



INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE AND MANAGEMENT

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HOW CAN FREE TRADE EXCEL ECONOMIC GROWTH**SHAHZAD GHAFOR****LECTURER****DEPARTMENT OF MANAGEMENT SCIENCES****COMSATS INSTITUTE OF INFORMATION TECHNOLOGY****LAHORE, PAKISTAN****UZAIR FAROOQ KHAN****LECTURER****CENTRE FOR EXCELLENCE IN RESEARCH****DEPARTMENT OF MANAGEMENT SCIENCES****COMSATS INSTITUTE OF INFORMATION TECHNOLOGY****LAHORE, PAKISTAN****ABSTRACT**

We have conducted a survey of journal articles that have examined the relationship between free trade and economic growth. In particular, we have carefully selected six empirical studies that were published over a ten-year period and critically reviewed, and evaluated these studies in depth. We have also extensively presented and discussed the issues as well as the controversies that are related to the various measures of openness. In a number of the trade-growth empirical studies researchers have made major attempt to identify the relationship between free trade and economic growth. Most of the trade-growth studies show that there is a positive relationship between free trade and economic growth. However, some of these influential studies have been subject to strong criticism, mainly due to a number of methodological shortcomings. As for the million-dollar question: Does free trade advance economic growth? Our conclusion is that this question is not yet resolved, because although researchers have devoted considerable efforts to show a positive trade-growth relationship, nevertheless, the methodologies and the measurements applied in these studies have been fragile to the scrutiny of critics.

KEYWORDS

Excel, Free Trade, Economic Growth, Empirical.

INTRODUCTION

The idea that free trade advances economic growth goes back to Adam Smith and since then most economists have supported the claim that free trade promotes economic growth. Nevertheless, strategic trade theory has challenged the traditional view of free trade and its ability to advance economic growth (Brander and Spencer 1985). After World War II protectionist theories started to gain influence and attract the attention of policymakers internationally (Edwards 1993; Miller & Upadhyay 2000). As a result Import Substitution Industrialization (ISI) strategies were implemented particularly in most of the developing countries (Edwards 1993; Krueger 1998; Ben-David 1998; Yanikkaya 2003). According to Edwards (1993) the ISI strategies were based on reasons similar to the infant-industry argument. In the beginning the ISI strategies appeared to work well, however the negative aspects of the ISI strategies soon became noticeable (Baldwin 2003). Therefore, over time ISI strategies were abandoned because they failed to produce a sustainable increase in the long-run economic growth rate.

Consequently, in the 1970s and 1980s trade liberalization was promoted, for example through the World Bank Structural Adjustment Loans (Greenway and Wright 2002). The main argument is that trade liberalisation promotes trade and brings about economic growth (Wood and Walde 2004). There is a large body of empirical studies that highlight the positive impact of free trade on economic growth.

These empirical studies have used innovative methodological approaches in an attempt to identify the relationship between free trade and economic growth. However, some of these influential studies have been criticised by prominent skeptics such as Rodriguez and Rodrik (2000) on several grounds. Surprisingly, Krueger (1998) claims that it is empirically straightforward to show whether or not countries that adopt outward-oriented strategies experience rapid growth. However, we are not convinced that the openness-growth link can easily be demonstrated through empirical studies. In my view, the nature of the openness-growth relationship is very complex. Therefore, presenting strong empirical evidence about the impact of openness on growth, which is not prone to criticism, is far from straightforward. One of the challenges researchers face is constructing a robust openness measures. In spite of the considerable efforts that have been put into developing more advanced openness measures, existing measures are still far from "perfect". Nevertheless, a number of studies have applied a wide range of measure of openness, methods, and different types of samples of countries to identify the trade-growth link. The results of these studies consistently show evidence that support the fact that trade promotes economic growth.

However, Rodriguez and Rodrik (2000) have reviewed a number of the trade-growth studies published in the 1990s. Based on their investigation they criticize the studies mainly due to weak measures and methods. It is important to note that Rodriguez and Rodrik do not claim that trade restrictions advance growth or trade is detrimental to growth, but they claim the evidence presented in the empirical studies they have reviewed, do not convincingly demonstrate a causal positive relationship between openness and growth.

THEORETICAL FRAMEWORK

The endogenous growth theory pioneered by Romer (1986) and Lucas (1988) provided a theoretical framework for linking openness to trade with long-run economic growth. In his groundbreaking work, Romer (1990) presented the endogenous growth model. His one-sector neoclassical model with endogenous technology change is a fundamental shift from the previously dominant exogenous growth model developed by Solow in 1956. In the standard neo-classical exogenous growth model, trade policies promote changes through specialization, but not directly through the steady-state growth rate (Lee 1993; Baldwin 2003). Therefore, the main source of growth according to the standard neo-classical model is exogenous technological progress (Lee 1993). In addition, the standard neo-classical exogenous growth model predicts income convergence between similar countries even without trade. However, researchers such as Ben-David (1993, 1996, 1998) and Sachs and Warner (1995) argue that trade greatly enhances income convergence.

