CYRUS CHRONICLE JOURNAL (CCJ):

Contemporary Economic and Management Studies in Asia and Africa

An imprint of the CYRUS Institute of Knowledge (CIK)

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CYRUS CHRONICLE JOURNAL (CCJ):
Contemporary Economic and Management Studies in Asia and Africa

The flagship journal of the CYRUS Institute of Knowledge

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Purpose:

The CYRUS Institute of Knowledge (CIK) Journal is a refereed interdisciplinary journal. The editorial objective is to create opportunities for scholars and practitioners to share theoretical and applied knowledge. The subject fields are management sciences, economic development, sustainable growth, and related disciplines applicable to the Middle East, Central Asia (MENA) and North Africa. Being in transitional stages, these regions can greatly benefit from applied research relevant to their development. **CCJ** provides a platform for dissemination of high quality research about these regions. We welcome contributions from researchers in academia and practitioners in broadly defined areas of management sciences, economic development, and sustainable growth. The Journal's scope includes, but is not limited to, the following:

Business Development and Governance

Entrepreneurship

Ethics and Social Responsibility

International Business and Cultural Issues

International Economics

International Finance

Innovation and Development

Institutions and Development

Leadership and Cultural Characteristics

Natural Resources and Sustainable Development

Organization and Cultural Issues

Strategy and Development

Women and Business Development

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Editorial Advisory Board Members:

Professor Tagi Sagafi-nejad is the editor of **CCJ**. Dr. Sagafi-nejad is ex-editor of International Trade Journal, the author, in collaboration with John Dunning of The UN and Transnational Corporations: From Codes of Conduct to Global Compact, (2008) and "The Evolution of International Business Textbooks" (2014). He was the Radcliffe Killam Distinguished Professor of International Business, founding Director of the PhD Program in International Business, and Director and Center for the Study of Western Hemispheric Trade at Texas A&M International University (2003-2013). Dr. Sagafi-nejad is well-known internationally and has outstanding credentials to develop The Cyrus Chronicle into a high quality publication. He will be assisted by an editorial board consisting of distinguished members from world-class institutions of higher learning, practice and industry.

Submission Process:

We invite authors to submit their papers and case studies to Editor@Cyrusik.org. We will have a quick turn-around review process of less than two months. We intend to begin with two issues per year consisting of about 5-8 papers and case studies per issue. The first issue is being planned for the fall of 2015. A selected number of papers submitted to the CIK conference will be double-blind reviewed for inclusion in **THE CCJ**. We intend to have special issues on themes that are within the scope of Journal. Also, we will have invited guest issues.

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<u>**Background:**</u>

This is a historical time for the mentioned regions, and The Cyrus Chronicle intends to offer what is most urgently needed. There is no question that organizations and businesses that are capable of analyzing and applying advanced knowledge in management sciences and development are in high demand, and especially during transitional periods. It is an unusual time in the target regions and the world, a time which requires active intellectual participation and contributions. It is the era of revolution in terms of communication, technology and minds for billions of people. It is a time for intellectuals, entrepreneurs, and philanthropists to help enlighten minds and therefore enrich the quality of life for millions. It is a time to focus intensely on the regions' historical characteristics, achievements, human and natural resources, and its significant deficit in development, management sciences, and democracy. CIK's vision, "to cultivate the discourse on human capital potentials for better living," is the appropriate response to current challenges, and the journal is a platform for sharing the perspectives of scholars and practitioner with a wider audience.

CYRUS associates tend to have a foot in two worlds. First, most of the associates possess a wealth of intellectual and experiential knowledge which is enhanced by their active involvement in business, consulting and scholarly research and collegiate teaching. Second, some associates are sons and daughters of the affirmation regions and possess an ethnic identity, language skills, and the insights only embraced by insiders. Third, most of the CIK board of directors' members and associates are well-known scholars, members of editorial boards of journals, and even editors. CYRUS possesses depth, breadth, and a competitive edge to successfully manage chronicle.

CYRUS is committed to developing knowledge that positively contributes to the life of the world citizens, especially, the target regions. CIK is a charitable, educational, and scientific organization that has been in operation since 2011. It is a secular and nonpartisan organization that has many scholars and practitioner as member.

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Editor's Introduction

Welcome to the premier issue of *Cyrus Chronicle Journal (CCJ): Contemporary Economic and Management Studies in Asia and Africa.* The journal intends to cover scholarship pertaining to the two vibrant and rapidly growing continents, Asia and Africa. They tend to be either ignored or misunderstood; and there are limited outlets for scholars who work on these countries to share their scholarly outputs. Focusing on these two continents will help researchers from both developed countries as well as these two continents - which together account for the largest portion of the world population and growth. The CCJ intends to fill these gaps. An examination of our mission may shed some light on this question. The primary purpose of the journal is four-fold:

