มหาวิทยาลัยรังสิต
RANGSIT UNIVERSITY

งานวิจัยฉบับสมบูรณ์

โครงการวิจัย

ความเสี่ยงและความยั่งยืนของระบบเศรษฐกิจที่พึ่งพาการค้าระหว่างประเทศ

RISK AND SUSTAINABILITY OF TRADE DEPENDENT ECONOMY

โดย

ผศ.ดร. วรรณกิตติ์ วรรณศิลป์

สนับสนุนโดย

สถาบันวิจัย มหาวิทยาลัยรังสิต

2565

ชื่อเรื่อง: ความเสี่ยงและความยั่งยืนของระบบเศรษฐกิจที่พึ่งพาการค้าระหว่างประเทศ.....

ผู้วิจัย: ผศ.ดร.วรรณกิตติ์ วรรณศิลป์..... **สถาบัน/คณะ**: เศรษฐศาสตร์.....

ปีที่พิมพ์: ...2566..... **สถานที่พิมพ์**: มหาวิทยาลัยรังสิต

แหล่งที่เก็บรายงานวิจัยฉบับสมบูรณ์: มหาวิทยาลัยรังสิต **จำนวนหน้างานวิจัย**: ...80... หน้า

คำสำคัญ: การเปิดประเทศ อัตราการเจริญเติบโตของผลิตภัณฑ์มวลรวม ประเทศไทย แบบจำลอง ARDL

ลิขสิทธิ์: มหาวิทยาลัยรังสิต

บทคัดย่อ

งานวิจัยนี้ ภายใต้ชื่อเรื่อง “ความเสี่ยงและความยั่งยืนของระบบเศรษฐกิจที่พึ่งพาการค้าระหว่างประเทศ” มีจุดมุ่งหมายในการค้นหาผลกระทบของอัตราการเปิดการค้าระหว่างประเทศต่ออัตราการเจริญเติบโตของผลิตภัณฑ์มวลรวม อัตราการเปิดการค้าระหว่างประเทศคือสัดส่วนระหว่างผลรวมของมูลค่าส่งออกและนำเข้า ต่อมูลค่าของผลิตภัณฑ์มวลรวม ผู้วิจัยมีความประสงค์ที่จะทดสอบว่าการขยายตัวของอัตราการเปิดประเทศ มีผลกระทบเป็นเชิงบวกหรือหรือเชิงลบหรือไม่มีผลใดๆ ต่ออัตราการเจริญเติบโตของผลิตภัณฑ์มวลรวม

ข้อมูลทางสถิติแสดงให้เห็นว่า ประเทศในกลุ่มเอเชียตะวันออก มีอัตราการเจริญเติบโตของผลิตภัณฑ์มวลรวมที่ค่อนข้างสูง อันเป็นผลจากการขยายอัตราการเปิดการค้าระหว่างประเทศ ในช่วงทศวัตรที่ 1990 อย่างไรก็ดี ในช่วงทศวัตรที่ 2000 จนถึงปัจจุบัน ประเทศเหล่านี้ได้ประสบปัญหาอัตราการเจริญเติบโตทางเศรษฐกิจที่ชะลอตัวลง ทั้งๆที่การขยายตัวทางการค้าระหว่างประเทศยังคงดำเนินไปอย่างต่อเนื่อง

จากข้อมูลเชิงประจักษ์ดังกล่าว ทำให้ผู้วิจัยคาดการณ์ในเบื้องต้นว่าอัตราการเปิดประเทศน่าจะมีผลต่ออัตราการเจริญเติบโตของผลิตภัณฑ์มวลรวมในลักษณะที่ไม่เป็นเชิงเส้น โดยเฉพาะคือ ได้

ตั้งสมมติฐานว่า อัตราการเปิดประเทศจะมีผลเชิงบวกต่ออัตราการเจริญเติบโตของผลิตภัณฑ์มวลรวมในช่วงแรกของการเปิดประเทศ ทั้งนี้ ประโยชน์จากการเปิดการค้าระหว่างประเทศที่เป็นปัจจัยกระตุ้นอัตราการเจริญเติบโตคือความเชี่ยวชาญในการผลิตและการโอนทางเทคโนโลยี อย่างไรก็ดี หากการเปิดประเทศยังขยายตัวต่อไปโดยไม่มีกำหนด ผลของการเปิดประเทศต่ออัตราการเจริญเติบโตทางเศรษฐกิจจะกลับเป็นเชิงลบ ด้วยเหตุผลที่อธิบายได้ด้วยทฤษฎีเศรษฐศาสตร์จุลภาคซึ่งกล่าวว่า ผลตอบแทนจากปัจจัยการผลิตจะลดลง เมื่อปริมาณการผลิตเพิ่มมากขึ้น

ในการทดสอบสมมติฐานที่ว่าผลของอัตราการเปิดประเทศต่ออัตราการเจริญเติบโตของผลิตภัณฑ์มวลรวมมีลักษณะไม่เป็นเชิงเส้น ผู้วิจัยได้ใช้แบบจำลอง Auto-regressive Distributed Lags (ARDL) เพื่อประมาณการสมการดุลยภาพระยะยาวและการปรับตัวระยะสั้น โดยมีตัวแปรมหภาคที่เกี่ยวข้องในการกำหนดดุลยภาพได้แก่ อัตราการเจริญเติบโตของผลิตภัณฑ์มวลรวม การลงทุนของภาคเอกชน สินเชื่อธนาคารพาณิชย์ ปริมาณเงินตามความหมายกว้าง และอัตราการเปิดการค้าระหว่างประเทศ ในการนี้ ผู้วิจัยได้เลือกประเทศไทยเป็นกรณีศึกษา ข้อมูลที่เกี่ยวข้องได้มาจากฐานข้อมูลของธนาคารโลก ซึ่งเป็นข้อมูลรายปี ครอบคลุมช่วงเวลาปี 1960-2019

ผลจากการประมาณการได้แสดงผลเป็นการสนับสนุนสมมติฐานของการวิจัย กล่าวคือ อัตราการเปิดประเทศเป็นปัจจัยที่กระตุ้นให้อัตราการเจริญเติบโตของผลิตภัณฑ์มวลรวมให้เพิ่มสูงขึ้นในระยะแรกเริ่มของการเปิดประเทศ อย่างไรก็ตาม เมื่ออัตราการเปิดประเทศขยายตัวผ่านจุดหนึ่งไป อัตราการเปิดประเทศจะกลับกลายเป็นปัจจัยที่ส่งผลเชิงลบต่ออัตราการเจริญเติบโตของผลิตภัณฑ์มวลรวม นั่นคือ อัตราการเจริญเติบโตจะลดลงในขณะที่อัตราการเปิดประเทศขยายตัวเพิ่มขึ้น ปรากฏการณ์เช่นนี้สามารถอธิบายได้ด้วยเหตุผลดังนี้ ในระยะแรกของการเปิดประเทศ การค้าระหว่างประเทศจะช่วยให้มีการขยายกำลังการผลิต และมีการถ่ายโอนเทคโนยี ช่วยให้เกิดความขำนาญในการผลิต และทำให้ผลตอบแทนจากการใช้ปัจจัยการผลิตเพิ่มสูงขึ้น อย่างไรก็ดี เมื่ออัตราการเปิดประเทศขยายต่อไปโดยไม่มีกำหนด ถึงจุดหนึ่งกำลังการผลิตก็จะขยายตัวเกินศักยภาพ ซึ่งจะยังผลให้ผลตอบแทนจากปัจจัยการผลิตลดลง และจะทำให้อัตราการเจริญเติบโตของผลิตภัณฑ์มวลรวมลดลง ซึ่งเป็นไปตามข้อกล่าวอ้างของทฤษฎีเศรษฐศาสตร์จุลภาค

นอกจากนั้น ผลจากการประมาณการผลกระทบที่ไม่เป็นเชิงเส้นของอัตราการเปิดประเทศต่ออัตราการเจริญเติบโตของผลิตภัณฑ์มวลรวม ยังทำให้เราสามารถคำนวณอัตราการเปิดประเทศที่

เหมาะสมที่จะทำให้เราได้รับอัตราการเจริญเติบโตของผลิตภัณฑ์มวลรวมสูงสุด ซึ่งจากการคำนวณดังกล่าว จะได้อัตราการเปิดประเทศที่เหมาะสมอยู่ที่ 91.57% ซึ่งจะทำให้เราได้รับอัตราการเจริญเติบโตของผลิตภัณฑ์มวลรวมอยู่ที่ 9.74%

ในส่วนที่เกี่ยวกับความยั่งยืนของระบบเศรษฐกิจ จากการประมาณการสมการการปรับตัวระยะสั้นพบว่า ระบบสามารถปรับตัวเข้าสู่ดุลยภาพระยะยาวได้ ในอัตราร้อยละ 59 ของขนาดของการเบี่ยงเบนในงวดถัดไป โดยการปรับตัวจะเป็นแบบแกว่งตัว (Oscillation)

ผลของงานวิจัยนี้สามารถนำไปใช้เป็นข้อเสนอแนะเชิงนโยบายได้ดังนี้ ผู้กำหนดนโยบายทางเศรษฐกิจจำเป็นจะต้องคำนวณระดับของอัตราการเปิดประเทศที่เหมาะสม ที่จะทำให้ประเทศได้มีอัตราการเจริญเติบโตของผลิตภัณฑ์มวลรวมในระดับสูงสุด และหากปล่อยให้ประเทศมีอัตราการเปิดประเทศเกินระดับที่เหมาะสมที่คำนวณได้เกิดขึ้น ผลที่จะได้รับคืออัตราการเจริญเติบโตของผลิตภัณฑ์มวลรวมจะชะลอตัวลงอย่างหลีกเลี่ยงไม่ได้ และเมื่อถึงจุดหนึ่งอาจกลายเป็นอัตราการเจริญเติบโตที่ติดลบได้

นอกจากนั้นยังมีคำแนะนำเพิ่มเติมคือ หากผู้กำหนดนโยบายต้องการหลีกเลี่ยงการชะลอตัวของอัตราการเจริญเติบโตของผลิตภัณฑ์มวลรวม จำเป็นอย่างยิ่งที่ประเทศจะต้องเปลี่ยนกระบวนการผลิตเป็นแบบเน้นเทคโนโลยี หรือเปลี่ยนโครงสร้างของระบบเศรษฐกิจเป็นลักษณะที่นำด้วยธุรกิจภาคบริการ ตามแบบของสิงคโปร์และฮ่องกงเป็นตัวอย่าง ที่เขาสามารถคงไว้ซึ่งอัตราการเจริญเติบโตของผลิตภัณฑ์มวลรวมที่ยอมรับได้ ภายใต้สภาวะการเปิดประเทศในระดับที่สูงมาก

Title: Risk and Sustainability of Trade Dependent Economy……

Researcher: Asst.Prof. Wanakiti Wanasikp…**Affiliation:** Faculty of Economics……

Year of Publication: …2023… **Publisher:** Rangsit University

Source: Rangsit University **No. of pages**: …80… pages

Keywords: Trade Openness, GDP Growth, Thailand, ARDL Model……

Abstract

This research, entitled "Risk and Sustainability of Trade Dependent Economy, is aimed at examining the impact of the degree of trade openness (TO) on the GDP growth. The degree of trade openness is defined as the ratio of export plus import to GDP. The researcher attempts to find whether the impact of trade openness on GDP growth is positive or negative, or none at all. The statistical evidence showed that, for many Eastern Asian countries, the trade openness had contributed to high GDP growth rate during the 1990 decade. However, from the years 2000's onward, these countries had experienced the slowdown in GDP growth, despite the continuing expansion of international trade.

Based on such evidence, the researcher conjectures that the trade openness might have an impact on GDP growth in nonlinear manner. In particular, it is hypothesized in this research that, the trade openness will stimulate GDP growth of the country at the beginning periods due to the specialization in production and technology transfer facilitated by trade. But as the trade openness continues to expand, the point will be reached, beyond which the trade openness will result in the slowdown of GDP growth rate. This can be explained by microeconomic theory which explains that

the marginal return of input will be diminishing as the scale of production expands beyond a certain optimal point.

To test the hypothesis of nonlinear impact of trade openness on GDP growth, the researcher employs the Auto-Regressive Distributed Lags (ARDL) model to construct the long–run equilibrium relationship and short-run adjustment among macro-variables involved, namely, GDP Growth, Investment, Bank Credit, Broad Money, and Trade Openness. The researcher selects Thailand as a case study. The annual data for the estimation of the ARDL model were collected mostly from World Bank's database, covering the period 1970-2019.

The estimation results come out in support of the hypothesis, that is, the trade openness contributes positively to GDP growth at the beginning of trade openness. However, at a certain point in time, the GDP growth starts to decline, despite the continuing trade expansion. This phenomenon can be explained as follow. At the beginning of trade, the country can benefit extensively from technology transfer and specialization brought along with trade. But later on, as trade continues to expand without limit, the point will be reached when the return from resource utilization will decline as the limited resource input is stretched beyond its capacity. This will result in the overall GDP to grow at a declining rate. This result is in line with microeconomic principle of diminishing return of input in the production process.

The estimation of nonlinear impact of trade openness on GDP growth also enables us to compute the optimal degree of openness in which the maximum GDP growth for the economy can attain. Our calculation results show that the optimal degree of openness is 91.57%, and the associated maximum GDP growth is 9.74%.

In term of the sustainability of the economic system, the result from the estimation of short-run Error Correction equation indicates that the system is able to adjust, with oscillation, back to its long-run equilibrium at the rate of 59% of the size of disequilibrium in subsequent periods.

The results from this research provide policy implication as follow. It is recommended that it is necessary for the policy maker to study to find the optimal level of trade openness that will yield the maximum output growth rate. If the trade openness is expanded beyond this optimal level, then the growth rate will go down unavoidably and might even turn to negative growth at some point.

It is further recommended that, to avoid growth rate slowdown, the country must change its production process into technology-intensive or transform its economic structure into service-oriented economy. Singapore and Hong Kong are good examples of service-oriented economy in that they can maintain reasonable growth rate despite having very high degree of trade openness.

Acknowledgement

The researcher would like to express his sincere thanks to the Research Institute of Rangsit University for providing him with financial support. The availability of this research funds enables the project to move on without difficulty until the completion of the research work.

The researcher also would like to thank the Faculty of Economics where the researcher is affiliated, for facilitating him with enthusiastic working environments. The colleagues and officials of the Faculty are all amicable and supportive and help encourage the researcher all the way from the beginning to the success of the project.

Wanakiti Wanasilp

Contents

List of Tables

Chapter 1

Introduction

Introduction

During 1990's, the world had experienced a high level of globalization, as seen in gigantic increases in the volume of international trade and investment. These international trade activities will benefit the countries involved in terms of higher GDP growth and GDP per capita. The highly successful group of countries that enjoyed the gain from trade the most are those in the East and South-East Asian region, such as Singapore, Taiwan, South Korea, Hong Kong, Malaysia, and Thailand. Some of them had achieved a double-digit annual growth rate of GDP for many consecutive years during that period.