Contrary to standard neo-classical models of exogenous growth, Romer's endogenous growth model illustrates how deliberate investment decisions made by profit maximizing firms advance innovation, and as a result economic growth is accelerated by the endogenous technological improvements.

In the endogenous growth model, human capital is the main driving force for research and development (R&D) and it ultimately leads to advanced technology, which in turn stimulates economic growth. Therefore, the stock of human capital determines the rate of growth. Consequently, Romer's endogenous growth

model predicts that countries with larger stock of human capital will grow more rapidly. In Romer's endogenous growth model the common growth rate is given as:

$$g = (\delta H - \lambda p) / (\sigma \Lambda + 1)$$

where g is the growth rate; δ is the productivity parameter; H is total human capital in each country; Λ is a constant that depends on the technology parameters; p is the discount rate; and σ is a constant that depends on the rate of intertemporal substitution.

After constructing the model above, he then explains its implications for growth, trade and R&D. He points out that growth is linked to the degree of economic integration to the world markets; therefore trade can enable countries to accelerate their growth rate. He implies that trade would have at least two positive implications for new technological innovations: First of all, trade will increase the market size by providing access to new markets internationally, but more importantly trade will provide access to the stock of knowledge that is accumulated worldwide.

According to Edwards (1998), Romer's endogenous growth model has provided convincing academic support for the proposition that openness to trade has a positive impact on economic growth. Grossman and Helpman (1990) and Ben-David (1998) believe that the emergence of the endogenous growth model has been the main driving force in reviving the interest of researchers to continue exploring the impact of trade on economic growth.

Subsequently, based on the insights gained from Romer's endogenous growth model, Grossman and Helpman (1990) constructed a dynamic two-country model to investigate the relationship between trade and growth. In their model each country produces three types of goods: final goods, intermediate goods and R&D. Similar to Romer, Grossman and Helpman assume that R&D creates a second output and this output contributes to the stock of intangible knowledge. Based on their model, they study the impacts of trade on long-run economic growth and conclude that factor price equalization would ultimately ensure that both countries would experience a similar pace of output growth and consumption regardless of their national factor endowment. As in Romer, they also conclude that endogenous technological improvements that lead to increase in labour productivity can advance long-run economic growth.

Furthermore, they analyze the impact of trade policies on the steady-state growth rate and identify that there is a relationship between trade intervention and long-run growth. In relation to trade policies they also highlight the central role of comparative advantage and its broader interpretation:

Comparative advantage continues to play a critical role in determining whether policy in one country will speed or decelerate growth. But comparative advantage now must be interpreted with care, because it reflects not only natural ability, but also the (endogenous) benefits from cumulative experience (Grossman and Helpman 1990 p. 814).

In addition, they point out that comparative advantage in R&D is just one of the channels through which free trade has an impact on long-run growth. Other factors such as the trade environment, for example the institutional arrangements in a country, might have an impact on how fast accumulation of human capital takes place as well as the rate at which knowledge is disseminated.

Grossman and Helpman (1994) agree with Romer (1990) that often most technological innovations require a deliberate investment in R&D by profit maximizing firms. As a result the knowledge gained from R&D plays a central role in the long-run economic growth process. Furthermore, they emphasize that technological innovation is the catalyst for economic growth. They also highlight that trade will facilitate the diffusion of knowledge and as a result stimulate economic growth. In addition, they argue that firms competing in the global market place will face more pressure not only to adopt new knowledge at a faster pace, but also to produce more innovative ideas in order to stay competitive internationally. Ben-David (1998) makes similar points.

The theoretical model constructed by Grossman and Helpman provides the impression that firms might have a lot more to gain by venturing out into the international market due among other things to trade flows facilitating the diffusion of technology, knowledge and ideas. However, it is also clear that these firms must be able to cope with the additional pressure that comes with competing in the international market place. In addition, Ben-David (1998) supports Grossman and Helpman's view that trade allows diffusion of knowledge and has substantial positive flow-on effects. Although it is not the focus of this paper, Rodriguez and Rodrik (1999) cite empirical studies that have investigated the relationship between trade and firms' performance. These studies did not find evidence that support firms gaining technological or any other type of benefit from venturing into export markets. They argue that competitive firms tend to self-select into the international markets. As a result, causality appears to go from productivity to export market rather than vice versa. Dollar and Kraay (2003) make a similar point regarding the reverse causation. On the basis of these micro economic level studies, Rodriguez and Rodrik (1999) suggest that relating these empirical findings to trade policy should be a fruitful alternative researchers should explore further.