1. To share and promote knowledge of economic, management, and development issues facing countries of Asia and Africa. Focusing on assessment, evaluation, and possible solutions help advance countries in this two continent which has the largest world habitants. Development challenges are global; virtually every country faces problems concerning economic development, sustainability, food and water, population and environmental degradation. Yet no country gains by shunning opportunities that globalization can provide, with the possible exception of a few countries whose leaders lack a full understanding of the opportunities that globalization can offer. To take advantage of such opportunities, knowledge is the primary requisite. And this journal aspires to make a contribution to this body of knowledge.
2. To encourage the generation and dissemination of knowledge by local scholars whose access to mainstream academic outlets may be limited? We know many scholars from academic, public and private sector organizations whose first-hand knowledge of problems and solutions isn't being shared for lack of an appropriate outlet for dissemination. The CCJ may provide an opportunity for spreading such knowledge.
3. To focus on countries that span the northern band of Asia – from China to Turkey – to the northern tier of Africa, areas that have not previously been the subject of much attention. In the past these countries have tended to gain the attention of scholars and the media only in times of manmade or natural crises. But in fact, these nations have many challenges similar to those of others. They wrestle with shortages of food and water and the growth of population and pollution. Although they have educated their own citizens, especially in countries that had been under the shackles of dictatorship for decades, now they have become freer to express ideas in journals such as this.
4. Academic scholarship emanating from the region under the journal's coverage tend to get lost in the academic jungle where the pressure of "publish or perish" leaves behind the younger and less experienced members. This journal will give an opportunity to the scholars with first-hand knowledge of these areas to publish their research and thereby make important contributions to the management and development body of scholarship on which the journal will concentrate. We need to know more about these topics in countries such as Afghanistan, Kazakhstan and Tunisia as well as other countries covered by this journal. The CCJ will provide a platform for established as well as younger scholars who might collaborate with them in their research.

On the journal's operational side, we want to make the publication more accessible to a wide audience across the world, and so, consistent with the 21st century trend toward electronic media, we will publish this journal online. To maintain rigor and originality, articles submitted to the journal will undergo the standard blind review process. Reviewers' anonymous comments are shared with authors, as appropriate.

Submission guidelines and procedures are delineated on the journal's website http://www.cyrusik.org/research/the-cyrus-chronicle/.

As the first editor of the journal, I am pleased and proud to accept this challenge. I bring some experience; my first editorial assignment was as an undergraduate at then Pahlavi University in Shiraz, Iran, a top ranking institution in the region. A few students and I founded and published *Danesh-Pajouh* (knowledge seeker). In those days when freedom of expression was severely limited, we managed to publish one issue in March 1965 before the censors put a stop to the enterprise.

 Years later, while directing a doctoral program in international business in Texas in the early 2000s, I also was the co-editor - and eventually editor - of the *International Trade Journal* (ITJ) until my retirement in 2013. Under my leadership *ITJ* acceptance fell below 10%.

As editor of the *CCJ*, I hope to accomplish the goals of the journal elucidated above. In the premier issue, we have already reached a threshold of about 20% in acceptance. Still, *CCJ* needs your support and so I ask for your help in the following ways:

1. Contribute articles;
2. Encourage your colleagues to do the same;
3. Spread the word, especially in countries where *CCJ* can be most effective;
4. Cite the articles published in this journal in your own research when applicable;
5. Attend the annual conferences of the CIK (http://www.Cyrusik.org) that serve as a spawning ground for articles that may ultimately be published in this journal;
6. Give us your feedback by telling us how we can further promote and improve the journal?

Welcome and thank you.

Tagi Sagafi-nejad, Editor

Globalization and Economic Growth Revisited: A Bootstrap Panel Causality Test

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Abstract
This paper revisits the nature and direction of causation between globalization and economic growth in nine OECD countries and China by applying the bootstrap panel Granger causality test to the data over the period of 1981-2008. Empirical results support evidence on causality from globalization to economic growth for Netherlands and the UK; causality from economic growth to globalization in the US, neutrality for Australia, Belgium, Canada, France, Italy, and Japan. Based on the empirical results from this paper, we provide important policy implications for the OECD countries and China.

Keywords: Globalization; Economic Growth; OECD Countries; China; Bootstrap Panel Causality Test

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INTRODUCTION

Globalization has accelerated considerably since the mid-1980s. It is not only one of the most important concepts in economic development but its impact has been hotly debated and contested. Dunning (2003) wrote about "making globalization good", while Stiglitz, another prominent student of the subject, wrote about globalization and its discontents in 2002 and about making it "work" in 2006. These and other scholars would agree with Intriligator (2003) who describes it as representing one of the most influential forces in determining the future of the planet. Furthermore Akinboye (2007) regards it as one of the most dominant forces in the present day world economy. Numerous other scholars who have studied the subject, including Roderik (1997), Scudder (2010), Zhuang and Koo (2007) have noted that no nation can exist in isolation in the era of globalization. With unprecedented pace of global interdependence, increased international trade, foreign direct investment inflows and the Internet linking all countries and regions of the world, we literally live in a "global village". These, and numerous other studies, confirm that economic growth is impacted by globalization, and have provided ample evidence as well as policy recommendations. The importance of globalization in economic development has triggered scholarly

interest in examining this relationship.

Studies of the multidimensional phenomenon of globalization (and its predecessor, internationalization) have established that development can proceed under a variety of internal and external conditions. There is, nonetheless, general agreement that development is much more likely to take place under "open economy" conditions, which means, *inter alia*, exposure to the forces of globalization. Empirical results differ, depending on the country, time period, and the methodology employed. In particular, the lack of consensus on the direction of causality between globalization and economic growth provides an opportunity to analyze the nature of this connection with the help of different econometric methods.