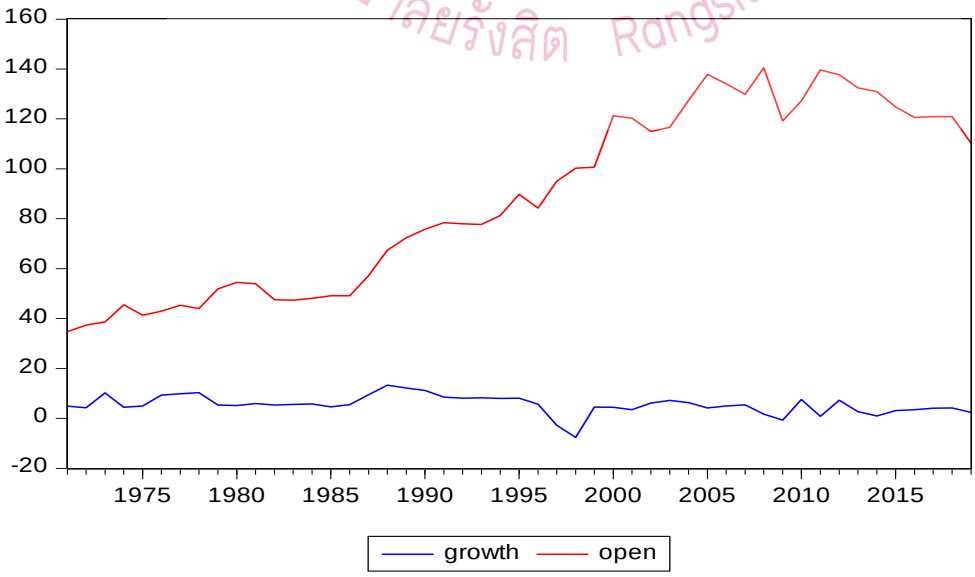
Even though the degree of globalization or Trade Openness kept increasing well into 2010 decade, the GDP growth seemed to decline since the start of the decade for countries involved in trade. The exception is China, where the double-digit growth had been enjoyed for almost every year during 2010's.

From our observation, the decline in output growth seemed to occur when the degree of Trade Openness is high. We conjecture at this point that, the higher the degree of trade openness that any country is exposed to, the more production of output will be carried out to satisfy the demand from international market. When the scale of production is enlarged beyond the normal capacity, more stress would be exerted on limited resources being used in production process. This will result in lower Marginal Product of input and hence the lower growth rate of GDP for the economy engaging in higher level of international trade.

Background and Problem

Although we agree with the existing theory which claims that international trade can stimulate output growth via the transfer of technology and specialization that can help improve productivity of labor, this research work will attempt to explore from other angles. We put forward that, as the degree of trade openness is expanded beyond some critical range, the trade openness will have negative impact on output growth as a result from declining marginal product of limited input due to increasing scale of production forthcoming from the enlargement of the trade openness. In other words, we propose that the trade openness, when expanding to some range, might result in the over-capacity production, and hence will force the marginal product to decline. This over-capacity production will in turn cause the output growth rate to go down when the level of trade openness increases to certain critical range.

The author has selected Thailand as a case study. For a preliminary observation, the data of the degree of Trade Openness and GDP growth rate for Thailand during 1970-2019 were plotted on a graph below.

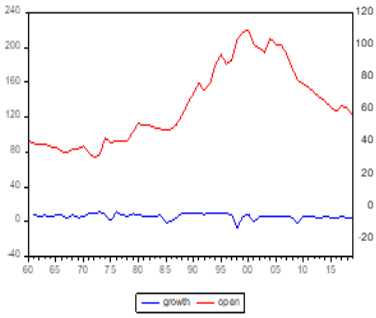


As shown in the graph, the GDP growth of Thailand appeared to increase and reach the height at double digit level around late 1980's. After that period, the growth rate started to decline, despite the fact that the trade openness kept increasing continuously from 1970's to 2010's. When trade openness reached the peak at around 130% at the beginning of 2010's, the output growth rate has gone down to around 6%, and further down to 4% towards late 2010's period.

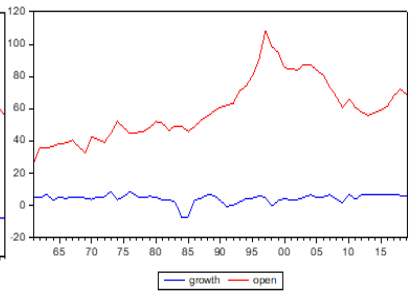
Viewing from other perspective, we can say that, the output growth and trade openness will move up together at the beginning range of international trade. Later on, at some critical point, the output growth will decouple from the trade openness. It will be declining from that point onward and will never go back to co-move with the trade openness again.

The data on growth and trade openness for some countries in Asia are also plotted below for comparison. It can be seen that the movements of the two variables share the same pattern as appeared in the case of Thailand. That is, both output growth and trade openness seemed to move upward together at the beginning range of trade expansion. However, when trade openness increased to a certain level, the output growth is seen to decouple from trade openness by moving downward, despite the trade openness that still kept on expanding continuously.

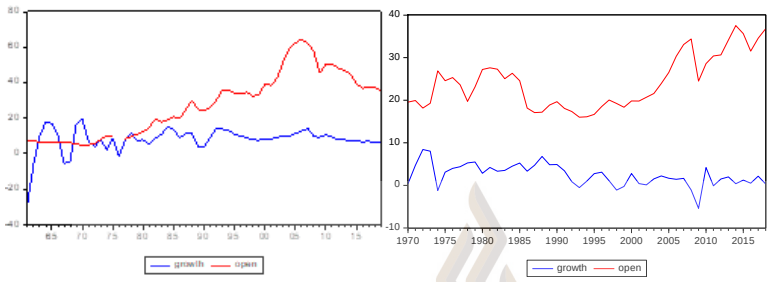
Malasia



Philippines



China Japan



Objective of the Research

With this observation in mind, the researcher hypothesizes that, the trade openness will have positive impact on GDP growth at the beginning of the trade. At some point later on, the impact of trade openness on growth will turn negative, due to the declining marginal product of limited resources used as the scale of production is increasing in response to increasing demand from international trade.

In this research, the country that depends on international trade as a driver of economic growth will face the risk in the form of a declining growth rate as hypothesized above. The country will also face the problem of sustainability, which in our context is defined as the ability of the economic system to sustain the the impact of external shock and able to revert back to its long run equilibrium after deviating from equilibrium due to the shock.

In this research, the Auto-Regressive Distributed Lag (ARDL) model will be employed to estimate the impact of various factors affecting output growth. Our particular focus is on the impact of the level of trade openness on GDP growth which we assume the impact to be nonlinear. In simple words, we hypothesize that the relationship between trade openness and growth will be positive at the

beginning range of trade openness. But as the level of trade openness is increasing, the point will be reached at which the rate of output growth is maximized. If the level of trade openness is expanding further beyond this point, the relationship between trade openness and output growth will become negative, which will result in the associated output growth rate getting decline continuously and may eventually turn to negative growth rate at some range of trade openness.

The selection of explanatory variables is based on the basic theory of aggregate demand and aggregate supply (AD-AS framework) that determines the equilibrium of Gross Domestic Product (GDP). The key variables that drive Aggregate Demand (AD) comprise the familiar money supply, household consumption, investment, government spending and net export. In this research work, we will use the Trade Openness to represent the volume of international trade. It is measured as a ratio of the value of import plus export divided by gross domestic product.

On the aggregate supply side, the key drivers are labor, capital, technology, human capital (comprising education, health and R&D), infrastructure, oil, natural resources, among others.

Definitions

Gross Domestic Product (GDP): is the value of national output. It can be measured from expenditure approach as the sum of household consumption, private investment, government expense and export (net of import). It may be expressed in equation as GDP = C + I + G + (X-M).

Degree of Trade Openness (TO): is defined as the ratio of the value of export plus import and the value of GDP.

GDP Growth rate: is the percentage change of GDP level on an annual basis. A rise and fall in GDP growth is caused by factor(s) that can have an impact on GDP growth. An increase in GDP growth rate will result in a rise in national and per capita income, leading to an improvement of standard of living. On the contrary, a reduction in GDP growth will result in a lowering national income and hence people will get poorer.

Long-run equilibrium relationship: is the equilibrium in which the relevant variables move together along time path within the appropriate band.

Error Correction Mechanism: is the ability of the economic system to revert back to its long-run equilibrium after the system gets hit by external shock.

Nonlinear impact of the Trade Openness: meaning that the impact of trade openness on GDP growth will change sign as the expansion of trade is growing. In particular, it is hypothesized in this research that the impact of trade openness on economic growth will be positive at the beginning rage of the trade. However, as trade continues to expand the critical point will be reached, in which, from that point onward the impact of trade openness on growth will turn negative.

Risk: In this research, the risk is defined in the context of the GDP growth being slowdown or turning negative due to the negative impact of the degree of trade openness.

Sustainability: is defined in the context of the ability of the economic system to adjust itself back to stay on its long-run equilibrium path after the system gets hit by external shock.

Scope of the Research

This research is aimed at examining the impact of the trade openness on the GDP growth for the case of Thailand. It is hypothesized that the impact of trade openness is nonlinear. The long-run

relationship among macroeconomic variables involved is formed under the framework of Auto-Regressive Distributed Lags (ARDL) model. The degree of trade openness will enter in this equation in nonlinear form. Apart from yielding the coefficients for measuring the impact of the variables involved, the estimation results will also enable us to calculate the optimal degree of trade openness at which the maximum GDP growth rate can be derived.

The data of the relevant variables for Thailand are collected from the database of the World Bank. All are annual data, covering the period of 1960- 2019.

Expected Benefit from the Research

A study on GDP growth and factors affecting it is always interesting since it is concerned with the standard of living of the people. A country with high growth rate will help improve the standard of living of its people. On the other hand, a country with low or negative growth rate will leave people in extreme poverty and may lead the country into a chaotic state. Therefore, a study in economic growth is always the main focus of economic researcher.

In this research, the researcher attempts to find the nonlinear impact of trade openness on GDP growth. There are many research works that examine the relationship between trade openness and economic growth in existing literature. But very few, if any, gets involved with the impact of trade openness in a nonlinear manner.

The researcher hopes that this research will help establish new findings in this field of knowledge. And it is also further expected that the finding from this research will help improve the efficiency of economic performance of the country which will eventually lead to better standard of living of general people.

Chapter 2

Related Theory and Literature Review

Related Theory and Literature Review

The new growth theory holds that international trade will help stimulate output growth via technology transfer and specialization in production (Roe, T. and H. Motadi (2001)). The results from empirical tests performed in existing literature so far are still inconclusive in support of the above claim. The approach used in earlier period is to establish the direct association between trade openness and output growth to find the impact of trade on growth. The results of the empirical research along this line are mostly in favor of the trade being beneficial to output growth. Those that find positive impact of trade on growth include, as for examples, the work of Sachs and Warner (1995), Frankel and Romer (1999), and Willard (2000).

Later on, there were some doubts about the methodology and the measurement of index and data used in earlier research works that yield the result in favor of the positive relationship between trade and growth. Mendoza (2010) claims otherwise that the positive relation between trade and growth is conditional, meaning that other factors may have influence on this relation as well. Stone and Strutt (2009) put forward that good infrastructure of the economy is a necessary condition for trade to be beneficial to growth. Chang et al., (2005) hold their view that the positive impact of trade on growth will be strengthened by good infrastructure, high investment in human capital, and deep financial market.

The development in research work on the relationship between trade and growth as mentioned above has provided new directions for researcher in this area in later periods. Fatima, S., et.al. (2020) employed a GMM method for dynamic panel data to investigate the impact of trade

openness on GDP growth for both developed and developing countries covering the period 1980-2014. The Human Capital Accumulation (HCA) is treated as an intervening variable. Under this setting, trade may have negative impact on growth when countries exhibit a low level of HCA.

Huang, L.C., et.al. (2014) examine whether financial development is associated with a stronger or weaker trade openness–growth relationship. Both linear and nonlinear econometric models are used with panel data for 46 countries from 1983 to 2007. The results indicate that in countries with higher stock market development trade openness enhances economic growth, while in countries with less stock market development the ability of trade to facilitate growth is weak.

Ramzan, M., B., et.al. (2019) employed GMM method to investigate the relationship between GDP growth and trade openness from the panel data of 82 countries during the period 1980- 2014. They establish that GDP growth is related to trade openness via Total Factor Productivity (TFP). In particular, : trade may have a negative impact on GDP growth when countries have specialized in low-TFP development level. However, at the high level of TFP development, trade openness will have positive impact on GDP growth.

Keho, Y. (2017) examines the impact of trade openness on economic growth for Cote d'Ivoire over the period 1965–2014 in a multivariate framework, including capital stock, labor and trade openness as regressors. The researcher uses the Autoregressive Distributed Lag bounds test to cointegration and the Toda and Yamamoto Granger causality tests. The results show that trade openness has positive effects on economic growth both in the short and long run.

Awokuse, T.O. (2008) re-examines the relationship between trade and economic growth in Argentina, Colombia, and Peru, with emphasis on both the role of exports and imports. Granger causality tests and impulse response functions were used to examine whether increase in trade stimulates economic growth (or vice versa). The results suggest that, although there is some empirical evidence supporting export-led growth, the empirical support for import-led growth hypothesis is

relatively stronger. In some cases, there is also evidence for reverse causality from gross domestic product growth to exports and imports.

Hye, Q.M.A. (2012) investigate the long run effect of trade openness on economic growth in the case of Pakistan from 1971 to 2009. A composite trade openness index is developed by using principal component analysis (PCA) and is employed in the JJ cointegration, autoregressive distributed lag (ARDL) approach to cointegration, dynamic OLS and variance decomposition. The results suggest the existence of a negative and significant association between trade openness and economic growth.

As for Hye, Q.M.A., et.al. (2016), the autoregressive distributed lag (ARDL) cointegration technique and rolling regression method are used. The empirical findings indicate that trade openness is positively related to economic growth in the long run and short run. However, results from the rolling window suggest that trade openness is negatively linked to economic growth only for a number of years.

As for the case of Thailand, there are quite a number of empirical works that deal with the investigation of the relationship between trade openness and GDP growth. Examples of these works are:

Diaoa, X., et.al. (2005) analyze the general equilibrium interaction between productivity and investment in an intertemporal growth model using the data of Thailand during the period of 1960-1995. They found that the spillover from international trade can increase productivity through rising investment. Hence, the positive relation between trade openness and GDP growth can be established.

Thangavelu, S.M. and G. Rajguru (2004) investigate the relationships between trade and labor productivity for nine rapidly developing Asian countries, including Thailand, in a timeseries framework using a vector error-correction model. The impact from trade was divided into export-led and import-led. It was found that there is no causal effect from exports to labor productivity growth

for some countries under investigation. Rather, the impact from import to labor productivity is found to be significant. This suggests that import-led growth is stronger than export-led one.

Asada, H. (2022) applies the autoregressive distributed lag approach, using data for Thailand from 2000 to 2017. It was found that trade openness and human capital development contributed positively to Thailand's GDP growth in the long run, while FDI inflows contributed negatively.