Romer's (1990) knowledge-driven model described above is based on a closed economy, and only towards the end Romer speculates, what will happen if two economies totally integrate. Subsequently, in models constructed by Rivera-Batiz and Romer (1991) they open up the economies, but limit the scope of the paper and only examine the integration of two similar economies. In this paper, they distinguish between trade in pure goods and trade involving information exchange i.e. ideas and knowledge. Based on their models they claim that if there is only trade in goods between the two economies then there will be a "one-off" impact on growth in both countries. On the other hand, if trade involves both information exchange and goods between the two economies, then the impact on the growth rate will be permanent. However, they also acknowledge the limitations of their models. The main limitations are: a) there is no explanation as to how information exchange between the two countries impacts on the productions of goods; and b) a number of details of R&D at the micro level have been overlooked in their analysis.

The model proposed by Grossman and Helpman (1990) illustrates the underlying forces by which trade ultimately contributes to economic growth. However, the model does not provide a definite answer as to whether trade intervention will increase or decrease the long-run growth rate. It depends on whether the country has a comparative advantage or disadvantage in R&D. Rivera-Batiz and Romer (1991) point out that the impacts of trade restriction on growth are very complicated. They specifically point out that:

There are some models in which trade restrictions can slow down the worldwide rate of growth. There are others in which they can speed up worldwide rate of growth (p. 532).

As Lee (1993), Harrison (1996), Baldwin (2003) and Yanikkaya (2003) stress that the theoretical foundation regarding the relationship between trade and economic growth is ambiguous. Furthermore, Yanikkaya (2003) argues that trade theory does not provide enough guidance with respect to the interaction between the effect of trade openness on growth and technical progress. According to Lee (1993) and Harrison (1996) there is a lack of a robust theoretical framework that clearly demonstrates and establishes how trade and trade policies are linked to long-term economic growth. Therefore, Harrison believes empirical literature will assist in providing a definitive answer. However, Lee argues that the main reason the relationship between trade and economic growth still remains an open question, and continues to be widely debated in the empirical literature, is due to the lack of a robust theoretical foundation. Furthermore, Sirinivasan states there are issues associated with growth regressions due to both trade policy and economic growth being endogenous variables. As a result there are difficulties in establishing causality. Nevertheless, recently Lee *et al.* (2004) have made an attempt to address the issues related to endogeneity.

Overall, it appears that there is a lack of a clear theoretical understanding of the trade-growth relationship. However, in general, as the endogenous growth theory also suggests, trade is expected to advance productivity growth via many different channels: allowing the realization of comparative advantage, facilitating diffusion of advanced technologies, knowledge and ideas, introducing and increasing competition, significantly increasing the market size and providing ways to utilize economies of scale. In addition, Alcalá and Ciccone (2001) find evidence that trade has a positive impact on average labour productivity through labour efficiency.

In the next section, we will provide a broad overview of the empirical studies that have investigated the impacts of free trade on economic growth.

BROAD OVERVIEW OF THE LITERATURE

Throughout history economists that have been interested in the wealth of nations have also been interested in trade (Frankel and Romer 1999). Therefore, economists have extensively debated the relationship between trade and economic growth (Edwards 1997; Ben-David 1998). Even today this topic still is subject to significant debate among economists and policymakers (Yanikkaya 2003). As Rodriguez and Rodrik (1999) point out, the impact of trade on economic growth has attracted major attention in the existing literature. Understanding the link between trade and economic growth has very important implications for policy

analysis. As a result, the impact of trade on growth is a widely researched topic. A number of major empirical studies (such as Dollar 1992; Sachs and Warner 1995; Edwards 1998; Lee 1993; Harrison 1996; Wacziarg 1998; Ben-David 1998; Frankel and Romer 1999; Vamvakidis 2002; Dollar and Kraay 2003; Wacziarg and Welch 2003) have attempted to explain and estimate the impact of trade on economic growth. The majority of the empirical studies have concluded that free trade advances economic growth. However, some of the studies have been subject to strong criticism by Rodriguez and Rodrik (2000), mainly due to a number of methodological shortcomings. Winters (2004) and Baldwin (2003) both agree that Rodriguez and Rodrik's critique for the most part is well justified. After undertaking an extensive review of the main contributions to the field and presenting a rigorous critique of these empirical studies, Rodriguez and Rodrik (2000) concluded that the issues regarding the relationship between trade policy and economic growth are not yet resolved. Lee (1993) and Harrison (1996) make similar points. In addition, Frankel and Romer (1999) argue that despite the considerable efforts made by researchers, there is still a lack of convincing evidence that explains the impact of trade on income.