This study revisits the globalization and economic growth nexus using the recently developed econometric techniques - bootstrap panel Granger causality - proposed by Kónya (2006) and others to test the causal relationship between the two. We use the panel data from nine OECD countries and China over the period 1981-2008.[13] We contribute to the literature by using this causality analysis to provide new information regarding the importance of the choice of statistical techniques in analyzing the direction of causality. The empirical results show significant

[13] The reason that we incorporate China with the nine OECD countries in our study is that China has made remarkable economic progress over the past two decades. China's average annual economic growth rate over the past two decades (1990-2010) was about 9.818%. In 2011, per capita GDP in China was US$ 8.800 (PPP-adjusted). Second, China has become the world's first largest trading countries with the foreign exchange reserves estimated at US$ 3.18 trillion at the end of 2011. Third, China does not epitomize the typical open economy; indeed economic growth has taken place despite the relative closeness of the economy.

causal relation only in three countries, (i) one-way Granger causality from globalization to economic growth in Netherlands and the UK, and (ii) one-way Granger causality from economic growth to globalization in the US. Interestingly, we do not find significant causal relation between globalization and economic growth in the case of China.

The novelty of this study is three-fold. First, in detecting the existence of causality, we rely upon the recently developed panel causality method – the so-called bootstrap panel test. This test accounts for cross-sectional dependency and heterogeneity across countries and is not sensitive to co-integration among and unit root properties of the variables involved. Panel data methods produce reliable and statistically powerful method in contrast to time series analysis because panel data combines information from cross-section as well as time dimensions, and is thus both synchronic and diachronic. Second, we test for cross-sectional dependency among countries by drawing upon the most recent advances in panel data econometrics. In the increasingly interdependent world, countries are highly integrated; a shock in one country– such as the 2008 turbulence - is easily transmitted to others through international economic interrelationships and enhanced contagion. Finally, we take into consideration heterogeneity across the countries rather than testing causality assuming homogeneity for the entire panel. As stated by Granger (2003), "investigating causality for the whole panel is the null hypothesis". Furthermore, the homogeneity assumption for estimated parameters in panel data in the past cannot capture country-specific characteristics.

The paper is organized as follows. Section 2 explains the hypothesis and reviews the literature on the globalization and economic growth relationship. Section 3 describes the data. Section 4 outlines the econometric methodology. Section 5 presents our empirical results and discusses some economic and policy implications of the empirical findings. Section 6 contains our

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overall conclusions and suggests areas for further research.

HYPOTHESES AND LITERATURE

To gauge the relation between globalization and economic growth, we propose four hypotheses. The first is one-way Granger causality running from globalization to economic growth, which we refer to as the *"globalization-led growth hypothesis".* Globalization has entailed an increase in trade between countries, exporting and importing have accelerated. Since World War II, the average annual rate of growth of world trade has nearly consistently exceeded the rate of growth of the world economy. The globalization process has made it possible for countries to sell goods and services across the globe and purchase needed goods and commodities from others. One sign of globalization is integration of markets and production across countries. By reducing or eradicating barriers and integrating economies, globalization stimulates. Numerous scholars have provided evidence that shows globalization has a positive effect on economic fundamentals. The rich literature includes Blomstromet et al. (1992); Dollar (1992); Borensztein et al. (1998); Greenaway et al. (1999); Chanda (2001); Dollar and Kraay (2001);Dunning (2003);Stiglitz (2003); Dollar (2004); Lumbila (2005); Sylwester (2005).

The second hypothesis is *"growth-led globalization",* i.e., one-way Granger causality running from economic growth to globalization. As economic growth accelerates, a country will attract become more attractive to foreign capital and foreign workers who seek better opportunities. (UNCTAD, *World Investment Report*, various issues). A country's absorptive capacity will enable it to attract and take better advantages of investments – domestic and foreign. This also entails acceleration in cross-border transfer of knowledge, expertise and labor. More opportunities are made available for the exchange of various goods and services. This only accelerates the pace of the country's globalization. It is a widely held view, supported by empirical evidence, that globalization increases foreign direct investment flows among nations. See UNCTAD, (2011 and prior issues), Islam, (1999); and Aninat, (2002).

The third hypothesis is a two-way Granger causal relationship between globalization and economic growth, which we call the *"feedback hypothesis".* Economic growth leads a country to further globalize, which in turn stimulates economic growth, and vice versa. Thus globalization and economic growth are mutually reinforcing.

The fourth hypothesis stipulates that there is no relationship between globalization and economic growth, thus the *"neutrality hypothesis".* Rodrik (1998) and Alesina et al. (1994) found no effect of capital account openness, one of the indicators of globalization, on economic growth. Similarly, Carkovic and Levine (2002) found no robust influence of foreign direct investment on growth. This indicates that the major competitions of a country come from its own human, natural and other unique resources. Economic development literature has long established these internal and immutable sources of economic growth and essential ingredients. See pioneering development theorists Dennison (1967) and Simon Kuznets (1968, 1973). Sources of economic growth reside primarily within each country's economic, financial, cultural, political and human resources, according to these and similarly established development paradigms.