Kohpaiboon, A. (2003), using data of Thailand during 1970- 1999, he examines the impact of FDI on GDP growth, conditioning on the level of trade openness. It is found that, the impact of FDI on growth will be greater under Trade Promotion regime as compared to that of the Import Substitution regime.

Hussin, F. and N. Saidin (2012) examines the impact of economic variables which are foreign direct investment (FDI), openness and gross fixed capital formation on economic growth of ASEAN-4 countries over the period 1981- 2008. The impact of variables to GDP is estimated using three panel estimation models which are called pooled model (pooled), fixed effects model (FEM) and random effects model (REM). The findings show that all variables are correlated with each other and also have the positive relationship to GDP. Hence, all variables may lead economic growth boost when they are increase whereas FDI becomes the most efficient variable in order to assist economic growth and followed by openness and gross fixed capital formation.

Sriyana, J., & Afandi, A. (2020 examine the effects of trade openness and other economic variables such as foreign direct investment, gross capital formation and human capital on economic growth in selected ASEAN countries. Using long term annual data, the empirical NARDL models incorporate asymmetric effects of trade openness on economic growth. This paper highlights that trade openness has a net positive impact on economic growth only in the Philippines and Singapore. It implies that most of the other countries in that region have a challenge regarding the implementation of trade liberalization.

Contribution of this Research

While the results from existing literature are still inconclusive with regard to the impact of trade openness on output growth, this research work will look at the problem from different angle. We will assume that output growth is a nonlinear function of the degree of trade openness, other things being equal. With this setting, the impact of the trade openness on growth can be positive in some range and may change to negative in other range. And if the growth function is well-behaved, then the optimal level of trade openness can be found and the associated maximum growth rate can be computed.

Therefore, the contribution of this paper will be to conduct the empirical work to establish the nonlinear relationship between trade openness and GDP growth for the case of Thailand. In addition, with this setting, the optimal level of the degree of openness can be calculated and set as a policy target so that the maximum GDP growth rate can be achieved.

Chapter 3

Research Methodology

Methodology

This research is quantitative research. Based on the Auto-Regressive Distributed Lags (ARDL) model, the long-run equilibrium relationship will be formed, using relevant variables that are theoretically proposed to drive macroecono0mic equilibrium. Then the time series data for these variables will be collected, and the equations will be estimated by software program to obtain the coefficients for statistical analysis.

According to the ARDL model, there are two equations that need to be estimated. The first equation will explain the long-run relationship among all variables that form and drive macroeconomic equilibrium along the time path. The second equation will indicate how the economic system adjust itself back to its long-run equilibrium after the system gets hit by external shock.

In sum, the sequence of the operations will run as follow:

1) Test Unit Root
2) Calculate the optimal lag length for ARDL model
3) Estimate the long-run equilibrium relationship equation
4) Compute the optimal degree of trade openness and the associated maximum GDP growth rate
5) Estimate the short-run adjustment equation (or the so-called “Error Correction Model”

Unit Root Test:

Prior to processing the ARDL equation, each and every variable must be tested for stationarity, the so-called Unit Root Test. Following Dickey, D.A. and W. Fuller (1981), the equation for Augmented Dickey-Fuller (ADF) test for unit root is as follow.

$$\Delta y_t = \alpha + \beta t + \gamma y_{t-i} + \sum_{i=1}^{p} \theta_i \, y_{t-1} + \varepsilon_t \qquad (1)$$

The hypothesis is H_o: $\gamma = 0$ The series y_t has unit root (nonstationary)

H_a: $\gamma < 0$ The series y_t has no unit root (stationary)

If H_o is rejected (i.e., stationary) at the level of the data, we say that the series is integrated of order 0, or I(0).

But if H_o is rejected (i.e., stationary) at the first difference of the data, we say that the series is integrated of order 1, or I(1).

The Model

The ARDL model was developed by Pesaran, M.H., Y. Shin and R.J. Smith (2001). The model is the extension of the Cointegration and Error Correction models. It combines both long run and short run variables in one single equation. Consequently, the ARDL model has an advantage over the cointegration model in that it can include variables of different order of integration, I(0) and I(1) in particular, in one single equation for processing. On the contrary, the Cointegration model will accept only I(1) variables in its long run relationship equation.

The general form of ARDL model is shown below.

$$\Delta y_t = \alpha + \sum_{i=1}^{p} \gamma_i \Delta y_{t-i} + \sum_{i=1}^{p} \beta_{1i} \Delta x_{1t-i} + \sum_{i=1}^{p} \beta_{2i} \Delta x_{2t-i} + \cdots \ldots$$

$$+ \cdots \ldots \ldots + \sum_{i=1}^{p} \theta_i y_{t-1} + \sum_{i=1}^{p} \tau_{1i} x_{1t-1} + \sum_{i=1}^{p} \tau_{2i} x_{2t-1} + \cdots \ldots + \varepsilon_t \quad (2)$$

Where

$\alpha, \gamma_i, \beta_{1i}, \beta_{2i}, \theta_i, \tau_{1i}, \tau_{2i}$ are parameters to be estimated

Δ is the first difference operator

y_t is the dependent variable of our interest

x_{1t}, x_{2t},….., are relevant explanatory variables

ε_t is the error or residual term

i = 1,2,3,….,p is lag length

Data and Variables

In this paper, the variables under investigation comprise the following.

The dependent variable is Real GDP Growth (GROWTH)

The explanatory variables that drive GDP growth rate comprise:

INV is private investment

BANKCREDIT is the credit issued by banks to private sector

BM is Broad Money defined as bank notes in circulation plus all deposits at financial Institutions

OPEN is the degree of Trade Openness

$OPEN^2$ is the square of the degree of Trade Openness

The data of each variable mentioned above is expressed as a percent of GDP.

The selection of the variables for processing is based on the theoretical underpinning and the availability of the data during the period under study. All data are annual data, covering the periods of 1970- 2019. These data were collected from the website of the World Bank.

Chapter 4

Results of the Study

Estimation Results

Unit Root Test

The result of Unit Root Test for stationarity is shown in Table 1 below.

Table 1 Unit Root Test

With Intercept and Trend	t-statistic	Critical Value	Prob. Value	Order of Integration
GROWTH	-4.3041	-4.1611	0.0068*	I(0)
INV	-2.6796	-4.1658	0.2494	I(1)
D(INV)	-4.9014	-4.1706	0.0018*	
BANKCREDIT	-2.4019	-4.1658	0.3739	I(1)
D(BANKCREDIT)	-3.3030	-3.1842	0.0783***	
BM	-1.4069	-4.1611	0.8464	I(1)

D(BM)	-5.6011	-4.1658	0.0002*	
OPEN D(OPEN)	-0.8263 -7.3373	-4.1611 -4.1658	0.9558 0.0000*	I(1)
OPEN2 D(OPEN2)	-1.8695 -7.5942	-4.1611 -4.1658	0.8574 0.0000*	I(1)

Note: H_o: There exists a unit root. H_a: No unit root present.

D means first difference. *, **, and *** is significant at 1%, 5%, and 10% respectively.

The results from Unit Root Test above indicate that GROWTH is I(0) (i.e., stationary at level). The rest of the variables are I(1) (i.e., stationary at first difference). Note that, when the variables are different in term of the order of integration, the basic cointegration model cannot be employed for processing. In this case, the ARDL model, introduced by Pesaran, M.H., Y. Shin and R.J. Smith (2001), can come in handy.

Optimal Lag Length:

Using AIC criteria, the optimal lag model is selected to be ARDL(3,1,3,0,3,0), where the minimum value of AIC is attained.

Table 2 Optimal Lag Model (Using AIC Criteria)

Model	LogL	AIC*	BIC	HQ	Adj. R-sq	Specification
5235	-72.773554	4.035162*	4.683958	4.275766	0.829419	ARDL(3, 1, 3, 0, 3, 0)*
5110	-71.942626	4.042847	4.732193	4.298489	0.829658	ARDL(3, 1, 4, 0, 3, 0)
1485	-70.948333	4.043106	4.773002	4.313787	0.830923	ARDL(4, 2, 3, 0, 3, 0)
4610	-72.009989	4.045909	4.735255	4.301551	0.829136	ARDL(3, 2, 3, 0, 3, 0)
5247	-73.031049	4.046866	4.695662	4.287471	0.827411	ARDL(3, 1, 3, 0, 0, 3)

Long- run Relationship (Level Equation)

The result from the estimation of long run relationship is shown as in the following equation.

GROWTH = - 2.741520 + 0.147363.INV - 0.050885.BANKCREDIT - 0.155213.D(BM) + 0.212817.OPEN-

(prob) (0.3492) (0.0436)** (0.0080)* (0.0066)* (0.0270)*

- 0.001162.OPEN^2

(prob) (0.0160)** (3)

Note: * is significant at 1%, ** is significant at 5%

Interpretation of the Results

As can be seen from the above estimated level equation, all parameters are statistically significant at 1% and 5% levels. The factors that have negative impact on output growth (GROWTH)

are Bank Credit (BANKCREDIT), change in Broad Money (D(BM)) and the square of Trade Openness ($OPEN^2$.). On the other hand, the variables that have positive effect on GROWTH include Private Investment (INV) and Trade Openness (OPEN).

The impact of explanatory variables on GROWTH in terms of direction and size can be analyzed as follow.

Private Investment (INV): As private investment (INV) increases by 1%, the GDP growth rate (GROWTH) will increase by 0.15%. This seems to be in line with economic theory and our intuition. More investment will lead to more future consumption. In addition, profitable investment will create wealth and income to investors and workers alike. This might result in higher GDP growth since both consumption and investment are major components in the GDP measurement.

Bank Credit (BANKCREDIT): As bank credit increases by 1%, the GDP growth rate (GROWTH) will decrease by 0.05%. The negative effect of bank credit on growth is possible if the existing ratio of total household debt to GDP is high, like in the case of Thailand at the present time, where the ratio of household debt to GDP climbs to almost 90%. This high level of household debt will exert a constraint on household budget that will result in lower consumption for many periods to come.

Broad Money (BM): As change in broad money increases by 1%, the GDP growth rate (GROWTH) will decrease by 0.16%. This seems to be in line with the Classical Framework which put forward that money is neutral in the long run. That is, as more money is injected into the economy, all of its impact will go to price in the long run. Nothing will go to boost the real output. On the other hand, the rise in price, which is an inflation, might retard the growth of real output. So, the negative impact of broad money on real output growth rate seems to be reasonable from theoretical perspective.

Trade Openness (OPEN): Of particular interest is the case of Trade Openness (OPEN) where it is entered into the growth equation in nonlinear form. The result indicates that the parameter of OPEN is positive, where as that of its square, $OPEN^2$, is negative. This result suggests that growth rat is a concave function of Trade Openness and hence the growth-maximizing level of the Trade Openness can be found.

Computation of optimal Level of Trade Openness:

From the result in equation (3) above, we can write GROWTH as a nonlinear function of OPEN as follow (assuming all other variables constant).

$$GROWTH = F(OPEN) = 0.212817OPEN - 0.001162OPEN^2 \quad (4)$$

This function is concave and hence we can derive the optimal value of trade openness (OPEN) that will maximize GDP growth rate (GROWTH).

Maximize GROWTH with respect to OPEN:

$F' = 0.212817 - (2)(0.001162)OPEN = 0$, so that GROWTH maximizing value of OPEN is 91.57%.

$F'' = -0.0023 < 0$, confirming that the function is concave and hence the maximum GROWTH is attained.

Where F' is the first derivative, and F'' is the second derivative.

Substituting for OPEN = 91.57 into equation (4) above to get the associated maximum annual GROWTH rate = 9.74%.

This means that, in order to obtain the maximum growth rate of 9.74%, the level of Trade Openness must be maintained at the level of 91.57%. Increasing trade openness (OPEN) beyond 91.57% will result in reducing GDP growth rate. The growth might eventually turn to negative at some point going forward if the degree of trade openness keeps on increasing without limit.

Bound Test for Long Run Relationship

The Bound Test is used to test the existence of long run relationship among variables under study. The null hypothesis (H_o) is "There is no long run relationship". The result of Bound Test is shown in Table 3 below.

Table 3 Bound Test for Long Run Relationship

Test Statistic	Value	Significance	I(0)*	I(1)*
*F-statistic	6.54	10.0%	1.75	2.87
Variables	5	5.0%	2.04	3.24
Sample Size	46	2.5%	2.32	3.59
		1.0%	2.66	4.05

Note *Pesaran, M.H., Y. Shin and R.J. Smith (2001)

H_o: No long run relationship exists. H_a: There exists long run relationship.

It can be seen from Table 3 above that the calculated F-statistic is 6.54, greater than the critical values of both lower and upper bounds. Therefore, the null hypothesis of "No long run relationship" is rejected. Consequently, we can conclude that there exists long run relationship among variables under investigation.

Sort- run Adjustment Equation (Error Correction Model)

The existence of long run relationship, as confirmed by Bound Test above, will further allow for short run adjustment to correct the disequilibrium, or deviation from long run equilibrium, that might occur due to external shock. The Error Correction form resulted from the estimation of our ARDL(3,1,3,0,3,0) model is shown below.

Table 4 Error Correction Form of the Model ARDL(3,1,3,0,3,0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GROWTH(-1))	0.471634	0.169326	2.785364	0.0092
D(GROWTH(-2))	0.301113	0.123907	2.430148	0.0213
D(INV)	0.763509	0.111063	6.874573	0.0000
D(BANKCREDIT)	-0.011020	0.049979	-0.220490	0.8270
D(BANKCREDIT(-1))	0.079534	0.054693	1.454206	0.1563
D(BANKCREDIT(-2))	0.061895	0.043534	1.421750	0.1654
D(OPEN)	0.375588	0.066913	5.613118	0.0000
D(OPEN(-1))	0.025226	0.043061	0.585814	0.5624
D(OPEN(-2))	0.126297	0.038118	3.313330	0.0024
CointEq(-1)*	-1.595602	0.215352	-7.409275	0.0000

Most of the estimated coefficients of the Error Correction equation, except BANKCREDIT with lags 1 and 2, and OPEN with lag 1, are statistically significant. Of particular interest is the coefficient of error term, labelled as “CointEq(-1), which has the value of – 1.59. This means that, after the shock, the system is able to revert to its long run equilibrium with oscillation at the rate of 59% of the size of the disequilibrium in each successive perio after the shock.

Note that in Short-run Adjustment (Error Correction) Equation, we do not pay attention to the relationship between trade openness and growth. This is because this equation shows the short run adjustment of the system to revert back to long run equilibrium after it deviates from equilibrium due to external shock. In other words, this equation focuses on the stability of the system, not the relationship among variables. It is obviously so, as can be seen that all variables in this equation are entered in first difference form.

Chapter 5

Conclusion and Discussion

Conclusion

In this research work, the author attempts to investigate the relationship between the degree of trade openness and output growth. It is hypothesized that the relationship between trade openness and output growth is nonlinear. In particular, at the beginning of trade, the relationship between them is positive due to growth-enhancing effects of trade. But the point will be reached eventually, when the impact of trade on growth will become negative due to the reason to be explained below.