The empirical trade-growth literature has presented different types of evidence. In their widely cited paper Sachs and Warner (1995) claim that no country that liberalized trade failed to show economic growth. Furthermore, Wacziarg and Welch's (2003) study shows that trade liberalisation has positive impacts on growth. In addition, Lee's (1993) study found that restrictive trade policy have considerable negative impact on growth rates and cause income divergence. Lee *et al.* (2004) investigate the impacts of openness and growth and conclude that openness has only a small positive impact on growth.

On the other hand, Vamvakidis (2002) used historical data from 1870-1990 to estimate the impact of trade protection on economic growth and found very mixed results. His results include a positive relationship between trade and economic growth only after 1970. Subsequently, Clemens and Williamson (2001) also found mixed results: their results showed, protectionism was positively correlated with rapid growth before World War II, but it was negatively correlated thereafter. According to the findings of Vamvakidis (2000) and Clemens and Williamson (2001) the positive impacts of trade on economic growth seems to be a post-1970 phenomenon (Berggren & Jordahl 2005).

Contrary to conventional beliefs, Yanikkaya (2003) strongly disputes that trade barriers can have a favourable impact upon economic growth particularly for developing economies. Overall, his main point is that the link between trade restrictions and economic growth is not straightforward and mainly depends on some country specific characteristics. He claims that he finds it difficult to comprehend why trade liberalisation is supported strongly in academic and policy discussions. On the other hand, Winter (2004) emphasizes that there is no robust empirical evidence that suggests trade restrictions advance economic growth. Berg and Kruger (2003) also make the same point. Although almost all empirical trade-growth studies have consistently reported that trade advances economic growth, it appears that as Vamvakidis (2002) pointed out, the relationship between free trade and economic growth is still controversial and remains an open question. Most recently Lee *et al.* (2004) made a similar point. Broadly speaking, two approaches have been applied to investigate the connection between trade and economic growth: cross-country statistical analysis and case studies. In the next section, we will briefly discuss the strengths and weaknesses associated with both cross-country statistical analysis and case studies.

TRADE POLICY INDICATORS, OTHER POLICIES & GROWTH

Most economists agree that free trade is not a sufficient condition for economic growth and the extent to which trade stimulates growth depends on other policies and good quality institutions. According to Dollar and Kraay (2003) countries that are more open to trade also have better quality institutions. In addition, they also argue that countries with favourable geographic characteristics trade more and have better quality institutions. Acemoglu (2004) points out that it is important to unbundle institutions or in this case policies in order to identify what types of specific institutions or policies matter most for achieving certain outcomes.

Acemoglu's point is an interesting one, because trade liberalisation is usually introduced with a wide range of other policy changes (Clemens and Williams 2001; Sachs and Warner 1995; Berggren and Jordahl 2005). However, unbundling specific trade policy indicators from other policies and examining their impact on growth is not an easy task. A single trade policy indicator does not adequately reflect the complex economic environment, whereas aggregated trade policy indicators are able to capture a wide range of information. As a result, aggregated trade policy indicators are also highly likely to capture the effects of other policies in the economy. A number of researchers argue that isolating the benefits of other policies from the impacts of trade liberalisation on economic growth is very difficult. This suggests that Acemoglu's (2005) idea of unbundling the impacts of specific dimension of institutions or policies is useful, but in practice not straightforward. On the other hand, Baldwin (2003) offers a new idea by arguing that the pursuit to isolate the impacts of trade liberalisation on economic growth from the impact of other policies is misguided. He suggests the quest should focus on how trade policy interacts with other sound macro economic and fiscal policies to generate growth.

Even though the impact of free trade on economic growth is still controversial, empirical studies conducted by some researchers appear to acknowledge that openness to trade advances economic growth. Miller and Upadhyay (2000) specifically point out that:

Openness fosters competition, encourages modern technology, increases the demand for high-skilled labour, and promotes learning by doing. Too little openness, therefore does not allow a country to leverage its stock of human capital. Human capital investment without liberalisation of the external sector may lead to the under-utilization of human capital (pp. 411- 412).