With respect to the recent empirical evidence, Dreher (2006) uses panel data for 123 countries in the period 1970-2000 to analyze whether the overall index of globalization as well as sub-indexes constructed to measure single dimensions affect economic growth. Results show that globalization indeed promotes growth. Until recently, however, most studies have used a cross-section approach. These include Blomstromet et al. (1992), Dollar (1992), Alesina et al. (1994), Rodrik (1998), Chanda, (2001) and Garrett (2001). All of these studies present, however, only cross-sectional estimates. Moreover, they do not adequately control for endogeneity. Their results might therefore reflect unobserved characteristics

which do not vary over time instead of being the consequences of globalization; or they might indicate reverse causality. Aware of the shortcomings of the cross-section approach, some recent studies use panel data to examine the relationship between some dimensions of globalization and growth (Borensztein et al., 1998; Greenaway et al., 1999; Dollar and Kraay, 2001; Carkovic and Levine, 2002).

More importantly, most past studies have either utilized the ordinary least squares (OLS) method or the traditional panel technique (Alesina et al., 2000) in investigating the causal relationship between the two series, but these procedures do not distinguish between the long-run equilibrium, as well as the long-run and short-run causalities between the variables. We believe that traditional studies regarding the relationship between growth and globalization require a revision. Chang and Lee (2010) empirically re-examine the co-movement and the causal relationship among economic growth, the overall globalization index, and its three main dimensions: economic, social, and political integrations, using panel data for 23 OECD countries for 1970 to 2006. They find out that all variables move together in the long run when the political variable is taken into account in their testing model. The results of the panel causality test indicate that, although the evidence of short-run causality is very weak, it does show long-run unidirectional causality running from the overall index of globalization, economic globalization, and social globalization to growth.

DATA

The annual data used in this study cover the period 1981-2008 for nine OECD countries (Australia, Belgium, Canada, France, Italy, Japan, Netherland, the UK, and the US) and China. Variables include overall globalization index and real GDP (RGDP). We we use Dreher (2006) globalization (KOF) index. This index divides globalization in three dimensions: economic, social, and political integration. We focus on the overall index, which is made up of economic

globalization (36%), social globalization (38%), and political globalization (26%). See http://globalization.kof.ethz.ch/[14] Real GDP measured in constant 2005 U.S. dollars comes from the *World Development Indicators* data base (WDI, 2009). Belgium has the highest mean index at 87.71, while China has the lowest (43.27). The US has the highest real GDP at $9,374.85 billion, and Belgium has the lowest ($306.55 billion) mean. See tables 1 and 2 for the summary statistics.

METHODOLOGY
Bootstrap Panel Granger Causality Test

Granger causality, a concept coined by Nobel Prize winner Clive Granger, is a test for determining whether one time series can be used to predict the value of another interrelated series. Since panel data method provides more information and reliable statistical results compared to time series methods, this paper applies the bootstrap panel causality method recently proposed by Kónya (2006) to determine the nature of causal linkages between insurance activities and economic growth. Kónya argues that the bootstrap panel causality method is robust to unit root and cointegration properties of variables, implying that the testing procedure does not require any pre-testing for unit root and

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[14] Kacowicz (1999) claims that globalization means many different things for different people with an intensification of economic, political, social, and cultural relations across borders. Park (2003) also notices that on the basis of multi-layer perspectives of globalization, a large body of research is identified that globalization is constructed out of complex interactions among social, political, and economic processes together with materiality. This multi-scalar viewpoint shows that globalization is not only a process of economy, but is also constituted by the activities of society and politics. Therefore, we use the overall Globalization index in our study to test the causal link between globalization and economic growth. Details about how to construct the index see Dreher (2006).

cointegration. Variables are used in their level forms irrespective of time series properties. This feature of the bootstrap panel causality arises from generating country-specific critical values from the bootstrapping method and so the variables in the system do not need to be stationary. This in turn implies that the variables are used in level form irrespectively of their unit root and cointegration properties (Kónya, 2006).[15] It is important to note here that using the level of variable directly in empirical analysis may play a crucial role in determining causal linkages, since differencing variables to make them be stationary (i.e., using difference form of variables) may lead to a loss of trend dynamics of series .

The bootstrap panel causality approach of Kónya entails first estimating the system described by means seemingly unrelated regression (SUR) to impose zero restrictions for causality by the Wald principle, followed by generating bootstrap critical values. Note that since country-specific Wald tests with the country-specific bootstrap critical values are used in this panel causality method, it does not require the joint hypothesis for all countries in the panel. The system for panel causality analysis includes two sets of equations that can be written as follows:

$$y_{1,t} = \alpha_{1,1} + \sum_{i=1}^{ly_1} \beta_{1,1,i} y_{1,t-i} + \sum_{i=1}^{lx_1} \delta_{1,1,i} x_{1,t-i} + \varepsilon_{1,1,t}$$

$$y_{2,t} = \alpha_{1,2} + \sum_{i=1}^{ly_1} \beta_{1,2,i} y_{2,t-i} + \sum_{i=1}^{lx_1} \delta_{1,2,i} x_{2,t-i} + \varepsilon_{1,2,t}$$

$$\vdots$$

$$y_{N,t} = \alpha_{1,N} + \sum_{i=1}^{ly_1} \beta_{1,N,i} y_{N,t-i} + \sum_{i=1}^{lx_1} \delta_{1,N,i} x_{N,t-i} + \varepsilon_{1,N,t}$$

$$(1)$$

and

$$x_{1,t} = \alpha_{2,1} + \sum_{i=1}^{ly_2} \beta_{2,1,i} y_{1,t-i} + \sum_{i=1}^{lx_2} \delta_{2,1,i} x_{1,t-i} + \varepsilon_{2,1,t}$$

