	-0.42 (7,7)	-0.42 (7,7)
KENYA	-19.15 (10,12)	-19.15 (10,12)	0.01 (4,0)	-19.15 (10,12)
KOREA[R,3]	-0.14** (10,12)	-0.14** (10,12)	-0.14** (10,12)	-0.14** (10,12)
MADAGASCAR[C]	0.01 (2,3)	-0.09 (12,12)	0.01 (2,3)	0.01 (2,3)
MALAWI	0.21 (11,9)	0.12* (12,12)	0.04 (0,2)	0.12* (12,12)
MALAYSIA[R,3]	0.0005 (12,11)	-0.0002 (12,12)	-0.0002 (12,12)	-0.0002 (12,12)
MAURITIUS[R9]	0.42 (6,4)	0.08 (6,6)	0.08 (6,6)	0.08 (6,6)
MEXICO[R C]	0.66 (11,12)	0.66 (11,12)	0.66 (11,12)	0.66 (11,12)

NIGERIA	0.79** (10,12)	0.7** (12,12)	0.79** (10,12)	0.79** (10,12)
PAKISTAN[7 C]	3.13 (8,10)	4.28 (9,10)	4.28 (9,10)	4.28 (9,10)
PANAMA[R 10]	0.06* (3,0)	0.15 (6,6)	0.15 (6,6)	0.15 (6,6)
PARAGUAY	-2.39 (4,12)	-0.14 (12,12)	0.13 (1,0)	0.08 (2,0)
PERU[C]	0.05 (12,12)	0.05 (12,12)	0.05 (12,12)	0.05 (12,12)
PHILIPPINES	-0.09 (9,11)	-0.04 (11,11)	-0.09 (9,11)	-0.09 (9,11)
RWANDA[C]	1.07 (11,11)	1.35 (12,12)	0.46* (0,2)	1.35 (12,12)
SENEGAL	-0.003 (12,12)	-0.003 (12,12)	-0.003 (12,12)	-0.003 (12,12)
SIERRA LEON[11 C]	-0.13** (10,5)	-0.27** (10,11)	0.21* (1,0)	-0.27** (10,11)
SINGAPORE[R]	0.07* (12,7)	-3.92 (11,12)	-3.92 (11,12)	-3.92 (11,12)
SRI LANKA	0.55 (11,12)	0.55 (11,12)	0.55 (11,12)	0.55 (11,12)
THAILAND[3]	-0.02 (12,12)	-0.02 (12,12)	-0.02 (12,12)	-0.02 (12,12)
TRINIDAD[R]	0.24* (8,12)	0.24* (8,12)	0.24* (8,12)	0.24* (8,12)
TUNISIA	-0.49* (12,12)	-0.49* (12,12)	-0.49* (12,12)	-0.49* (12,12)
URUGUAY[R C]	0.54* (9,12)	0.81 (11,11)	0.81 (11,11)	0.81 (11,11)
VENEZUELA[R C]	0.99 (12,12)	0.99 (12,12)	0.99 (12,12)	0.99 (12,12)
ZIMBABWE[4]	-0.07 (6,8)	-0.02 (8,8)	0.02 (8,8)	0.02 (8,8)

R 'Rich' countries with PCGDPP (GDP per capita in purchasing power parity 2000 dollar – average over the period 1981-2002) > $5000.

C 'Closed Economy' countries with Trade (Exports + Imports) as a percentage of GDP, TRDGDP (1981-2002 average) < 50 per cent. All others are considered as highly trade-dependent Open Economy countries.

** Significant at 1 per cent level (based on asymptotic standard errors).

* Significant at 5 per cent level (based on asymptotic standard errors).

1 The following ARDL (p, q) model is fitted:

$$G_t = a + b.t + \sum_{i=1}^{p} b_i G_{t-i} + \sum_{j=0}^{q} c_j T_{t-j}$$

where G is the growth rate of real GDP per capita (PCGDPG), T is TRDGDP, the subscripts t, t-i and t-j indicate different time periods and p and q are unknown lags to be determined by various criteria.

We have used four alternative criteria: R Bar Square Criterion (RBSQ), Akaike Information Criterion (AIC), Schwarz Bayesian criterion (SBC) and Hannan-Quinn (H-Q) criterion. The estimates of the long-term coefficients are obtained with the aid of Microfit program and reported here with the chosen ARDL model (p, q) in parentheses.

2 Period of study is 1970-2002.

3 For Korea, Thailand, Malaysia and East Asia & the Pacific, we have added intercept dummy (D) and slope dummy (SD = D.t) for the period 1998-2002. This procedure changes the conclusion for Korea from a negatively significant relationship to no relationship of statistical significance. For others the conclusion of no relationship remains unaltered.

4 Period of study is 1975-2002.

5 This is an UN category.

6 Period of study is 1965-2002.

7 Period of study is 1967-2002.

8 Period of study is 1976-2002.

9 Period of study is 1981-2002.

10 Period of study is 1980-2002.

11 Period of study is 1964-2002.