However, Yanikkaya (2003) claims that the positive growth–openness connections are grossly overstated in the economics literature. Likewise, Freeman (2003) argues that the importance of openness for growth has been highly exaggerated. In addition, Rodriguez and Rodrik (1999) believe that there has been a tendency in the economics profession and in policy circles to overstate empirical findings in favor of free trade and openness. Nevertheless, there is an emerging consensus among researchers that openness to trade has positive impacts on a broad range of policies and institutions (Dollar and Kraay 2003). In that case, one of the important questions is, how one can isolate the effect of openness from good quality institutions, and above all, how do we define and correctly measure openness?

OPENNESS MEASUREMENTS

As discussed in the theoretical framework section, openness to trade is expected to lead to economic growth via many different channels. Pritchett (1996) defines 'openness' as: "*an economy's trade intensity*" (P. 309). However, at times the terms 'outward-oriented' or 'outward-orientation' are used synonymously with the term 'openness' see for example Edwards (1998). It is essential to note that the concept of 'openness' refers to a country's openness to free trade.

According to Edwards (1997) the literature on trade and economic growth has been considerably stalled by definitional and measurement difficulties. Moreover, not having a clear definition of openness is still a significant problem (Yanikkaya 2003). In his literature review Edwards (1993) points out the literature has been unsuccessful in terms of measuring or defining a country's trade orientation. Edwards (1997) raised his concerns regarding the "outward-orientation" index that was developed by the World Bank in 1987 and yet he used this index in 1997 along with five other openness measures. He also argues that trade dependency ratios that have been used in early cross-country studies are flawed, mainly because they are not automatically linked to policy. Furthermore, he questions the validity of the Heritage Foundation Index, because he argues, it is a "subjective" measure of trade orientation. Overall, Edwards (1993, 1997, 1998) appears to think that most trade-growth studies are critically affected by the complexity related in correctly measuring openness to international trade.

Openness to trade can be measured in many different ways (Alcala and Ciccone 2003). Consequently, applying different measures of openness will assign countries into diverse categories and as a result classifying a country according to their degree of openness is a complex task (Yanikkaya 2003). Moreover, Harrison (1996) points out that one of the reasons that make it easier to be skeptical of past empirical studies and their findings is that different studies apply different types of openness measures, and methodologies as well as different samples of countries. Therefore, she argues their findings may differ for a range of reasons. In addition, Baldwin (2003) points out that the conclusions of any study will be significantly affected by how broad or narrow the term openness is defined. I fully agree with Baldwin's point and he explains further:

One can interpret openness in narrow terms to include only import and export taxes or subsidies as well as explicit non-tariff distortions of trade or in varying degrees of broadness to cover such matters as exchange-rate policies, domestic taxes and subsidies, competition and other regulatory policies, education policies, the nature of the legal system, the form of government, and the general nature of institutions and culture (pp. 2-3).

Baldwin (2003) argues that the main reason there is a disagreement in the empirical studies regarding the relationship between openness and growth appears to be due to the definition of openness. In addition, Yanikkaya (2003) argues that the definition of openness has changed significantly during the years and unfortunately, it still remains unclear as to what exactly openness means and how it is measured.

Alcala and Ciccone (2001, 2004) explain, most empirical studies measure the impacts of trade on productivity based on the following openness measure: nominal imports plus exports relative to nominal GDP. Contrary to Rodriguez and Roderick (1999), Alcala and Ciccone (2004) argue that this measurement of openness provides misleading results about the productivity gains as a result of trade. Therefore, in their studies, they apply what they call measure of real openness. They define real openness as imports plus exports in exchange rate US\$ relative to GDP in purchasing power parity US\$. Nevertheless, according to Rodriguez and Rodrik (1999) in a situation where the tradable sector experiences productivity increases for reasons not directly related to trade, then measures of openness will show an increase even without an increase in trade. Therefore, they argue real openness measure leads to the acknowledgement of a link between trade and openness without justification. However, Lee *et al.* (2004) point out the issues that are associated with measurements of openness that are closely related to the level of income:

What most economists would consider good measures of the degree of openness of a country are, unfortunately, closely linked to the level of income. For example, measuring openness as the ratio between the sum of import plus exports to GDP clearly is a function of the growth rate of economy – both the numerator and denominator are linked to the GDP growth. What this implies is that not even the sign of the bias in the standard OLS regression can be assessed (Lee et al. 2004 p. 452).

In addition, O'Rourke (1997) argues that measuring openness based on the ratio of exports, or imports to GDP is unsatisfactory. He also thinks researchers' effort to measure a country's openness to trade have so far been unsuccessful.