The reason behind the growth-reducing impact of trade openness is that as trade openness increase, more production will be forthcoming. With limited resources, more stress and strain will be exerted on resource input being used, resulting in a decline in marginal product or productivity. Consequently, the output growth rate will decline as trade openness increases beyond certain level.

In this paper, the author employed an ARDL model to estimate the relationship between output growth and the variables that are considered to have impact on growth. Particular focus is on the degree of openness (OPEN), where its impact on growth is assumed to be nonlinear. That is, both OPEN and OPEN- squared are entered as regressors in long run relationship equation.

Each and every variable is tested for stationarity, using ADF test for the presence of unit root. The optimal lag model is selected to be ARDL (3,1,3,0,3,0). The results from the estimation can be summarized as follow.

The long run relationship, which was confirmed to exist by using Bound Test, indicates the following results: All parameters are statistically significant at 1% and 5% levels. The factors that have negative impact on output growth (GROWTH) are Bank Credit (BANKCREDIT), change in Broad Money (D(BM)) and the square of Trade Openness ($OPEN^2$.). On the other hand, the variables that have positive effect on GROWTH include Private Investment (INV) and Trade Openness (OPEN).

The focus of attention is on the case of Trade Openness where it is entered in equation in nonlinear form. The result indicates that the parameter of OPEN is positive, while that of its square, $OPEN^2$, is negative. This result suggests that growth rate is a concave function of Trade Openness and hence the growth-maximizing level of the Trade Openness can be found. With a simple maximization of GROWTH function with respect to variable trade openness (OPEN), the optimal level of OPEN is found to be 91.57%, with the associated maximum output growth rate at 9.74%.

In terms of risk and sustainability of trade-dependent economy, we can say that, for the case of Thailand, the risk that they are confronted at the moment is the risk from growth slowdown as the trade openness keeps expanding. However, with the existing conditions, the economic system of Thailand is still stable. This can be judged from the value of the coefficient of the Error Correction term in Short Run Error Correction equation, which is – 1.59. With this value, it is guaranteed that, when the system deviates from equilibrium in short run, it will revert back to its the long run equilibrium for certain, although at slow pace due to the oscillations in adjustment.

The result from our finding provides policy recommendation as follow. It is necessary that the policy maker must find the optimal level of trade openness that maximizes the growth rate of the economy. Too high level of trade openness might result in growth rate being slowing down to the point that could be detrimental to the economy. The growth rate that is too low might yield too few

output that may not be adequate to service the debt, in particular if the increased production induced by trade expansion is financed by external borrowing

If, however, the country insists on increasing the level of trade openness for some reason, it is advised that the country must transform its production into technology-intensive in order to raise productivity so that the desired high level of output growth can be maintained.

The other way to avoid growth-reducing effect from trade is to restructure the country to be service-oriented economy, such as Singapore and Hong Kong. Being a service economy, the production of services in general will be technology-intensive. Consequently, the marginal product of the service-oriented economy will not go down quickly as compared with that of the economy that relies on labor-intensive production.

Discussion

There are extensive research works in existing literature dealing with the impact of trade openness (defined as the ratio of export plus import to GDP) on economic growth (defined as the percentage of GDP). The findings from these works are still inconclusive, however. Most of earlier works are in favor of the positive impact of trade openness on GDP growth. See for examples, Sachs and Warner (1995), Frankel and Romer (1999), and Willard (2000). Later on, the works in this area probe further to examine the factors that cause the impact of trade openness on the GDP growth to be positive. Mendoza (2010) claims otherwise that the positive relation between trade and growth is conditional, meaning that other factors may have influence on this relation as well. Stone and Strutt (2009) put forward that good infrastructure of the economy is a necessary condition for trade to be beneficial to growth. Chang et al., (2005) hold their view that the positive impact of trade on growth

will be strengthened by good infrastructure, high investment in human capital, and deep financial market.

In this research, the researcher attempts to make it more general by proposing that the impact of trade openness on GDP growth can be either positive or negative depending on the condition of the influencing factors. It is proposed further in this research that the direction of the impact of trade openness depends on the range of the expansion of the trade. It is hypothesized that the positive effect of trade openness occurs at the beginning range of trade expansion. At this range, the high GDP growth rate can be attained due to specialization in production and technology transfer available from trade. However, as trade expansion continues, the point will be reached in which the associated GDP growth will go down. This phenomenon can be explained by microeconomic theory which states that the marginal product of input will increase at the beginning of production, reach the peak at some point, and will go down from that point onward. The term marginal product so mentioned can be thought of as the productivity that is generally used in macroeconomics as a key indicator of economic growth.

References

Asada, H. (2022), Effects of Foreign Direct Investment, Trade Openness, and Human Capital Development on the Economic Growth of Thailand, International Journal of Asian Business and Information Management Volume 13 Issue 1, 2022.

Awokuse, T.O. (2008), Trade openness and economic growth: is growth export-led or import-led?, Applied Economics, 40:2, 161-173.

Chang, R., Kaltani, L. and Loayza, N. (2005). Openness can be Good for Growth: The Role of Policy Complementarities. Paper Presented in Conference at Central Bank of Peru (2005).

Dickey, D.A. and W. Fuller (1981), Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root, Econometrica, 1981.

Diaoa, X., J. Rattsbb and H.E. Stokke (2005), International spillovers, productivity growth and openness in Thailand: an intertemporal general equilibrium analysis, Journal of Development Economics 76 (2005) 429 – 450.

Eva Paus, E., N. Reinhardt and M. Robinson (2003), Trade Liberalization and Productivity Growth in Latin American Manufacturing, 1970-98, The Journal of Policy Reform, 6:1, 1-15.

Fatima, S., B. Chen, M. Ramzan and Q. Abbas (2020), The Nexus Between Trade Openness and GDP Growth: Analyzing the Role of Human Capital Accumulation, SAGE Open October-December 2020: 1–18.

Frankel, A. J., & Romer, D. (1999). Does Trade Cause Growth? The American Economic Review, 89(3), 379-399.

Greene, W.H. (2003), Econometric Analysis, Prentice Hall, 5th Ed.

Hamilton, J.D. (1994), Time Series Analysis, Princeton University Press.

Hussin, F. and N. Saidin (2012), Economic Growth in ASEAN-4 Countries: A Panel Data Analysis, International Journal of Economics and Finance; Vol. 4, No. 9; 2012.

Hye, Q.M.A. (2012), Long term effect of trade openness on economic growth in case of Pakistan, Qual Quant (2012) 46:1137–1149.

Hye, Q.M.A. and W.Y. Lau (2015), Trade Openness and Economic Growth: Empirical Evidence from India, Journal of Business Economics and Management, Volume 16(1): 188–205.

Hye, Q.M.A., S. Wizarat and W.Y. Lau (2016), The Impact of Trade Openness on Economic Growth in China: An Empirical Analysis, Journal of Asian Finance, Economics and Business, Vol 3 No 3 (2016) 27-37.

Huang, L.C. and S.H. Chang (2014), Revisit the nexus of trade openness and GDP growth: Does the financial system matter?, The Journal of International Trade & Economic Development, 23:7, 1038-1058.

İşcan, T. (1998) Trade liberalisation and productivity: A panel study of the Mexican manufacturing
industry, The Journal of Development Studies, 34:5, 123-148.

Keho, Y. (2017), The impact of trade openness on economic growth: The case of Cote d'Ivoire, Cogent Economics & Finance, 5:1.

Lutkepohl, H. and M. Kratzig (2004), Applied Time Series Econometrics, Cambridge University Press.

Mendoza, U. R. (2009). Trade and Growth in the Post – 2008/2009 Crisis World. World Economics, 11(4).

Nannicini, T. and A. Billmeier (2011), Economies in Transition: How Important Is Trade Openness for Growth?, OXFORD BULLETIN OF ECONOMICS AND STATISTICS, 73, 3 (2011).

Pesaran, M.H., Y. Shin and R.J. Smith, Bounds Testing Approaches to the Analysis of Level Relationships, Journal of Applied Econometrics, 16, (2001), pp.289-326.

Ramzan, M., B. Sheng, M. Shahbaz, J. Song and Z. Jiao (2019), Impact of Trade Openness on GDP Growth: Does TFP matter?, Journal of International Trade and Economic Development, Vol.28, 2019.

Kohpaiboon, A. (2003), Foreign trade regimes and the FDI–Growth Nexus: a case study of Thailand, The Journal of Development Studies.

Stone, S., & Strutt, E. A. (2009). Transport Infrastructure and Trade Facilitation in the Greater Mekong Subregionde. ADB Working Paper No. 130.

Tahir, M. and H.O. Ali (2014), Trade Openness and Economic Growth: A Review of the Literature, Asian Social Science; Vol. 10, No. 9; 2014.

Tahir, M. (2015), The relationship between international trade openness and economic growth in the developing economies Some new dimensions, Journal of Chinese Economic and Foreign Trade Studies, June, 2015.

Thangavelu, S.M. and G. Rajguru (2004), Is there an export or import-led productivity growth in rapidly developing Asian countries? A multivariate VAR analysis, Applied Economics, 2004, 36, 1083–1093.

Willard, L. (2000). Does Openness Promote Growth? Agenda, 7(3), 251-26

Appendix 1

Unit Root Test

GROWTH – I(0)

Null Hypothesis: GROWTH has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.304071	0.0068
Test critical values:	1% level	-4.161144	
	5% level	-3.506374	
	10% level	-3.183002	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GROWTH)
Method: Least Squares
Date: 09/27/22 Time: 06:58
Sample (adjusted): 2 49
Included observations: 48 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GROWTH(-1)	-0.574068	0.133378	-4.304071	0.0001
C	4.814426	1.414370	3.403938	0.0014
@TREND("1")	-0.068878	0.035422	-1.944478	0.0581

R-squared	0.292618	Mean dependent var	-0.052573
Adjusted R-squared	0.261179	S.D. dependent var	3.646209
S.E. of regression	3.134088	Akaike info criterion	5.183015
Sum squared resid	442.0127	Schwarz criterion	5.299965
Log likelihood	-121.3924	Hannan-Quinn criter.	5.227210
F-statistic	9.307444	Durbin-Watson stat	1.965347
Prob(F-statistic)	0.000414		

INV – I(1)

Null Hypothesis: INV has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.679635	0.2494
Test critical values:	1% level	-4.165756	
	5% level	-3.508508	
	10% level	-3.184230	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INV)
Method: Least Squares
Date: 09/27/22 Time: 07:01
Sample (adjusted): 3 49
Included observations: 47 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INV(-1)	-0.155050	0.057862	-2.679635	0.0104
D(INV(-1))	0.502099	0.130289	3.853737	0.0004
C	4.881073	1.814548	2.689967	0.0101
@TREND("1")	-0.023346	0.025458	-0.917053	0.3642

R-squared	0.313719	Mean dependent var	-0.002304
Adjusted R-squared	0.265839	S.D. dependent var	2.727069
S.E. of regression	2.336641	Akaike info criterion	4.616571
Sum squared resid	234.7752	Schwarz criterion	4.774030
Log likelihood	-104.4894	Hannan-Quinn criter.	4.675824
F-statistic	6.552175	Durbin-Watson stat	1.783909
Prob(F-statistic)	0.000953		

D(INV)

Null Hypothesis: D(INV) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.901449	0.0013
Test critical values:	1% level	-4.170583	
	5% level	-3.510740	
	10% level	-3.185512	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INV,2)
Method: Least Squares
Date: 09/27/22 Time: 07:03
Sample (adjusted): 4 49
Included observations: 46 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INV(-1))	-0.762201	0.155505	-4.901449	0.0000
D(INV(-1),2)	0.330479	0.145278	2.274795	0.0281
C	0.564227	0.776896	0.726258	0.4717
@TREND("1")	-0.022116	0.027096	-0.816194	0.4190

R-squared	0.365425	Mean dependent var	0.001227
Adjusted R-squared	0.320098	S.D. dependent var	2.921983
S.E. of regression	2.409355	Akaike info criterion	4.679537
Sum squared resid	243.8097	Schwarz criterion	4.838549
Log likelihood	-103.6293	Hannan-Quinn criter.	4.739103
F-statistic	8.062008	Durbin-Watson stat	1.944327
Prob(F-statistic)	0.000235		

BANKCREDIT – I(!)

Null Hypothesis: BANKCREDIT has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.401859	0.3739
Test critical values:	1% level	-4.165756	
	5% level	-3.508508	
	10% level	-3.184230	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(BANKCREDIT)
Method: Least Squares
Date: 09/27/22 Time: 07:09
Sample (adjusted): 3 49
Included observations: 47 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BANKCREDIT(-1)	-0.092044	0.038322	-2.401859	0.0207
D(BANKCREDIT(-1))	0.653002	0.115352	5.660943	0.0000
C	4.873948	2.330296	2.091558	0.0424
@TREND("1")	0.140244	0.103810	1.350969	0.1838

R-squared	0.458469	Mean dependent var	1.924073
Adjusted R-squared	0.420688	S.D. dependent var	8.259912
S.E. of regression	6.286830	Akaike info criterion	6.596056
Sum squared resid	1699.542	Schwarz criterion	6.753516
Log likelihood	-151.0073	Hannan-Quinn criter.	6.655309
F-statistic	12.13484	Durbin-Watson stat	1.944036
Prob(F-statistic)	0.000007		

D(BANKCREDIT)

Null Hypothesis: D(BANKCREDIT) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.302961	0.0783
Test critical values:	1% level	-4.165756	
	5% level	-3.508508	
	10% level	-3.184230	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(BANKCREDIT,2)
Method: Least Squares
Date: 09/27/22 Time: 07:11
Sample (adjusted): 3 49
Included observations: 47 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(BANKCREDIT(-1))	-0.395043	0.119603	-3.302961	0.0019
C	1.928278	2.086080	0.924355	0.3603
@TREND("1")	-0.047357	0.071990	-0.657825	0.5141

R-squared	0.199072	Mean dependent var	-0.026021
Adjusted R-squared	0.162667	S.D. dependent var	7.233155
S.E. of regression	6.618765	Akaike info criterion	6.679396
Sum squared resid	1927.554	Schwarz criterion	6.797491
Log likelihood	-153.9658	Hannan-Quinn criter.	6.723836
F-statistic	5.468151	Durbin-Watson stat	1.806349
Prob(F-statistic)	0.007569		

BM – I(1)

Null Hypothesis: BM has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.406869	0.8464
Test critical values:	1% level	-4.161144	
	5% level	-3.506374	
	10% level	-3.183002	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(BM)
Method: Least Squares
Date: 09/27/22 Time: 07:58
Sample (adjusted): 2 49
Included observations: 48 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BM(-1)	-0.105193	0.074771	-1.406869	0.1663
C	5.549288	2.538888	2.185716	0.0341
@TREND("1")	0.206902	0.170784	1.211483	0.2320

R-squared	0.048597	Mean dependent var	1.825517
Adjusted R-squared	0.006313	S.D. dependent var	4.276796
S.E. of regression	4.263276	Akaike info criterion	5.798414
Sum squared resid	817.8984	Schwarz criterion	5.915364
Log likelihood	-136.1619	Hannan-Quinn criter.	5.842610
F-statistic	1.149293	Durbin-Watson stat	1.561060
Prob(F-statistic)	0.325985		