$$x_{2,t} = \alpha_{2,2} + \sum_{i=1}^{ly_2} \beta_{2,2,i} y_{2,t-i} + \sum_{i=1}^{lx_2} \delta_{2,2,i} x_{2,t-i} + \varepsilon_{2,2,t}$$

$$\vdots$$

$$x_{N,t} = \alpha_{2,N} + \sum_{i=1}^{ly_2} \beta_{2,N,i} y_{N,t-i} + \sum_{i=1}^{lx_2} \delta_{2,N,i} x_{N,t-i} + \varepsilon_{2,N,t}$$

$$(2)$$

where y denotes the real income, x refers to the indicator of globalization, N is the number of the members of panel $(j=1,…,N)$, t is the time period $(t=1,…,T)$, l is the lag length. In this system definition, each equation has different predetermined variables while the error terms might be cross-sectionally correlated and hence these sets of equations are the SUR system. To test for Granger causality in this system, alternative causal relations for a country are likely to be found: (i) there is one-way Granger causality from X to Y if not all $\delta_{1,i}$ are zero, but all $\beta_{2,i}$ are zero; (ii) There is one-way Granger causality from Y to X if all $\delta_{1,i}$ are zero, but not all $\beta_{2,i}$ are zero; (iii) There is two-way Granger causality between X and Y if neither $\delta_{1,i}$ nor $\beta_{2,i}$ are zero; and (iv) There is no Granger causality between X and Y if all $\delta_{1,i}$ and $\beta_{2,i}$ are zero.

Before proceeding to estimation, the issue to be considered is to determine optimal lag lengths.[16] Since the results from the causality test

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[15] We refer to Kónya (2006) for the details of bootstrapping method on how to generate country—specific critical values.

[16] As indicated by Kónya (2006), this is a crucial step because the causality test results may depend critically on the lag structure. In general, too few or too many lags may cause problems. Too few lags mean that some important variables are omitted from the model and this specification error will usually cause bias in the retained regression coefficients, leading to incorrect conclusions. On the other hand, too many lags waste observations and this specification error will usually increase the standard errors of the estimated

may be sensitive to the lag structure, determining the optimal lag length(s) is crucial for robustness of findings. For large panels, varying lag structure for both equations and variables would cause to substantial computational burden. Following Kónya (2006), maximal lags are allowed to differ across variables, but to be the same across equations. The system is estimated for each possible pair of ly_1, lx_1, ly_2, and lx_2 respectively by assuming from *1* to *4* lags and then choose the combinations which minimize the Schwarz Bayesian Criterion.[17]

Cross-Sectional Dependence Tests

One important assumption in the bootstrap panel causality is the existence of cross-sectional dependency among the countries in the panel. In the case of cross-sectionally correlated errors, estimating the system described with the SUR estimator is more efficient than the ordinary least squares estimator (OLS) since the country-by-country OLS estimator is not able take into account cross-sectional dependency. Thereby, testing cross-sectional dependency is crucial for the estimator selection and hence panel causality results.

To test for cross-sectional dependency, the Lagrange multiplier (LM) test of Breusch and Pagan (1980) is one of the familiar tests. The null hypothesis of no cross-section dependence- $H_0 : Cov(u_{it}, u_{jt}) = 0$ for all *t and* $i \neq j$ - is tested against the alternative hypothesis of cross-section dependence $H_1 : Cov(u_{it}, u_{jt}) \neq 0$, for at least one pair of $i \neq j$. In order to test the null hypothesis, Breusch and Pagan (1980) developed the LM test as:

$$LM = T \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{ij}^2 \qquad (3)$$

where $\hat{\rho}_{ij}$ is the sample estimate of the pair-wise correlation of the residuals from Ordinary Least Squares (OLS) estimation of equation (1) for each *i*. Under the null hypothesis, the *LM* statistic has asymptotic chi-square with $N(N-1)/2$ degrees of freedom. It is important to note that the LM test is valid for N relatively small and T sufficiently large. For the large panels where $T \to \infty$ first and then $N \to \infty$, Pesaran (2004) proposed the scaled version of the *LM* test as follows:

$$CD_{lm} = \left(\frac{1}{N(N-1)} \right)^{1/2} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} (T\hat{\rho}_{ij}^2 - 1) \qquad (4)$$

Under the null hypothesis with, the CD_{lm} test converges to the standard normal distribution. The CD_{lm} test subjects to substantial size distortions when *N* large and *T* small. Pesaran developed a more general cross-sectional dependency tests that is valid for the panels where T→∞ and N→∞ in any order. The so-called CD test is as follows:

$$CD = \sqrt{\left(\frac{2T}{N(N-1)} \right)} \left(\sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{ij} \right)$$

$$(5)$$

Under the null hypothesis, the CD test has asymptotic standard normal distribution. Pesaran indicates that the *CD* test has exactly mean zero for fixed T and N and is robust to heterogeneous dynamic models including multiple breaks in slope coefficients and/or error variances, so as long as the unconditional means of y_{it} and x_{it} are time-invariant and their innovations have symmetric distributions. However, the *CD* test will lack power in certain situations in which the population average pair-wise correlations are zero, but the underlying individual population pair-wise correlations are non-zero (Pesaran et al., 2008, p.106). Pesaran et al. (2008) proposes a bias-

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coefficients, making the results less precise.