In an attempt to solve the measurement and definitional problems of openness, Sachs and Warner (1995 p. 22) have developed five criteria to determine whether a country is open or closed. If one of the criteria is considered to be present in a country, then the country is deemed to be *closed*, otherwise *open*. The five criteria are:

1. Non-tariff barriers (NTBs) covering 40% or more trade.
2. Average tariff of 40% or more.
3. A black market exchange rate that is depreciated by 20% or more relative to the official exchange rate, on average, during the 1970s or 1980s.
4. A socialist economic system (as defined by Kornai).
5. A state monopoly on major exports.

The five criteria combine a wide range of trade restrictions. As a result, these criteria provide an opportunity to identify the different methods used by policymakers to close their economy to trade.

Edwards (1997) argues that Sachs and Warner's openness indicators are better than the ones that were used previously. However, he questions the classification of countries as either closed or open. Wacziarg and Welch (2003) acknowledge that it is too simplistic to classify countries into just two categories. The binomial nature of the openness categorization has attracted major criticism from a number of researchers such as James Duesenberr. In my view, this criticism is justified, because Sachs and Warner's openness indicators do not provide any information about the extent to which a country is open or closed to trade. As Stanley Fisher also pointed out: *it is odd to have both India and Hong Kong classified as open in 1995, when their degrees of openness are so different (Sachs and Warner 1995 p. 103).*

Rodriguez and Rodrik (1999) have demonstrated the openness indicators used by researchers such as (Dollar 1992; Edwards 1992; Sachs and Warner 1995) are not robust, because the indicators are either difficult as measures of trade barriers or they are strongly correlated with other explanatory variables. Dollar and Kraay (2004) agree with Rodriguez and Rodrik that measures of trade barriers are usually highly correlated with other variables that reduce growth performance. Furthermore, in her empirical study Harrison (1996) applied seven different measures of openness and found that half of her measures of openness were not robust when she included macroeconomic variables, while the other half appear to be robust. As a result, she speculates that either the openness measures are proxies for other type of changes in the economy or there is a possibility of severe multicollinearity between the variables in the right-hand side. If there is severe multicollinearity, then it may be very difficult to isolate the impact of different types of macroeconomic and trade openness measures. In addition, Vamvakidis (2002) points out that the positive relationship he found between openness and growth in his empirical study is sensitive to both the measurements of openness and other independent variables in the growth regression equations.

More recently, Berrgren and Jordahl (2005) have pointed out that there are benefits associated with applying the Area 4 Economic Freedom of the World Index (EFI). When studying the relationship between economic freedom and growth Haan and Sturm (2000) have used the average ratio of exports and imports to GDP as a proxy for openness. The studies performed by using the EFI were mainly focused on identifying the relationship between EFI and long-run economic growth, but some of the empirical studies have specifically concentrated on identifying which one of the disaggregated EFIs have positive and robust links to growth. Historically, the EFI is not widely used as proxy for openness or trade policy indicator in the trade-growth literature. However, Arnoldsson (2005) has recently compared the EFI with a wide range of trade policy indicators and he believes that the EFI may potentially assist in solving some of the measurement issues identified in trade-growth literature. His concluding remarks include that future research should explore the potential strengths EFI may have as a trade policy indicator.

According to Yanikkaya (2003), different openness measurements have different theoretical impacts on growth as well as different connection with growth. Consequently, lack of consistency in research findings is to be expected when a range of measures of openness are applied (Alcala and Ciccone 2003). Furthermore, Wacziarg and Welch (2003) argue that less complex openness measures or outward orientation indicators are too general to be able to capture all the essential aspects of trade policy. We agree, a simple openness measure will not be able to reflect the complex nature of the economic environment; however a highly complex measure of openness might make it difficult to draw definitive policy conclusions, so it is important to strike the right balance when constructing measures of openness.

CRITICAL EVALUATION OF THE LITERATURE

EMPIRICAL STUDIES

As mentioned in section 3 there is a large body of empirical work on the relationship between trade and growth. According to Rodriguez and Rodrik (1999) the papers published by Dollar in 1992 and Sachs and Warner in 1995 are two of the most widely cited empirical studies on the relationship between trade and economic growth. Accordingly, I will start my review with these two prominent empirical studies. In addition, I will also critically review the following four empirical studies: Edwards (1998); Ben-David (1998); Frankel and Romer (1999) and Dollar and Kraay (2003). My rationale for selecting these six empirical studies is: Firstly, they are widely cited in the trade-growth literature. Secondly, they have made different types of contributions to this field and have provided some new insights. Thirdly, they all apply different types of methodologies to identify the relationship between openness to trade and economic growth. As a result the literature provides a wide range of perspectives. Fourthly, these studies were published over a ten-year period, therefore this collection of literature is a good representation of the research that has been conducted in the trade-growth field over that time. Finally, these empirical studies also reveal the trends in this area of research and the current state of knowledge in this field without being superseded. The review of these empirical studies is structured in chronological order.