D(BM)

Null Hypothesis: D(BM) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.601145	0.0002
Test critical values:	1% level	-4.165756	
	5% level	-3.508508	
	10% level	-3.184230	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(BM,2)
Method: Least Squares
Date: 09/27/22 Time: 08:00
Sample (adjusted): 3 49
Included observations: 47 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(BM(-1))	-0.831086	0.148378	-5.601145	0.0000
C	1.884266	1.374178	1.371195	0.1773
@TREND("1")	-0.016719	0.046741	-0.357681	0.7223

R-squared	0.416262	Mean dependent var	-0.072213
Adjusted R-squared	0.389728	S.D. dependent var	5.548795
S.E. of regression	4.334714	Akaike info criterion	5.832890
Sum squared resid	826.7488	Schwarz criterion	5.950984
Log likelihood	-134.0729	Hannan-Quinn criter.	5.877330
F-statistic	15.68811	Durbin-Watson stat	1.998266
Prob(F-statistic)	0.000007		

OPEN

Null Hypothesis: OPEN has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.826398	0.9558
Test critical values:	1% level	-4.161144	
	5% level	-3.506374	
	10% level	-3.183002	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(OPEN)
Method: Least Squares
Date: 09/27/22 Time: 08:02
Sample (adjusted): 2 49
Included observations: 48 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
OPEN(-1)	-0.074543	0.090203	-0.826398	0.4129
C	5.626694	3.178544	1.770211	0.0835
@TREND("1")	0.101223	0.233975	0.432623	0.6674

R-squared	0.042731	Mean dependent var	1.572862

Adjusted R-squared	0.000186	S.D. dependent var	6.900824
S.E. of regression	6.900183	Akaike info criterion	6.761434
Sum squared resid	2142.564	Schwarz criterion	6.878384
Log likelihood	-159.2744	Hannan-Quinn criter.	6.805630
F-statistic	1.004366	Durbin-Watson stat	2.071572
Prob(F-statistic)	0.374339		

D(OPEN) – I(1)

Null Hypothesis: D(OPEN) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.337273	0.0000
Test critical values:	1% level	-4.165756	
	5% level	-3.508508	
	10% level	-3.184230	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(OPEN,2)
Method: Least Squares
Date: 09/27/22 Time: 08:03
Sample (adjusted): 3 49
Included observations: 47 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(OPEN(-1))	-1.127250	0.153633	-7.337273	0.0000
C	4.092932	2.189022	1.869754	0.0682
@TREND("1")	-0.092329	0.075470	-1.223377	0.2277

R-squared	0.551050	Mean dependent var	-0.280245
Adjusted R-squared	0.530643	S.D. dependent var	10.18129
S.E. of regression	6.975163	Akaike info criterion	6.784290
Sum squared resid	2140.727	Schwarz criterion	6.902385
Log likelihood	-156.4308	Hannan-Quinn criter.	6.828730
F-statistic	27.00326	Durbin-Watson stat	1.994333
Prob(F-statistic)	0.000000		

OPEN^2 – I(1)

Null Hypothesis: OPEN2 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.369528	0.8574
Test critical values:	1% level	-4.161144	
	5% level	-3.506374	
	10% level	-3.183002	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(OPEN2)
Method: Least Squares
Date: 09/27/22 Time: 13:45
Sample (adjusted): 2 49
Included observations: 48 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
OPEN2(-1)	-0.131694	0.096160	-1.369528	0.1776
C	334.3208	479.7646	0.696843	0.4895
@TREND("1")	43.90680	44.27324	0.991723	0.3266

R-squared	0.052006	Mean dependent var	228.2239
Adjusted R-squared	0.009873	S.D. dependent var	1565.990
S.E. of regression	1558.240	Akaike info criterion	17.60096
Sum squared resid	1.09E+08	Schwarz criterion	17.71791
Log likelihood	-419.4231	Hannan-Quinn criter.	17.64516
F-statistic	1.234332	Durbin-Watson stat	2.067484
Prob(F-statistic)	0.300693		

D(OPEN^2)

Null Hypothesis: D(OPEN2) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.594194	0.0000
Test critical values:	1% level	-4.165756	
	5% level	-3.508508	
	10% level	-3.184230	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(OPEN2,2)
Method: Least Squares
Date: 09/27/22 Time: 08:07
Sample (adjusted): 3 49
Included observations: 47 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(OPEN2(-1))	-1.161981	0.153009	-7.594194	0.0000
C	635.0684	489.9989	1.296061	0.2017
@TREND("1")	-14.38948	17.09347	-0.841812	0.4044

R-squared	0.568067	Mean dependent var	-56.09175
Adjusted R-squared	0.548433	S.D. dependent var	2362.240
S.E. of regression	1587.395	Akaike info criterion	17.63928
Sum squared resid	1.11E+08	Schwarz criterion	17.75737
Log likelihood	-411.5230	Hannan-Quinn criter.	17.68372
F-statistic	28.93378	Durbin-Watson stat	2.024008
Prob(F-statistic)	0.000000		

Appendix 2

LONG-RUN RELATIONSHIP (LEVEL EQUATION) AND BOUND TEST

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INV	0.147363	0.069938	2.107047	0.0436
BANKCREDIT	-0.050885	0.017908	-2.841420	0.0080
D(BM)	-0.155213	0.053129	-2.921450	0.0066
OPEN	0.212817	0.091500	2.325868	0.0270
OPEN2	-0.001162	0.000455	-2.553057	0.0160
C	-2.741520	2.882550	-0.951075	0.3492

EC = GROWTH - (0.1474*INV -0.0509*BANKCREDIT -0.1552*D(BM) + 0.2128*OPEN -0.0012*OPEN2 -2.7415)

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
		Asymptotic: n=1000		
F-statistic	6.535400	10%	2.08	3
K	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15
		Finite Sample: n=50		
Actual Sample Size	46			
		10%	2.259	3.264
		5%	2.67	3.781
		1%	3.593	4.981
		Finite Sample: n=45		
		10%	2.276	3.297
		5%	2.694	3.829
		1%	3.674	5.019

Appendix 3

SHORT-RUN ADJUSTMENT (ERROR CORRECTION MODEL- ECM)

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GROWTH(-1))	0.471634	0.169326	2.785364	0.0092
D(GROWTH(-2))	0.301113	0.123907	2.430148	0.0213
D(INV)	0.763509	0.111063	6.874573	0.0000
D(BANKCREDIT)	-0.011020	0.049979	-0.220490	0.8270
D(BANKCREDIT(-1))	0.079534	0.054693	1.454206	0.1563
D(BANKCREDIT(-2))	0.061895	0.043534	1.421750	0.1654
D(OPEN)	0.375588	0.066913	5.613118	0.0000
D(OPEN(-1))	0.025226	0.043061	0.585814	0.5624
D(OPEN(-2))	0.126297	0.038118	3.313330	0.0024
CointEq(-1)*	-1.595602	0.215352	-7.409275	0.0000

R-squared	0.830283	Mean dependent var	-0.170969
Adjusted R-squared	0.787854	S.D. dependent var	3.614072
S.E. of regression	1.664616	Akaike info criterion	4.046727
Sum squared resid	99.75412	Schwarz criterion	4.444257
Log likelihood	-83.07471	Hannan-Quinn criter.	4.195644
Durbin-Watson stat	1.546933		

* p-value incompatible with t-Bounds distribution.

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	6.535400	10%	2.08	3
k	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15

Appendix 4

OPTIMAL LAG LENGTH

(Using AIC criteria, the optimal lag length is selected to be ARDL(3,1,3,0,3,0)

Model	LogL	AIC*	BIC	HQ	Adj. R-sq	Specification
5235	-72.773554	4.035162*	4.683958	4.275766	0.829419	ARDL(3, 1, 3, 0, 3, 0)*
5110	-71.942626	4.042847	4.732193	4.298489	0.829658	ARDL(3, 1, 4, 0, 3, 0)
1485	-70.948333	4.043106	4.773002	4.313787	0.830923	ARDL(4, 2, 3, 0, 3, 0)
4610	-72.009989	4.045909	4.735255	4.301551	0.829136	ARDL(3, 2, 3, 0, 3, 0)
5247	-73.031049	4.046866	4.695662	4.287471	0.827411	ARDL(3, 1, 3, 0, 0, 3)
1460	-70.154891	4.052495	4.822941	4.338213	0.830389	ARDL(4, 2, 3, 1, 3, 0)
2110	-72.245710	4.056623	4.745969	4.312266	0.827295	ARDL(4, 1, 3, 0, 3, 0)
1497	-71.276144	4.058007	4.787902	4.328687	0.828385	ARDL(4, 2, 3, 0, 0, 3)
1435	-69.277087	4.058049	4.869045	4.358806	0.830232	ARDL(4, 2, 3, 2, 3, 0)
5185	-71.282714	4.058305	4.788201	4.328986	0.828334	ARDL(3, 1, 3, 2, 3, 0)
4485	-71.315978	4.059817	4.789713	4.330498	0.828074	ARDL(3, 2, 4, 0, 3, 0)
4622	-72.420556	4.064571	4.753917	4.320213	0.825917	ARDL(3, 2, 3, 0, 0, 3)
2122	-72.433256	4.065148	4.754494	4.320791	0.825816	ARDL(4, 1, 3, 0, 0, 3)

Appendix 5

DATA FOR THAILAND (1960-2019)

	Thailand 2010USD	thailand					Thailand	
1960	gdppc	m	Rgdp	inflation	gdpdefl	open	growth	pop
1971	946.8831	5.5E+10	3.59E+10	-0.78632	17.68182	34.80183	4.895374	379632
1972	959.7059	6.78E+10	3.75E+10	6.336936	18.8023	37.37331	4.278508	390586
1973	1028.942	8.33E+10	4.13E+10	18.44564	22.27051	38.64926	10.23643	401595
1974	1046.424	1E+11	4.32E+10	20.33469	26.79915	45.54477	4.466253	412523
1975	1070.564	1.16E+11	4.53E+10	3.488023	27.73391	41.33795	4.970405	423263
1976	1142.056	1.4E+11	4.95E+10	4.497085	28.98113	42.94026	9.326811	433772
1977	1225.415	1.67E+11	5.44E+10	6.014699	30.72425	45.33606	9.843463	444059
1978	1321.605	1.99E+11	6E+10	9.697183	33.70364	43.99897	10.29575	454130
1979	1362.926	2.28E+11	6.32E+10	8.645577	36.61752	51.86796	5.371767	464017
1980	1404.006	2.78E+11	6.65E+10	12.70248	41.26885	54.47907	5.173541	473744
1981	1457.653	3.22E+11	7.04E+10	8.372423	44.72405	53.96867	5.906868	483262
1982	1506.688	3.97E+11	7.42E+10	5.057855	46.98613	47.54833	5.352349	492559
1983	1561.718	4.92E+11	7.84E+10	3.649156	48.70073	47.3845	5.584202	501739
1984	1621.787	5.89E+11	8.29E+10	1.447867	49.40585	48.06927	5.75243	510948
1985	1666.751	6.56E+11	8.67E+10	2.177203	50.48151	49.15523	4.64724	520269
1986	1727.34	7.45E+11	9.15E+10	1.653155	51.31605	49.17085	5.533828	529800
1987	1857.896	8.9E+11	1E+11	4.723214	53.73982	57.22798	9.518946	539458
1988	2068.516	1.05E+12	1.14E+11	5.918397	56.92035	67.41347	13.28811	548915
1989	2284.034	1.32E+12	1.27E+11	6.116743	60.40202	72.40693	12.19051	557721
1990	2503.809	1.66E+12	1.42E+11	5.773182	63.88914	75.78236	11.16716	565581
1991	2686.069	1.99E+12	1.54E+11	5.746524	67.56055	78.47113	8.55826	572324
1992	2874.14	2.29E+12	1.66E+11	4.490454	70.59432	77.95465	8.083388	578110
1993	3083.218	2.73E+12	1.8E+11	6.490655	75.17726	77.74612	8.251916	583377
1994	3299.385	3.02E+12	1.94E+11	4.672764	78.68989	81.24895	7.997025	588752
1995	3531.792	3.56E+12	2.1E+11	5.740236	83.20682	89.75617	8.120315	594672
1996	3690.27	3.93E+12	2.22E+11	4.098141	86.61652	84.27415	5.651944	601301
1997	3546.403	4.7E+12	2.16E+11	4.421168	90.44577	95.05179	-2.75358	608465
1998	3236.388	5.18E+12	1.99E+11	8.06371	97.73909	100.2405	-7.63404	615851
1999	3345.607	5.37E+12	2.08E+11	-2.57695	95.22019	100.7063	4.572308	622985
2000	3458.353	5.64E+12	2.18E+11	1.33105	96.48738	121.298	4.455247	629526
2001	3544.442	6.56E+12	2.25E+11	1.917532	98.33772	120.268	3.444249	635391
2002	3731.274	6.65E+12	2.39E+11	1.690476	100	114.9697	6.149018	640690
2003	3969.735	7.06E+12	2.56E+11	2.149531	102.1495	116.6928	7.189262	645498
2004	4190.488	7.47E+12	2.72E+11	3.569259	105.7953	127.4119	6.289342	649952
2005	4337.88	7.93E+12	2.84E+11	5.091556	111.1819	137.8539	4.187638	654161

2006	4525.956	8.57E+12	2.98E+11	5.104213	116.8569	134.0869	4.967811	658125
2007	4745.304	9.11E+12	3.14E+11	2.473338	119.7472	129.8732	5.435152	661820
2008	4801.877	9.94E+12	3.19E+11	5.13378	125.8947	140.437	1.725699	665309
2009	4744.763	1.06E+13	3.17E+11	0.194772	126.1399	119.2694	-0.69062	668668
2010	5076.34	1.18E+13	3.41E+11	4.080989	131.2876	127.2505	7.513391	671950
2011	5094.473	1.36E+13	3.44E+11	3.743098	136.2019	139.6754	0.840132	675183
2012	5437.878	1.5E+13	3.69E+11	1.909144	138.8023	137.6749	7.242796	678359
2013	5558.737	1.61E+13	3.79E+11	1.778746	141.2715	132.4623	2.687496	681445
2014	5589.326	1.68E+13	3.83E+11	1.441486	143.3078	130.9055	0.984425	684387
2015	5741.354	1.76E+13	3.94E+11	0.722159	144.5394	124.8398	3.133897	687145
2016	5916.126	1.83E+13	4.07E+11	2.658072	147.9517	120.5566	3.42922	689713
2017	6135.472	1.92E+13	4.23E+11	1.979357	151.3877	120.9079	4.06625	692098
2018	6370.015			1.464479		120.8992	4.150762	694285
2019	6501.556			0.747796		110.2992	2.371876	696255