[17] In order to save space, results from the lag selection procedure are not reported here but available upon request.

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adjusted test which is a modified version of the LM test by using the exact mean and variance of the LM statistic. The bias-adjusted LM test is:

$$LM_{adj} = \sqrt{\left(\frac{2T}{N(N-1)}\right)} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{ij} \frac{(T-k)\hat{\rho}_{ij}^2 - \mu_{Tij}}{\sqrt{v_{Tij}^2}}$$

(6)

where μ_{Tij} and v_{Tij}^2 are respectively the exact mean and variance of $(T-k)\hat{\rho}_{ij}^2$, that are provided in Pesaran et al. (2008, p.108). Under the null hypothesis with first T→∞ and then N→∞, the LM_{adj} test is asymptotically distributed as standard normal.

Slope homogeneity tests

Another important point in the bootstrap panel causality approach is cross-country heterogeneity. Therefore, one needs to determine whether slope coefficients are homogeneous. In order to test the null hypothesis of slope homogeneity against the alternative hypothesis, one familiar approach is to apply the Wald principle. This principle is valid for cases where a) the cross-section dimension (N) is relatively small; b) the time dimension (T) of the panel is large; c) the explanatory variables are strictly exogenous; and d) the error variances are homoscedastic. Swamy (1970) developed the slope homogeneity test that allows for cross-section heteroscedasticity (Pesaran and Yamagata, 2008). However, the Wald and Swamy tests are applicable for panel data models where *N* is small relative to *T*. Pesaran and Yamagata (2008) proposed a standardized version of Swamy's test (the so-called $\tilde{\Delta}$ test) for testing slope homogeneity in large panels. The $\tilde{\Delta}$ test is valid as $(N,T) \to \infty$ without any restrictions on the relative expansion rates of N and T when the error terms are normally distributed. In the $\tilde{\Delta}$ test approach, the first step is to compute the following modified version of the Wald-Swamy test:

$$\tilde{S} = \sum_{i=1}^{N} \left(\hat{\beta}_i - \tilde{\beta}_{WFE}\right)' \frac{x_i' M_\tau x_i}{\tilde{\sigma}_i^2} \left(\hat{\beta}_i - \tilde{\beta}_{WFE}\right)$$

(7)

where $\hat{\beta}_i$ is the pooled OLS and $\tilde{\beta}_{WFE}$ is the weighted fixed effect pooled estimation of the regression model $y_{it} = \alpha_i + \beta_i' x_{it} + \varepsilon_{it}$; M_τ is an identity matrix, the $\tilde{\sigma}_i^2$ is the estimator of σ_i^2.[18] The standardized dispersion statistic is then defined as:

$$\tilde{\Delta} = \sqrt{N}\left(\frac{N^{-1}\tilde{S} - k}{\sqrt{2k}}\right)$$

(8)

Under the null hypothesis with the condition of $(N,T) \to \infty$ so long as $\sqrt{N}/T \to \infty$ and the error terms are normally distributed, the $\tilde{\Delta}$ test has asymptotic standard normal distribution. The small sample properties of $\tilde{\Delta}$ test can be improved under the normally distributed errors by using the following bias adjusted version:

$$\tilde{\Delta}_{adj} = \sqrt{N}\left(\frac{N^{-1}\tilde{S} - E(\tilde{z}_{it})}{\sqrt{\text{var}(\tilde{z}_{it})}}\right)$$

(9)

where the mean $E(\tilde{z}_{it}) = k$ and the variance $\text{var}(\tilde{z}_{it}) = 2k(T-k-1)/T + 1$.

EMPIRICAL RESULTS, ECONOMIC, AND POLICY IMPLICATIONS

As outlined earlier, testing for the cross-sectional dependence and slope homogeneity in the bootstrap panel causality analysis is crucial for selecting the appropriate estimator and for imposing restriction for causality. Taking into account cross-sectional dependency in empirical analysis is important where countries are integrated and have a high degree of economic globalization. Thus, our empirical study starts

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[18] In order to save space, we refer to Pesaran and Yamagata (2008) for the details of Swamy's test and the estimators describe in equation (7).

with examining the existence of cross-sectional dependency and heterogeneity across the countries concerned. To investigate the existence of cross-sectional dependence, we carried out four different tests (CD_{BP}, CD_{lm}, CD, and LM_{adj}) and reported the results in Table 3. It is clear that the "no cross-sectional dependence" hypothesis is rejected at the conventional levels of significance, implying that the SUR method is appropriate, rather than country-by-country OLS estimation assumed in the bootstrap panel causality approach. This finding implies that a shock occurred in one of these nine OECD countries and/or China seems to be transmitted to other countries.[19]

Table 3 also reports the results of the Pesaran and Yamagata (2008) slope homogeneity tests. Both tests reject the null hypothesis of the slope homogeneity hypothesis, and support the country-specific heterogeneity. The rejection of slope homogeneity implies that the panel causality analysis results in misleading inferences by imposing homogeneity restriction on the variable of interest. Hence, direction of causal linkages between globalization and economic growth may differ across the selected countries.