David Dollar (1992)

Dollar's (1992) empirical study is the most heavily cited paper in the trade-growth literature (Rodriguez and Rodrik 1999). Dollar (1992) investigated the causes of growth in 95 developing countries between 1976 and 1985, by developing two indices: i) "index of real exchange distortion; and ii) index of real exchange rate variability. These two indices have connection to "outward orientation" which he defines as:

Outward orientation generally means a combination of two factors: first, the level of protection, especially for inputs into the production process, is relatively low (resulting in a sustainable level of the real exchange rate that is favourable to exports); and second, there is relatively little variability in the real exchange rate, so the incentives are consistent over time (Dollar, 1992 p. 524).

Dollar (1992) implies that outward orientation brings about economic growth and countries that are outward oriented tend to have a stable real exchange rate and low level of trade protection. To find empirical evidence about the relationship between growth and outward orientation, he first corrects the variation in the indices, which are the result of factor endowment by regressing the price level on each country's endowments. Based on these residuals he develops a cross-country index of distortion in the real exchange rate. He then applies the Summer-Heston (1988, Mark 4.0) price levels to measure outward orientation. By regressing growth in per capita income in 95 developing countries averaged over the period of 1976-1985, he examines sources of growth based on the variables: rate of distortion, rate of variability and rate of investment.

Dollar finds that there is a significant negative correlation between growth per capita and real exchange rate distortion, after controlling for the rate of variability and rate of investment. He also finds that a higher level of exchange rate variability in a country is associated with a lower level of per capita GDP growth. He found that his outward orientations measure is strongly correlated with per capita GDP growth in the 95 developing countries he examined. As a result, he concludes that trade liberalisation and retention of an undistorted and a stable exchange rate will enable developing nations to significantly increase their economic performance. However, after investigating Dollar's (1992) distortion index, Levine and Renelt (1992) found Dollar's distortion index fragile to small changes and they suggest that:

One may want to interpret Dollar's index as a general measure of international distortions and not as a narrow measure of trade policy (P. 956).

In addition, Rodriguez and Rodrik challenge the appropriateness of Dollar's distortion index on theoretical grounds. They argue that, for distortion to be an appropriate measure of trade restriction three conditions have to be present and these conditions are highly unlikely to be present in reality. Similar to Levine & Renelt's (1992) findings, Rodriguez and Rodrik also argue that Dollar's regression results for the distortion index are not robust if one alters the growth equation. For example, when Rodriguez and Rodrik added regional dummies to the growth equation the distortion measure turned out to be statistically insignificant. Furthermore, they question the use of an exchange rate variability index. In their view, a variability index might be an indicator of the overall economic instability rather than trade restriction. Baldwin (2003) supports Rodriguez and Rodrik's arguments.

Dollar's findings are based on the volatile nature of the real exchange rate, whereas Sachs and Warner's (1995) results are based on a self-constructed index of openness. Undertaking comparative analysis of these two empirical studies is not straightforward, since the studies are looking at the relationship between openness and growth from different perspectives. In the next section, I will present Sachs and Warner's study.

Sebastian Edwards (1998)

The study conducted by Edwards (1998) is one of the best-known studies in this field. While the two empirical studies reviewed above i.e. Dollar (1992) and Sachs and Warner (1995) are focused on constructing respectively outward orientation measures and openness measurement indicators, Edwards (1998) attempts to take an alternative approach. Consequently, he focuses on investigating whether or not his econometric results are robust by using wide range of measures of openness. Edwards (1998) uses comparative data for 93 developed and developing countries to identify the link between openness and total factor productivity (TFP) growth based on nine readily available openness indexes. He regresses the nine indexes for ten-years average TFP from 1960-1990. By controlling for per capita GDP in 1965 and the average number of years' education in 1965, he shows that six of the nine indexes are statistically significant. After further investigation of the robustness of his findings, he concludes that there is a consistently significant positive relationship between openness and productivity growth. Therefore, countries that are more open seem to have faster productivity growth compared to countries that are more closed. Nevertheless, Rodriguez and Rodrik's (1999) close examination of Edwards' study reveals several weaknesses. Rodriguez and Rodrik question the reliability of Collected Taxes Ratio report of the IMF. They state:

We are puzzled by this data because many of the numbers for developing countries are implausible (p. 27).