	Thailand %gdp inv	%gdp govexp	%gdp bm	pcgrowth	%gdp cons	gdpflation	expgrowth	%gdp hhcons
1960	23.3292	11.52282	35.87093	1.914729	79.85593	-0.78632	18.3036	68.333
1971	22.71076	10.91828	39.88295	1.354214	80.05703	6.336936	16.60333	69.138
1972	22.48402	9.741108	37.49455	7.21429	76.84467	18.44564	-4.53029	67.103
1973	23.2919	9.342765	35.88352	1.699024	77.44269	20.33469	7.796834	68.099
1974	22.87504	10.31652	38.25308	2.306886	79.98088	3.488023	-4.71718	69.664
1975	22.90534	10.96941	40.34173	6.678005	79.55959	4.497085	24.09212	68.590
1976	25.92862	10.63767	41.38867	7.299013	78.01437	6.014699	11.17059	67.37
1977	25.2456	11.18046	40.74111	7.849596	75.69971	9.697183	12.44015	64.519
1978	25.56074	11.95169	40.72185	3.126629	77.08463	8.645577	10.42535	65.132
1979	27.77238	12.29211	42.01139	3.014062	77.74068	12.70248	7.707118	65.448
1980	27.98965	12.7581	42.37007	3.820997	78.04555	8.372423	9.160943	65.287
1981	26.94111	13.09067	47.21198	3.363992	76.66133	5.057855	11.65938	63.570
1982	28.46266	12.87496	53.39632	3.652346	77.97455	3.649156	-5.98326	65.099
1983	28.60111	13.16708	59.56151	3.846328	76.82016	1.447867	17.25816	63.653
1984	27.16507	13.52797	62.08993	2.772543	75.74898	2.177203	9.788936	62.221
1985	25.78029	12.75493	65.76239	3.635113	74.14419	1.653155	15.41645	61.389
1986	27.63793	11.32568	68.48048	7.558241	71.41155	4.723214	21.80561	60.085
1987	30.67911	10.04678	67.32175	11.33645	66.78519	5.918397	27.17106	56.738
1988	34.61921	9.520665	71.35034	10.419	65.01703	6.116743	21.53783	55.496
1989	40.38222	9.404615	76.16468	9.622219	65.96315	5.773182	13.39416	56.558
1990	41.63159	9.220608	79.21595	7.279291	64.19718	5.746524	15.14002	54.976
1991	39.25527	9.897969	81.0234	7.001721	64.66816	4.490454	13.80741	54.770
1992	39.06462	11.00126	83.63294	7.274472	62.9607	6.490655	12.98493	51.959
1993	39.99973	11.05226	81.88888	7.011076	63.18317	4.672764	13.10492	52.13
1994	41.32128	11.2506	84.3357	7.043963	62.55153	5.740236	15.37044	51.300
1995	41.65495	11.58426	84.82529	4.487173	63.2932	4.098141	-4.48368	51.708
1996	34.61144	12.08383	99.86532	-3.89854	65.08451	4.421168	9.051943	53.000

1997	22.15179	13.06449	110.1261	-8.74168	64.73961	8.06371	10.79142	51.675
1998	20.41001	13.56905	112.2033	3.374704	66.75767	-2.57695	8.635969	53.188
1999	21.57493	13.57597	111.2093	3.369969	67.7097	1.33105	15.83187	54.133
2000	22.48037	13.4745	122.7591	2.489317	69.47729	1.917532	-0.02039	56.00
2001	21.91159	13.17238	115.2106	5.271118	68.82987	1.690458	5.887284	55.657
2002	23.0319	12.92555	111.7933	6.390879	68.55682	2.149549	9.133828	55.631
2003	24.86419	13.11369	107.4364	5.560908	68.98855	3.569259	14.63108	55.874
2004	27.71262	13.65362	104.1042	3.517292	69.4935	5.091556	7.759717	55.839
2005	26.84663	13.50226	102.0562	4.335657	67.95342	5.104213	10.78768	54.451
2006	25.45625	13.92595	100.3654	4.846449	66.47435	2.473338	8.89375	52.54
2007	26.44772	14.34195	102.4457	1.192206	67.98135	5.13378	6.263624	53.63
2008	23.10895	15.98005	109.9221	-1.18942	69.04583	0.194772	-12.1403	53.065
2009	23.9927	15.80082	108.9809	6.988282	67.97635	4.080989	14.22026	52.175
2010	25.83637	16.14178	119.9257	0.357196	69.10272	3.743098	9.509416	52.960
2011	26.99365	16.35298	121.1165	6.740738	69.62138	1.909144	3.661679	53.26
2012	25.38354	16.36349	124.3692	2.222548	68.91573	1.778746	2.514338	52.552
2013	24.6614	16.91636	127.0496	0.550277	69.51256	1.441486	0.345468	52.59
2014	24.52852	17.12117	127.7308	2.719976	68.46783	0.722159	1.250152	51.346
2015	23.70996	16.86347	125.3769	3.044093	66.86611	2.658072	2.696053	50.002
2016	23.11583	16.28157	124.0617	3.707593	65.22561	1.979357	5.178552	48.944
2017	22.77277	16.15208	122.8777	3.822738	65.05184	1.464479	3.348039	48.899
2018	22.60249	16.13414	123.4958	2.065004	66.19562	0.745988	-2.60648	50.061
2019								

	Thailand 2010=100 cpi	%gdp bankcredit	%gdp capform	%gdp govexpedu
1960	12.83813	20.53673	24.2086	3.06622
1971	13.45921	20.94348	21.67666	3.02915
1972	15.54667	22.48382	26.99595	2.55425
1973	19.32662	24.18157	26.63503	2.14687
1974	20.35675	27.65596	26.75041	2.38088
1975	21.20141	34.44872	23.98528	3.01672
1976	22.81299	38.23777	26.88476	3.21512
1977	24.62071	41.65936	28.16387	3.21512
1978	27.05751	43.18345	27.20523	2.84529
1979	32.38879	40.74802	29.14192	2.57454
1980	36.49018	41.89036	29.67531	2.88314
1981	38.40922	44.63836	26.51654	3.27388
1982	39.84056	52.97959	29.97528	3.46387
1983	40.18514	56.7309	29.47311	3.43722
1984	41.16233	58.27108	28.24458	3.43722
1985	41.92041	56.7924	25.87231	3.40798
1986	42.95436	59.44409	27.87471	3.11582

1987	44.61357	64.05809	32.59089	2.75342
1988	47.00284	71.89809	35.06612	2.50243
1989	49.75908	83.36905	41.35376	2.50243
1990	52.60025	89.09622	42.84138	3.0886
1991	54.77745	98.46947	39.96395	3.04541
1992	56.59178	108.0099	39.65615	3.04541
1993	59.4484	125.6789	40.90778	3.40523
1994	62.90721	138.7866	42.86269	3.14498
1995	66.55904	146.3121	42.53269	3.49961
1996	70.30352	166.5037	34.27473	4.57719
1997	75.92409	153.4059	20.0715	4.6257
1998	76.14027	127.7173	20.17341	4.83267
1999	77.3524	105.1218	22.28261	5.25346
2000	78.61085	93.07866	23.11244	4.81787
2001	79.15901	96.86939	22.74419	3.86492
2002	80.58732	94.13453	23.8293	3.72561
2003	82.81084	95.14207	25.68141	4.03089
2004	86.57076	93.82807	30.42075	3.93859
2005	90.58546	88.90583	27.01164	4.05038
2006	92.61597	86.22632	25.49601	3.60315
2007	97.68066	87.70824	28.22643	3.5085
2008	96.85456	90.34107	20.6364	3.86194
2009	100	90.68259	25.35665	3.50844
2010	103.8088	101.429	26.79146	4.80555
2011	106.9385	106.3724	28.02417	4.53671
2012	109.275	111.52	27.4571	4.12402
2013	111.3459	113.9942	23.91902	3.72356
2014	110.3433	115.8562	22.35567	3.75967
2015	110.5509	113.7234	21.10223	3.63752
2016	111.2868	112.0994	22.92931	3.35573
2017	112.4708	112.1912	25.18728	3.05677
2018	113.2656	111.3749	23.95005	2.96898
2019				

CIECI 2022 Conference- Vietnam

ĐẠI HỌC QUỐC GIA HÀ NỘI
TRƯỜNG ĐẠI HỌC KINH TẾ
VNU UNIVERSITY OF ECONOMICS & BUSINESS

FRIEDRICH NAUMANN FOUNDATION For Freedom.
Việt Nam

AGENDA
International Conference (CIECI 2022)
International Economic Integration: Journey to new-generation FTAs

Time: 8.00 - 16:00, Friday, 25 November 2022
Venue: Room 801, Building E4, 144 Xuan Thuy street, Cau Giay district, Hanoi, Vietnam

Time	Activities
8:00 - 8:30	**Registration**
8:30 - 9:00	**Opening remarks and photo session** - **Representative** *from Vietnam National University - Hanoi* - **Assoc. Prof. Nguyen Truc Le,** *President of University of Economics and Business, Vietnam National University - Hanoi (VNU-UEB)* - **Prof. Andreas Stoffers,** *Country Director Vietnam, Friedrich Naumann Foundation for Freedom, Vietnam*
9:00 - 9:20	**Keynote 1: International Economic Integration: Journey to the new-generation FTAs** **Prof. Peter Draper**, *Executive Director of the Institute for International Trade, University of Adelaide, Australia*
9:20 - 9:40	**Keynote 2: Vietnam's journey to new-generation FTAs** **Assoc. Prof. Nguyen Anh Thu,** *Vice Rector of University of Economics and Business, Vietnam National University - Hanoi (VNU-UEB)*
9:40 - 10:00	**Tea break**
10:00 - 11:30	**Round Table and Q&A**

	Round Table Session 1: Formation and prospects of new generation FTAs - **Assoc. Prof. Nguyen Anh Thu,** *Vice Rector, University of Economics and Business, Vietnam National University - Hanoi (VNU-UEB), Vietnam* - **Assoc. Prof. Huynh Thi Thuy Giang,** *Vice President of the University of Economics and Law, Vietnam National University - Ho Chi Minh city, Vietnam* - **Prof. Peter Draper,** *Executive Director of the Institute for International Trade, University of Adelaide, Australia* - **Prof. Narong Petprasert**, *Dean of the Faculty of Economics, Rangsit University, Thailand* - **Assoc. Prof. Marcellin Yovogan,** *Vice Dean of the Faculty of Economics and Business Administration, Sofia University, Bulgaria* **Round Table Session 2: Vietnam's implementation of new generation FTAs** - **Dr. Vu Thanh Huong**, *Vice Dean of the Faculty of International Business and Economics, VNU-UEB, Vietnam* - **Dr. Trinh Minh Anh, *General Director*** *of Office of the Inter-Agency Steering Committee for International Economic Integration, Ministry of Industry and Trade, Vietnam* - **Assoc. Prof. Dao Ngoc Tien,** *Vice President of the Foreign Trade University, Vietnam* - **Dr. Nguyen Thi Thu Trang,** *Director of the WTO and International Trade Center, Vietnam Chamber of Commerce and Industry, Vietnam* - **Mr. Nguyen Dinh Vinh,** *Chairman of the BoD of Hanel JSC.,Vice Chairman of Vietnam Electronic Industries Association, Vietnam*
11:30 – 13:30	**Lunch**
13:30 - 16:00	**Parallel Sessions and Wrap up** **Session 1: Impacts of FTAs on International Trade** Room 801, Building E4, 144 Xuan Thuy Str., Cau Giay Dist., Hanoi, Vietnam **Co - chaired** by • **Prof. Shandre M. Thangavelu**, *Institute for International Trade, University of Adelaide, Australia* • **Dr. Vu Thanh Huong**, *Vice Dean of the Faculty of International Business and Economics, VNU-UEB, Vietnam* **Presentations:** • *The impact of the UKVFTA on Vietnam's exports of garments: An application of SMART model* **Nguyen Ngoc Diep**, *Thuongmai University, Vietnam* • *Potential gains from India-Australia Free Trade Agreement: An*

Ex-Ante Evaluation
Pravin Jadhav, Prajakta Arote, Rahul Choudhury, *IIRAM, India*

- *Assessing impacts of the United Kingdom - Vietnam Free Trade Agreement on Vietnam's electronics exports*
  Vu Thanh Huong, Nguyen Huu Chuyen, *VNU-UEB, Vietnam*

- *The Impact of Participating in the Regional Comprehensive Economic Partnership (RCEP) Agreement and Potential Export Markets for Vietnamese Rice: An Application of Augmented Gravity Model*
  Jadhav Chakradhar, Trinh Thanh Thao, *Centre for Economic and Social Studies (CESS), Vietnam*

Session 2: FTAs and Sustainable Growth
Room 506, Building E4, 144 Xuan Thuy Str., Cau Giay Dist., Hanoi, Vietnam

Co-chaired by

- **Dr. Wanakiti Wanasilp,** *Rangsit University, Thailand*
- **Dr. Nguyen Tran Ngoc Cuong,** *Lecturer of the Faculty of International Business and Economics, VNU-UEB, Vietnam*

Presentations:

- *Trade and Sustainable Development in New Generation FTAs: Depth, Scope, and Implications*

  Paul R Baker, *International Economics Consulting, Mauritius; Department of Economics, University of Mauritius, Mauritius; European Interdisciplinary Studies Department, College of Europe, Warsaw, Poland;* **Loan Le,** *International Economics Consulting, Ho Chi Minh City, Vietnam*
- *The Nexus Between Trade Openness and Growth: The Case of Thailand*
  Wanakiti Wanasilp, *Rangsit University, Thailand*

- *The existence of mercantilism: Implications for trade liberalization*
  Champ Nimpiboon, Narong Petprasert, Sitanon Jesdapipat, *Rangsit University, Thailand*

- *Export Comparative Advantage and Forecasted Export Value of Cereals and Cereal Preparations of Vietnam in ASEAN from 2022 to 2030*
  Nguyen Thi Ngoc Diep, *Tran Quang Canh*, *Vietnam National University – Ho Chi Minh City, Vietnam*

Session 3: FTAs and Sectoral Development
Room 302, Building E4, 144 Xuan Thuy Str., Cau Giay Dist., Hanoi, Vietnam

Co-chaired by

- **Prof. Andreas Stoffers,** *Country Director Vietnam, Friedrich Naumann Foundation for Freedom, Vietnam*
- **Dr. Cao Thi Hong Vinh,** *Lecturer of the Faculty of Graduate Studies, Foreign Trade University, Vietnam*

Presentations:

- *Impacts of new generation FTAs on Vietnam's service trade liberalization*
  Nguyen Huu Hoang, *Vietnam Court Academy*
- *Cross-Border Electronic Commerce and New Generation FTAs in Vietnam – An Analysis and Implication*
  Chung Tu Bao Nhu, Huynh Thi Thuy Giang, Truong Kim Huong, *Vietnam National University - Ho Chi Minh City, Vietnam*
- *The Effects of Employees' Perception of CSR on Job Satisfaction in Vietnam Hotel Industry During Economic Integration Context: The Moderating Role of Organizational Identification*
  Dang Thi Phuoc Toan, Do Thi Thanh Vinh, *Vietnam National University – Ho Chi Minh City, Vietnam*
- *Digital Transformation and Degree of Internationalization: The Moderating Role of Innovation Capabilities and Government Institutional Support*
  Vo Thi Thuy Duong, Pham Ngoc Dan Que, Tran Dang Anh Tuan, *Vietnam National University - Ho Chi Minh City, Vietnam*

Session 4: Economic Integration Issues
Room 303, Building E4, 144 Xuan Thuy Str., Cau Giay Dist., Hanoi, Vietnam

Co- chaired by

- **Assoc. Prof. Marcellin Yovogan,** *Vice Dean of Faculty of Economics and Business Administration, Sofia University, Bulgaria*
- **Dr. Luu Tien Dung,** *Vice Dean of Faculty of International Economic Relations, University of Economics and Law, Vietnam National University - Ho Chi Minh City, Vietnam*

Presentations:

- *Sustainable Finance and Performance: Do Firms Implementing ESG Parameters Have Better Financial Performance?*
  Marcellin Yovogan, Desislava Petkova, *Sofia University,*

	Bulgaria • *Regional Economic Integration in Africa: SADC's Challenges and Opportunities* **Katlego Kym Nawa, Pan**, *African University, Institute of Governance, Humanities and Social Sciences (African Union Commission)* • *Implimentation and Utilization of Commitments in the WTO and New Generation FTAs: Preliminary Report on the Results of Enterprise Survey within the Framework of FTU-WTO Chairs Programme* **Pham Thi Cam Anh, Do Ngoc Kien, Vu Kim Ngan, Hoang Thi Minh Hang,** *Foreign Trade University, Vietnam* • *U.S.Federal Reserve's Monetary Policy and its Impact on Vietnam's Trade and Investment* **Le Minh Tuan**, *Faculty of International Business and Economics, VNU - UEB, Vietnam*

Coordinator: Msc Tran Huong Linh
Mobile: +84346714268
Email: tranhuonglinh@vnu.edu.vn

ARTICLE PUBLISHED IN THE CIECI 2022 CONFERENCE PROCEEDING

The Nexus Between Trade Openness and Growth: The Case of Thailand

Wanakiti Wanasilp

Faculty of Economics, Rangsit University, Thailand.