The existence of the cross-sectional dependency and the heterogeneity across OECD countries and China provides supporting evidence for the suitability of the bootstrap panel causality approach. The results from the bootstrap panel Granger causality analysis[20] are reported in Tables 4-5. These results show one-way Granger causality running from globalization to economic growth for Netherland and the UK. The remaining eight countries show no relation between globalization and economic growth. As for the direction of causality between economic growth and globalization, we find one-way Granger causality running from economic growth to globalization for the US only and independence between economic growth and globalization for the rest of the nine countries. Our empirical evidence suggests that globalization is materially associated with economic growth only for two countries, i.e., Netherland and the UK. In sum, our results show that the globalization-growth nexus varies across countries with different conditions.

Several interesting things are to be gleaned from these results. First, we found one-way Granger causality running from economic growth to globalization only in the case of the US. This further explains why the US is still the dominating country with respect to the globalization process. Second, regarding the direction of causality from globalization to economic growth, we find one-way Granger causality running from globalization to economic growth only in the case of the Netherland and the UK, but not in the rest of the eight countries. These results indicate a strong mutual relationship between globalization and economic development in both Netherland and the UK; the higher the degree of globalization, the higher the economic growth. But this does not seem to hold in the other eight countries. We suspect some other factors may affect the economic growth of these countries. These could be akin to the so-called "Kuznets Curve".[21] Our results are consistent with

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[19] The cross-sectional dependency further implies that examining causal linkages between insurance activity and economic growth in these nine OECD countries and China requires taking this information in estimations of causality regressions into account. In the presence of cross-sectional dependency, the SUR approach is more efficient than the country-by-country ordinary least-squares (OLS) method (Zellner, 1962). Therefore, the causality results obtained from the SUR estimator developed by Zellner (1962) will be more reliable than those obtained from the country-specific OLS estimations.

[20] See Kónya (2006) for the bootstrap procedure and how the country specific critical values are generated.
[21] The so-called Kuznets Curve, named after Simon Kuznets, an early Nobel Prize-winner, argued that, income equality worsens before it gets better as a

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these expectations. Third, we found that the neutrality hypothesis holds for China. This indeed comes as a surprise because China has experienced significant economic growth in the past few decades. China's average annual economic growth rate over the past two decades (1990-2010) has been over 9%. We would expect at least a one-way or feedback to exist between globalization and economic growth in China. In fact, a study by Chang (2002), using 1987-1999 data, shows that a feedback effect does exist between the degree of openness and economic growth in China. Our results are not consistent with this expectation. One plausible explanation of the neutrality (no relationship) is that the overall globalization index is made up of economic (36%), social (38%), and political globalization (24%) and China has the lowest mean overall globalization index of 43.27, compared to the other nine OECD countries.[22] In fact, Chang and Lee (2010) point out that, if globalization is viewed only from the economic aspect, earlier empirical evidence seems ambiguous. For instance, using cross-country growth regressions estimated for the period 1920-1990, Vamvakidis (2002) finds that the positive correlation between openness and growth is only a recent phenomenon. Some point to strong positive impact of trade openness on growth, while others, such as Rodrik (1997) and Scudder (2010) see only minor or mixed effects. As noted before, globalization is a complex process with cultural,

country's economy develops. He might have also added "and further globalized". See Kuznets (1968 and 1973). The association between the two factors changes in the course of economic development. We leave further exploration of this curve and its applicability to the tests presented in this article to a future occasion.

[22] We would expect economic globalization will affect economic growth in China. Future study will be in this direction to test the causal relation between these three components and economic growth for the 10 countries.

economic, political, social, and technological dimensions (Held et al., 2000). Wade (2009) argues that the political economy of policy reforms play an important role in global imbalances and re-organizations. And Harrison (1996) and Rodríguez and Rodrik (2001) cast doubt on the statement that growth only benefits from openness.

Based on the results from the panel causality analysis, it is reasonable to conclude that the nature of the causality between globalization and economic growth in Australia, Belgium, Canada, France, Italy, Japan, and China is generally consistent with the neutrality hypothesis. Accordingly, one policy implication for these countries is that policies aimed at enhancing globalization do not exert an adverse impact economic growth and that globalization may not be affected by economic performance. One can attribute the neutrality between globalization and economic growth to a relatively small contribution of globalization to overall output under certain circumstances. In some cases, globalization may have little or no impact on economic growth. Our results seem to contrast with those found in Chang and Lee (2010), whose findings support the arguments that globalization is one of the most powerful weapons for stimulating economic growth, in particular, in OECD economies (Saich, 2000; Dreher, 2006; Mishkin, 2009).

We conclude by arguing that a one-size-fits-all strategy, with respect to either globalization or economic development, is not optimal for all countries, including the OECD countries we have studied. In the broad scheme of things, the choice between the market and government is a false one because neither can ever be perfect, and thus the Wade (1990) advice, to wit, "governing the market", is indeed the balanced approach. The overall relationship is neither linear nor homogeneous across time and space. Indeed history demonstrates cases where nations have failed, and scholars such as Rostow (1970) has provided penetrating analyses concerning the rise and fall of countries. Others,

including Acemoglu and Robinson (2012) have highlighted the pivotal role of institutions. The state and the market are complements rather than substitutes. More importantly, the relationship between the state and the market cannot be defined once-and-for-all in any dogmatic manner but evolve over time in an adaptive manner as circumstances change (Nayyar, 2006). In the end, although market openness and therefore globalization matters, good policy matters more. As Fischer (2001) and Dunning (2003) and Stiglitz (2003) have noted, if the process is inevitable, the question then is not whether to globalize or not but rather how best to take advantage of the opportunities afforded by globalization while minimizing its adverse effects. While the opportunities for growth provided by global integration could be substantial, they are not guaranteed