Moreover, in order to deal with heteroskedasticity, Rodriguez and Rodrik used White's method and found that only the four openness measurement indexes out of nine provide statistical significant results that relate the growth rate to TFP. The four variables are: 1) The World Development Report Outward Orientation Index, based on subjective trade strategies. 2) The average black market premium on a country's official foreign exchange rate. 3) A subjective index of trade distortions formulated by the Heritage Foundation. 4) The ratio of taxes on imports and exports to total trade. As part of their review process, Rodriguez and Rodrik explore these four variables further. Accordingly, they recalculate one of the variables i.e. the ratio of taxes on imports and exports to total trade, based on recent data that was unavailable when Edwards performed his analysis, and they found it to be no longer statistically significant. Moreover, when they replicated Edwards' calculation of the Heritage Foundation Index based on data from the 1980s, again they found that it was no longer statistically significant. Furthermore, Rodriguez and Rodrik question the appropriateness of the Heritage Foundation Index and the World Development Index, because these two indexes are subjective measures and are therefore seriously prone to judgement bias. It is rather ironic, because Edwards (1993, 1997) himself has raised questions about the subjective nature of these two openness measurements.

In addition, Rodriguez and Rodrik criticize the use of the black-market premium in a similar way to the Sachs and Warner's study. They stress again that the black-market premium has shortcomings, because it captures a wide range of policy distortions rather than just being an indicator of trade policy. Yanikkaya (2003) has tested the impact of a black market premium in a regression analysis and his results confirm Rodriguez and Rodrik's view that the black-market premium measures a mixture of many different policy failures. On that basis he concludes, the black-market premium is neither a measure of trade policy nor of any other single policy. In addition, Levine and Renelt (1992) have argued that the black-market premium represents the interplay of a number of policies; therefore it is not easy to interpret this variable as an indicator of any one policy. Lee *et al.* (2004) make a similar point. In general, Edwards appears to have made a very good attempt to focus his attention on investigating the robustness of his econometric results rather than focusing on how appropriate the specific openness indicators are. Nevertheless, even though he claims his results are very convincing, Rodriguez and Rodrik are not convinced about his results. Consequently, their scrutiny has exposed the fragile nature of Edwards' results. This again is very ironic, because when Edwards (1993) reviewed the empirical growth studies, he criticized most of the empirical studies for presenting fragile and unconvincing results.

CONCLUSION

We have critically reviewed and evaluated the trade-growth literature with particular emphasis on six carefully selected empirical studies that were published between 1992-2003. In this survey, I have also presented and discussed the issues that are related to the various measures of openness. The impact of trade on economic growth is still one of the most researched and also a much debated topic. Even though most of the empirical studies have found a positive relationship between trade and economic growth, there are still on-going controversies around the methodologies applied and about the validity of the evidence presented in these studies. Despite the significant effort researchers have devoted to construct advanced measures of openness, so far it has been extremely difficult to construct measures of openness that are widely accepted in this field. The complexities that are associated with developing robust measures of openness, which are not prone to criticism, should not be underestimated. Openness is a function of a wide range of factors; therefore constructing the "perfect" openness measures is not an easy task. On the other hand, given the considerable efforts researchers have already devoted in constructing this particular measure, it is reasonable to predict that the quest for more advanced measures of openness will continue in the future. It is essential to remind the reader that most of the critics do not claim that openness to trade is associated with lower GDP or trade is detrimental for economic growth. However, they claim that the evidence presented in the empirical studies is not convincing, mainly due to inaccurate and sometimes even inappropriate and misleading methods. The relationship between openness and growth is not straightforward. In addition, it is important to keep in mind, although openness may be a necessary condition for growth, it

is not a sufficient condition. The determinants of economic growth still remain a complicated issue, involving technology transfer mechanisms, investments in R&D, investments in human capital, dissemination of knowledge and ideas, and many different institutional arrangements related to the organization of the economy. Therefore, in my opinion, the old question: *whether or not trade advances economic growth still remains open*, because the empirical evidence presented by researchers has not been persuasive. Nevertheless, I have no doubt that the quest for a definite answer to this question that has been raised for years will continue in the future. I suggest that such a renewed research effort should take the following issues as the point of departure: perhaps the lack of empirical support might be in part due to the ambiguous nature of the theoretical foundation regarding the relationship between trade and economic growth. Therefore, first and foremost there is a need for a better theoretical understanding of the trade-growth relationship. Moreover, future research should focus on developing new and sophisticated econometric techniques to address the questions of causality. The potential strength of EFI as a measure of openness has not yet been fully explored. Therefore, I suggest that future research should explore further this particular index in order to determine the full potential of the EFI. Last but not least, future research should help develop strategies and better instruments to analyze and correctly interpret how trade policy interacts with other macro economic and fiscal policies to advance economic growth.

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