(Email: wanakiti@rsu.ac.th)

Abstract

This paper investigates the nonlinear relationship between the degree of trade openness and GDP growth rate for the case of Thailand. It is hypothesized that the growth rate will increase concurrently with the rising trade openness at the beginning periods of trade. However, a certain turning point will be reached, beyond which the growth rate will decline even though the trade openness keeps on rising. The reason behind this is that, at the beginning, the international trade may stimulate the growth by enlarging the scale of production, with increasing marginal product of input. But later on, as more trade being expanded without limit, the marginal product will eventually decline as suggested by microeconomic theory.

The Auto-Regressive Distributed Lag (ARDL) model is employed to estimate the long run relationship and short run adjustment among the variables involved. Our attention will focus on the nonlinear impact of trade openness on output growth rate. The result from the estimation indicates that the growth rate function is concave with respect to trade openness. Hence, the optimal degree of trade openness that maximizes the growth rate can be derived, which for the case of Thailand is found to be 91.57%. At this level of trade openness, the associated maximum annual output growth is attained at 9.74%.

The policy implication of this finding is in order. It is recommended that it is necessary for the policy maker to study to find the optimal level of trade openness that will yield the maximum output growth rate. If the trade openness is expanded beyond this optimal level, then the growth rate will go down and might even turn to negative growth at some point.

Keywords: Output Growth, Trade Openness, ARDL

1. Introduction

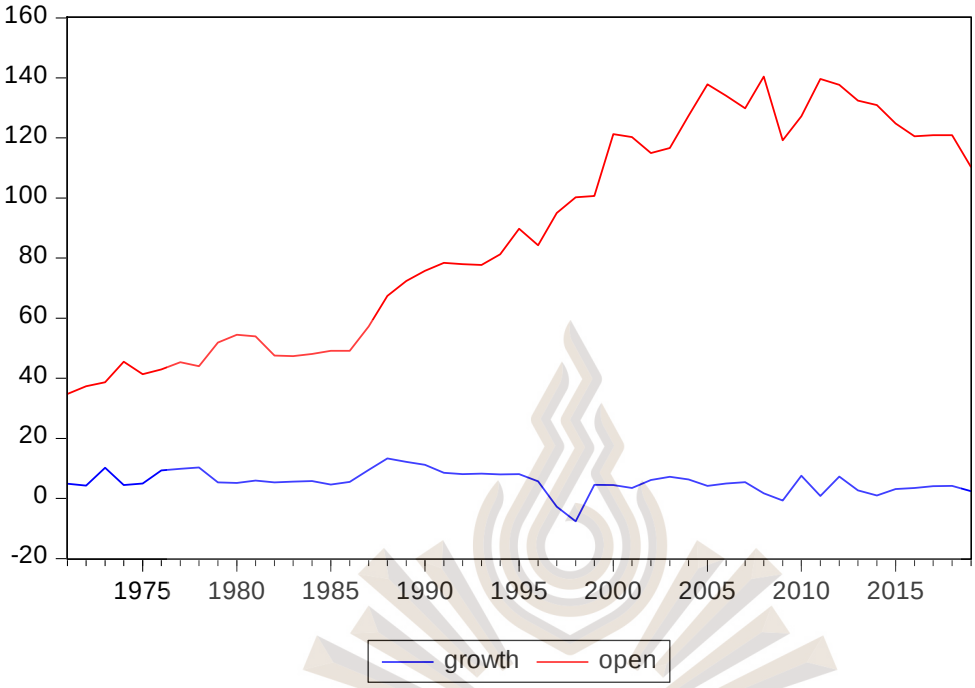
During 1990's, the world had experienced a high level of globalization, as seen in gigantic increases in the volume of international trade and investment. These international trade activities will benefit the countries involved in terms of higher GDP growth and GDP per capita. The highly successful group of countries that enjoyed the gain from trade the most are those in the East and South-East Asian region, such as Singapore, Taiwan, South Korea, Hong Kong, Malaysia, and Thailand. Some of them had achieved a double-digit annual growth rate of GDP for many consecutive years during that period.

Even though the degree of globalization or Trade Openness kept increasing well into 2010 decade, the GDP growth seemed to decline since the start of the decade for countries involved in trade. The exception is China, where the double-digit growth had been enjoyed for almost every year during 2010's.

From our observation, the decline in output growth seemed to occur when the degree of Trade Openness is high. We conjecture at this point that, the higher the degree of trade openness that any country is exposed to, the more production of output will be carried out to satisfy the demand from international market. When the scale of production is enlarged beyond the normal capacity, more stress would be exerted on limited resources being used in production process. This will result in lower Marginal Product of input and hence the lower growth rate of GDP for the economy engaging in higher level of international trade.

Although we agree with the existing theory which claims that international trade can stimulate output growth via the transfer of technology and specialization that can help improve productivity of labor, this research work will attempt to explore from other angles. We put forward that, as the degree of trade openness is expanded beyond some critical range, the trade openness will have negative impact on output growth as a result from declining marginal product of limited input due to increasing scale of production forthcoming from the enlargement of the trade openness. In other words, we propose that the trade openness, when expanding to some range, might result in the over-capacity production, and hence will force the marginal product to decline. This over-capacity production will in turn cause the output growth rate to go down when the level of trade openness increases to certain critical range.

The author has selected Thailand as a case study. For a preliminary observation, the data of the degree of Trade Openness and GDP growth rate for Thailand during 1970-2019 were plotted on a graph below.

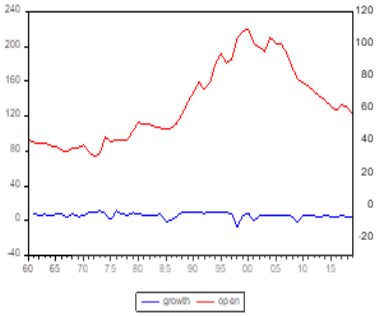


As shown in the graph, the GDP growth of Thailand appeared to increase and reach the height at double digit level around late 1980's. After that period, the growth rate started to decline, despite the fact that the trade openness kept increasing continuously from 1970's to 2010's. When trade openness reached the peak at around 130% at the beginning of 2010's, the output growth rate has gone down to around 6%, and further down to 4% towards late 2010's period.

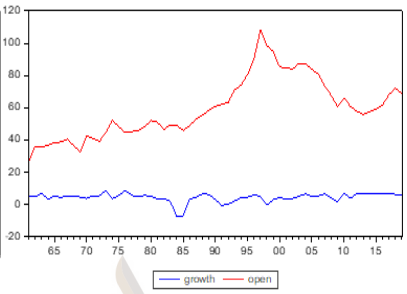
Viewing from other perspective, we can say that, the output growth and trade openness will move up together at the beginning range of international trade. Later on, at some critical point, the output growth will decouple from the trade openness. It will be declining from that point onward and will never go back to co-move with the trade openness again.

The data on growth and trade openness for some countries in Asia are also plotted below for comparison. It can be seen that the movements of the two variables share the same pattern as appeared in the case of Thailand. That is, both output growth and trade openness seemed to move upward together at the beginning range of trade expansion. However, when trade openness increased to a certain level, the output growth is seen to decouple from trade openness by moving downward, despite the trade openness that still kept on expanding continuously.

Malasia

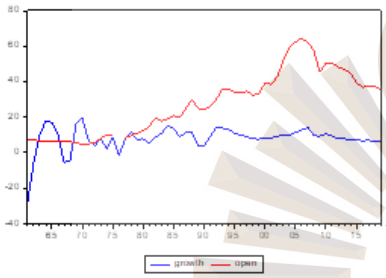


Philippines

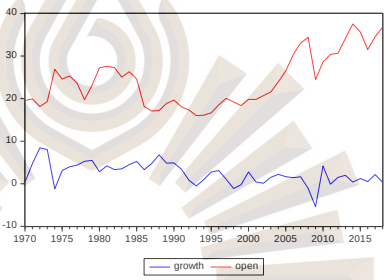


7

China



Japan



With this observation in mind, the author hypothesizes that, the trade openness will have positive impact on GDP growth at the beginning. At some point later on, the impact of trade openness on growth will turn negative, due to the declining marginal product of limited resources used as the scale of production is increasing in response to increasing demand from international trade.

In this paper, the Auto-Regressive Distributed Lag (ARDL) model will be employed to estimate the impact of various factors affecting output growth. Our particular focus is on the impact of the level of trade openness on GDP growth which we assume the impact to be nonlinear. In simple words, we hypothesize that the relationship between trade openness and growth will be positive at the beginning range of trade openness. But as the level of trade openness is increasing, the point will be reached at which the rate of output growth is maximized. If the level of trade openness is expanding further beyond this point, the relationship between trade openness and output growth will become negative, which will result in the associated output growth rate getting decline continuously and may eventually turn to negative growth rate at some range of trade openness.

The selection of explanatory variables is based on the basic theory of aggregate demand and aggregate supply (AD-AS framework) that determines the equilibrium of Gross Domestic Product (GDP). The key variables that drive Aggregate Demand (AD) comprise the familiar

money supply, household consumption, investment, government spending and net export. In this research work, we will use the Trade Openness to represent the volume of international trade. It is measured as a ratio of the value of import plus export divided by gross domestic product.

On the aggregate supply side, the key drivers are labor, capital, technology, human capital (comprising education, health and R&D), infrastructure, oil, natural resources, among others.

The paper is organized as follow. Section 1 is an introduction. Section 2 presents a literature review. The methodology is explained in Section 3. In Section 4 the estimation results are summarized and interpreted. Section 5 is a conclusion with policy implication being proposed.

2. Literature Review

The new growth theory holds that international trade will help stimulate output growth via technology transfer and specialization in production (Roe, T. and H. Motadi (2001)). The results from empirical tests performed in existing literature so far are still inconclusive in support of the above claim. The approach used in earlier period is to establish the direct association between trade openness and output growth to find the impact of trade on growth. The results of the empirical research along this line are mostly in favor of the trade being beneficial to output growth. Those that find positive impact of trade on growth include, as for examples, the work of Sachs and Warner (1995), Frankel and Romer (1999), and Willard (2000).

Later on, there were some doubts about the methodology and the measurement of index and data used in earlier research works that yield the result in favor of the positive relationship between trade and growth. Mendoza (2010) claims otherwise that the positive relation between trade and growth is conditional, meaning that other factors may have influence on this relation as well. Stone and Strutt (2009) put forward that good infrastructure of the economy is a necessary condition for trade to be beneficial to growth. Chang et al., (2005) hold their view that the positive impact of trade on growth will be strengthened by good infrastructure, high investment in human capital, and deep financial market.

The development in research work on the relationship between trade and growth as mentioned above has provided new directions for researcher in this area in later periods. Fatima, S., et.al. (2020) employed a GMM method for dynamic panel data to investigate the impact of trade openness on GDP growth for both developed and developing countries covering the period 1980-2014. The Human Capital Accumulation (HCA) is treated as an intervening variable. Under this setting, trade may have negative impact on growth when countries exhibit a low level of HCA.

Huang, L.C., et.al. (2014) examine whether financial development is associated with a stronger or weaker trade openness–growth relationship. Both linear and nonlinear econometric models are used with panel data for 46 countries from 1983 to 2007. The results indicate that in countries with higher stock market development trade openness enhances economic growth, while in countries with less stock market development the ability of trade to facilitate growth is weak.

Ramzan, M., B., et.al. (2019) employed GMM method to investigate the relationship between GDP growth and trade openness from the panel data of 82 countries during the period 1980- 2014. They establish that GDP growth is related to trade openness via Total Factor Productivity (TFP). In particular, : trade may have a negative impact on GDP growth when countries have specialized in low-TFP development level. However, at the high level of TFP development, trade openness will have positive impact on GDP growth.

Keho, Y. (2017) examines the impact of trade openness on economic growth for Cote d'Ivoire over the period 1965–2014 in a multivariate framework, including capital stock, labor and trade openness as regressors. The researcher uses the Autoregressive Distributed Lag bounds test to cointegration and the Toda and Yamamoto Granger causality tests. The results show that trade openness has positive effects on economic growth both in the short and long run.

Awokuse, T.O. (2008) re-examines the relationship between trade and economic growth in Argentina, Colombia, and Peru, with emphasis on both the role of exports and imports. Granger causality tests and impulse response functions were used to examine whether increase in trade stimulates economic growth (or vice versa). The results suggest that, although there is some empirical evidence supporting export-led growth, the empirical support for import-led growth hypothesis is relatively stronger. In some cases, there is also evidence for reverse causality from gross domestic product growth to exports and imports.

Hye, Q.M.A. (2012) investigate the long run effect of trade openness on economic growth in the case of Pakistan from 1971 to 2009. A composite trade openness index is developed by using principal component analysis (PCA) and is employed in the JJ cointegration, autoregressive distributed lag (ARDL) approach to cointegration, dynamic OLS and variance decomposition. The results suggest the existence of a negative and significant association between trade openness and economic growth.

As for Hye, Q.M.A., et.al. (2016), the autoregressive distributed lag (ARDL) cointegration technique and rolling regression method are used. The empirical findings indicate that trade openness is positively related to economic growth in the long run and short run. However, results from the rolling window suggest that trade openness is negatively linked to economic growth only for a number of years.