CONCLUSIONS

This study applies bootstrap panel Granger causality to test the causal relationship between globalization and economic growth using data from nine OECD countries and China over the 1981-2008 period. Regarding the globalization-growth nexus, our empirical results demonstrate one-way Granger causality running from globalization to economic growth, but only for Netherland and the UK. This is not the case for the remaining seven countries (i.e., Australia, Belgium, Canada, China, France, Italy, and Japan). As to the growth- globalization nexus, we find one-way Granger causality running from economic growth to globalization, but only for the US. This further explains that the US is still the dominating country in the globalization era. Our bootstrap panel Granger causality analysis provides support for the growth hypothesis for only Netherland and the UK. Results support the neutrality hypothesis for other seven countries (i.e., Australia, Belgium, Canada, China, France, Italy, and Japan). Our results have important policy implication for the ten countries we have examined (nine OECD countries and China). In this study, we have used the composite index,

comprised of economic (36%), social (38%), and political globalization (24%). Further studies could focus on the causal relation between each of these three components and economic growth.

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Table 1. Summary Statistics of Globalization Index

	Mean	Max.	Min.	Std. Dev.	Skew.	Kurt.	J.-B.
Australia	83.89	92.26	73.61	6.95	-0.16	1.43	2.98
Belgium	87.71	92.78	77.58	5.03	-0.67	2.11	3.04
Canada	83.71	88.76	79.34	3.46	-0.02	1.33	3.27
China	43.27	61.65	23.87	13.99	-0.09	1.47	2.76
France	80.38	88.03	68.45	6.13	-0.35	1.84	2.17
Italy	70.32	81.48	54.19	10.14	-0.37	1.58	2.98
Japan	56.67	70.81	45.49	8.16	0.12	1.69	2.07
Netherland	87.44	92.04	82.58	3.54	-0.09	1.39	3.05
UK	74.49	83.09	68.89	4.95	-0.46	1.78	2.73
US	75.79	81.21	66.16	4.67	-0.88	2.63	3.80

Note: 1. The sample period is from 1981 to 2008.

Table 2. Summary Statistics of Real GDP

	Mean	Max.	Min.	Std. Dev.	Skew.	Kurt.	J.-B.
Australia	604.83	1201.29	384.72	187.45	1.66	5.47	20.01***
Belgium	306.55	550.76	161.01	87.61	0.71	3.72	2.91
Canada	729.29	1328.61	511.62	208.39	1.31	3.96	8.99**
China	1161.75	3130.69	658.61	604.50	1.89	5.91	26.59***
France	1628.00	2831.21	875.43	439.67	0.63	3.60	2.25
Italy	1233.97	2003.72	684.63	301.00	0.29	3.18	0.44
Japan	3576.93	5640.00	1248.00	133.06	-0.53	2.05	2.37
Netherland	588.04	1069.93	371.23	185.00	1.35	3.89	9.48***
UK	1719.39	2908.93	1015.59	517.13	0.86	2.96	3.48
US	9374.85	13206.38	5865.93	2365.88	0.18	1.74	2.01

Note: 1. The sample period is from 1981 to 2008.
2. ** and *** indicate significance at the 0.05 and 0.01 levels, respectively.

Table 3. Cross-sectional Dependence and Homogeneous Tests

Test	Statistic
LM	276.141***
CD_{LM}	28.301***
CD	13.978***
LM_{adj}	55.628***
$\tilde{\Delta}$	23.154***
$\tilde{\Delta}_{adj}$	5.239***

Note: 1. *** indicates significance at the 0.01 level.

Table 4. Causality from globalization to economic growth

	Wald Statistics	Bootstrap Critical Value		
		10%	5%	1%
Australia	4.8411	5.7816	8.5843	15.7172
Belgium	3.2820	5.8622	8.4553	16.4531
China	2.0284	5.6418	8.1155	15.0025
Canada	4.1124	6.0625	8.5954	15.4994
France	1.6139	5.3982	8.0412	14.6628
Italy	1.0668	5.6665	8.1984	14.9764
Japan	1.5936	6.3606	9.3566	17.1660
Netherland	12.1679**	5.8666	8.7702	17.5820
United Kingdom	13.4621**	5.3877	7.8499	14.9809
United States	0.4879	5.1813	8.0031	15.2699

Note: 1. ** indicates significance at the 0.05.
　　　2. Bootstrap critical values are obtained from 10,000 replications.

Table 5. Causality from economic growth to globalization

	Wald Statistics	Bootstrap Critical Value		
		10%	5%	1%
Australia	0.1104	5.7816	8.5843	15.7172
Belgium	0.1034	5.8622	8.4553	16.4531
China	0.4489	5.3136	8.1155	15.0025
Canada	2.6112	6.0625	8.5854	15.4994
France	3.2117	5.3982	8.0412	14.6628
Italy	2.9891	5.6665	8.1984	14.9764
Japan	4.5209	6.3606	9.3566	17.1650
Netherland	0.1168	5.8666	8.7702	17.5820
United Kingdom	0.4083	5.3877	7.8498	14.9809
United States	6.8206*	5.4995	8.0031	15.2699

Note: 1.* indicates significance at the 0.1 level.
      2. Bootstrap critical values are obtained from 10,000 replications.