As for the case of Thailand, there are quite a number of empirical works that deal with the investigation of the relationship between trade openness and GDP growth. Examples of these works are:

Diaoa, X., et.al. (2005) analyze the general equilibrium interaction between productivity and investment in an intertemporal growth model using the data of Thailand during the period of 1960- 1995. They found that the spillover from international trade can increase productivity through rising investment. Hence, the positive relation between trade openness and GDP growth can be established.

Thangavelu, S.M. and G. Rajguru (2004) investigate the relationships between trade and labor productivity for nine rapidly developing Asian countries, including Thailand, in a timeseries framework using a vector error-correction model. The impact from trade was divided into export-led and import-led. It was found that there is no causal effect from exports to labor productivity growth for some countries under investigation. Rather, the impact from import to labor productivity is found to be significant. This suggests that import-led growth is stronger than export-led one.

Asada, H. (2022) applies the autoregressive distributed lag approach, using data for Thailand from 2000 to 2017. It was found that trade openness and human capital development contributed positively to Thailand's GDP growth in the long run, while FDI inflows contributed negatively.

Kohpaiboon, A. (2003), using data of Thailand during 1970- 1999, he examines the impact of FDI on GDP growth, conditioning on the level of trade openness. It is found that, the impact of FDI on growth will be greater under Trade Promotion regime as compared to that of the Import Substitution regime.

Hussin, F. and N. Saidin (2012) examines the impact of economic variables which are foreign direct investment (FDI), openness and gross fixed capital formation on economic growth of ASEAN-4 countries over the period 1981- 2008. The impact of variables to GDP is estimated using three panel estimation models which are called pooled model (pooled), fixed effects model (FEM) and random effects model (REM). The findings show that all variables are correlated with each other and also have the positive relationship to GDP. Hence, all variables may lead economic growth boost when they are increase whereas FDI becomes the most efficient variable in order to assist economic growth and followed by openness and gross fixed capital formation.

Sriyana, J., & Afandi, A. (2020 examine the effects of trade openness and other economic variables such as foreign direct investment, gross capital formation and human capital on economic growth in selected ASEAN countries. Using long term annual data, the empirical NARDL models incorporate asymmetric effects of trade openness on economic growth. This paper highlights that trade openness has a net positive impact on economic growth only in the Philippines and Singapore. It implies that most of the other countries in that region have a challenge regarding the implementation of trade liberalization.

While the results from existing literature are still inconclusive with regard to the impact of trade openness on output growth, this research work will look at the problem from different angle. We will assume that output growth is a nonlinear function of the degree of trade openness, other things being equal. With this setting, the impact of the trade openness on growth can be positive in some range and may change to negative in other range. And if the

growth function is well-behaved, then the optimal level of trade openness can be found and the associated maximum growth rate can be computed.

Therefore, the contribution of this paper will be to conduct the empirical work to establish the nonlinear relationship between trade openness and GDP growth for the case of Thailand. In addition, with this setting, the optimal level of the degree of openness can be calculated and set as a policy target so that the maximum GDP growth rate can be achieved.

3. Methodology

Unit Root Test:

Prior to processing the ARDL equation, each and every variable must be tested for stationarity, the so-called Unit Root Test. Following Dickey, D.A. and W. Fuller (1981), the equation for Augmented Dickey-Fuller (ADF) test for unit root is as follow.

$$\Delta y_t = \alpha + \beta t + \gamma y_{t-i} + \sum_{i=1}^{p} \theta_i \, y_{t-1} + \varepsilon_t \quad (1)$$

The hypothesis is H_o: $\gamma = 0$ The series y_t has unit root (nonstationary)

H_a: $\gamma < 0$ The series y_t has no unit root (stationary)

If H_o is rejected (i.e., stationary) at the level of the data, we say that the series is integrated of order 0, or I(0).

But if H_o is rejected (i.e., stationary) at the first difference of the data, we say that the series is integrated of order 1, or I(1).

ARDL Model

The ARDL model was developed by Pesaran, M.H., Y. Shin and R.J. Smith (2001). The model is the extension of the Cointegration and Error Correction models. It combines both long run and short run variables in one single equation. Consequently, the ARDL model has an advantage over the cointegration model in that it can include variables of different order of integration, I(0) and I(1) in particular, in one single equation for processing. On the contrary, the Cointegration model will accept only I(1) variables in its long run relationship equation.

The general form of ARDL model is shown below.

$$\Delta y_t = \alpha + \sum_{i=1}^{p} \gamma_i \Delta y_{t-i} + \sum_{i=1}^{p} \beta_{1i} \Delta x_{1t-i} + \sum_{i=1}^{p} \beta_{2i} \Delta x_{2t-i} + \cdots \ldots$$

$$+ \cdots \ldots \ldots + \sum_{i=1}^{p} \theta_i y_{t-1} + \sum_{i=1}^{p} \tau_{1i} x_{1t-1} + \sum_{i=1}^{p} \tau_{2i} x_{2t-1} + \cdots \ldots + \varepsilon_t \quad (2)$$

Where

$\alpha,\ \gamma_i, \beta_{1i}, \beta_{2i}, \theta_i,\ \tau_{1i}, \tau_{2i}$ are parameters to be estimated

Δ is the first difference operator

y_t is the dependent variable of our interest

x_{1t}, x_{2t},….., are relevant explanatory variables

ε_t is the error or residual term

i = 1,2,3,….,p is lag length

Variables

In this paper, the variables under investigation include the following.

The dependent variable is Real GDP Growth (GROWTH)

The explanatory variables that drive GDP growth rate comprise:

INV is private investment

BANKCREDIT is the credit issued by banks to private sector

BM is Broad Money defined as bank notes in circulation plus all deposits at financial Institutions

OPEN is the degree of Trade Openness

$OPEN^2$ is the square of the degree of Trade Openness

The data of each variable mentioned above is expressed as a percent of GDP.

The selection of the variables for processing is based on the theoretical underpinning and the availability of the data during the period under study. All data are annual data, covering the periods of 1970- 2019. These data were collected from the website of the World Bank.

4. Estimation Results

Unit Root Test

The result of Unit Root Test for stationarity is shown in Table 1 below.

Table 1 Unit Root Test

With Intercept and Trend	t-statistic	Critical Value	Prob. Value	Order of Integration
GROWTH	-4.3041	-4.1611	0.0068*	I(0)
INV	-2.6796	-4.1658	0.2494	I(1)
D(INV)	-4.9014	-4.1706	0.0018*	
BANKCREDIT	-2.4019	-4.1658	0.3739	I(1)
D(BANKCREDIT)	-3.3030	-3.1842	0.0783***	
BM	-1.4069	-4.1611	0.8464	I(1)
D(BM)	-5.6011	-4.1658	0.0002*	
OPEN	-0.8263	-4.1611	0.9558	I(1)
D(OPEN)	-7.3373	-4.1658	0.0000*	
OPEN2	-1.8695	-4.1611	0.8574	I(1)
D(OPEN2)	-7.5942	-4.1658	0.0000*	

Note: H_o: There exists a unit root. H_a: No unit root present.
D means first difference. *, **, and *** is significant at 1%, 5%, and 10% respectively.

The results from Unit Root Test above indicate that GROWTH is I(0) (i.e., stationary at level). The rest of the variables are I(1) (i.e., stationary at first difference). Note that, when the variables are different in term of the order of integration, the basic cointegration model cannot be employed for processing. In this case, the ARDL model, introduced by Pesaran, M.H., Y. Shin and R.J. Smith (2001), can come in handy.

ARDL- Optimal Lag Length:

Using AIC criteria, the optimal lag model is selected to be ARDL(3,1,3,0,3,0), where the minimum value of AIC is attained.

Table 2 Optimal Lag Model (Using AIC Criteria)

Model	LogL	AIC*	BIC	HQ	Adj. R-sq	Specification
5235	-72.773554	4.035162*	4.683958	4.275766	0.829419	ARDL(3, 1, 3, 0, 3, 0)*
5110	-71.942626	4.042847	4.732193	4.298489	0.829658	ARDL(3, 1, 4, 0, 3, 0)
1485	-70.948333	4.043106	4.773002	4.313787	0.830923	ARDL(4, 2, 3, 0, 3, 0)
4610	-72.009989	4.045909	4.735255	4.301551	0.829136	ARDL(3, 2, 3, 0, 3, 0)
5247	-73.031049	4.046866	4.695662	4.287471	0.827411	ARDL(3, 1, 3, 0, 0, 3)

ARDL- Level Equation (long run relationship)

The result from the estimation of long run relationship is shown as in the following equation.

GROWTH = - 2.741520 + 0.147363.INV - 0.050885.BANKCREDIT - 0.155213.D(BM) + 0.212817.OPEN -

(prob) (0.3492) (0.0436)** (0.0080)* (0.0066)* (0.0270)*

$- 0.001162.OPEN^2$

(prob) (0.0160)**

(3)

Note: * is significant at 1%, ** is significant at 5%

Discussion of the Results

As can be seen from the above estimated level equation, all parameters are statistically significant at 1% and 5% levels. The factors that have negative impact on output growth (GROWTH) are Bank Credit (BANKCREDIT), change in Broad Money (D(BM)) and the square of Trade Openness ($OPEN^2$.). On the other hand, the variables that have positive effect on GROWTH include Private Investment (INV) and Trade Openness (OPEN).

The impact of explanatory variables on GROWTH in terms of direction and size can be analyzed as follow.

Private Investment (INV): As private investment (INV) increases by 1%, the GDP growth rate (GROWTH) will increase by 0.15%. This seems to be in line with economic theory and our intuition. More investment will lead to more future consumption. In addition, profitable investment will create wealth and income to investors and workers alike. This might result in

higher GDP growth since both consumption and investment are major components in the GDP measurement.

Bank Credit (BANKCREDIT): As bank credit increases by 1%, the GDP growth rate (GROWTH) will decrease by 0.05%. The negative effect of bank credit on growth is possible if the existing ratio of total household debt to GDP is high, like in the case of Thailand at the present time, where the ratio of household debt to GDP climbs to almost 90%. This high level of household debt will exert a constraint on household budget that will result in lower consumption for many periods to come.

Broad Money (BM): As change in broad money increases by 1%, the GDP growth rate (GROWTH) will decrease by 0.16%. This seems to be in line with the Classical Framework which put forward that money is neutral in the long run. That is, as more money is injected into the economy, all of its impact will go to price in the long run. Nothing will go to boost the real output. On the other hand, the rise in price, which is an inflation, might retard the growth of real output. So, the negative impact of broad money on real output growth rate seems to be reasonable from theoretical perspective.

Trade Openness (OPEN): It is entered in the growth equation in nonlinear form. The result indicates that the parameter of OPEN is positive, where as that of its square, $OPEN^2$, is negative. This result suggests that growth rate is a concave function of Trade Openness and hence the growth-maximizing level of the Trade Openness can be found.

Computation of optimal Level of Trade Openness:

From the result in equation (3) above, we can write GROWTH as a nonlinear function of OPEN as follow (assuming all other variables constant).

$$GROWTH = F(OPEN) = 0.212817OPEN - 0.001162OPEN^2 \quad (4)$$

This function is concave and hence we can derive the optimal value of trade openness (OPEN) that will maximize GDP growth rate (GROWTH).

Maximize GROWTH with respect to OPEN:

$F^{/} = 0.212817 - (2)(0.001162)OPEN = 0$, so that GROWTH maximizing value of OPEN is 91.57%.

$F^{//} = - 0.0023 < 0$, confirming that the function is concave and hence the maximum GROWTH is attained.

Where $F^{/}$ is the first derivative, and $F^{//}$ is the second derivative.

Substituting for OPEN = 91.57 into equation (4) above to get the associated maximum annual GROWTH rate = 9.74%.

This means that, in order to obtain the maximum growth rate of 9.74%, the level of Trade Openness must be maintained at the level of 91.57%. Increasing trade openness (OPEN) beyond 91.57% will result in reducing GDP growth rate. The growth might eventually turn to negative at some point going forward if the degree of trade openness keeps on increasing without limit.

ARDL- Bound Test for Long Run Relationship

The Bound Test is used to test the existence of long run relationship among variables under study. The null hypothesis (H_o) is "There is no long run relationship". The result of Bound Test is shown in Table 3 below.

Table 3 Bound Test for Long Run Relationship

Test Statistic	Value	Significance	I(0)*	I(1)*
*F-statistic	6.54	10.0%	1.75	2.87
Variables	5	5.0%	2.04	3.24
Sample Size	46	2.5%	2.32	3.59
		1.0%	2.66	4.05

Note *Pesaran, M.H., Y. Shin and R.J. Smith (2001)

H_o: No long run relationship exists. H_a: There exists long run relationship.

It can be seen from Table 3 above that the calculated F-statistic is 6.54, greater than the critical values of both lower and upper bounds. Therefore, the null hypothesis of "No long run relationship" is rejected. Consequently, we can conclude that there exists long run relationship among variables under investigation.

ARDL- Error Correction Equation:

The existence of long run relationship, as confirmed by Bound Test above, will further allow for short run adjustment to correct the disequilibrium, or deviation from long run equilibrium, that might occur due to external shock. The Error Correction form resulted from the estimation of our ARDL(3,1,3,0,3,0) model is shown below.

Table 4 Error Correction Form of the Model ARDL(3,1,3,0,3,0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GROWTH(-1))	0.471634	0.169326	2.785364	0.0092
D(GROWTH(-2))	0.301113	0.123907	2.430148	0.0213
D(INV)	0.763509	0.111063	6.874573	0.0000
D(BANKCREDIT)	-0.011020	0.049979	-0.220490	0.8270
D(BANKCREDIT(-1))	0.079534	0.054693	1.454206	0.1563
D(BANKCREDIT(-2))	0.061895	0.043534	1.421750	0.1654
D(OPEN)	0.375588	0.066913	5.613118	0.0000
D(OPEN(-1))	0.025226	0.043061	0.585814	0.5624

D(OPEN(-2))	0.126297	0.038118	3.313330	0.0024
CointEq(-1)*	-1.595602	0.215352	-7.409275	0.0000

Most of the estimated coefficients of the Error Correction equation, except BANKCREDIT with lags 1 and 2, and OPEN with lag 1, are statistically significant. Of particular interest is the coefficient of error term, labelled as "CointEq(-1), which has the value of – 1.59. This means that, after the shock, the system is able to converge to its long run equilibrium with oscillation. This might take longer time to revert back to equilibrium than the case where error correction coefficient has the value less than 1 in absolute value.

Note that in Error Correction equation we do not pay attention to the relationship between trade openness and growth. This is because this equation shows the short run adjustment of the system to revert back to long run equilibrium after it deviates from equilibrium due to external shock. In other words, this equation focuses on the stability of the system, not the relationship among variables. It is obviously so, as can be seen that all variables in this equation are entered in first difference form.

5. Conclusion

In this research work, the author attempts to investigate the relationship between the degree of trade openness and output growth. It is hypothesized that the relationship between trade openness and output growth is nonlinear. In particular, at the beginning of trade, the relationship between them is positive due to growth-enhancing effects of trade. But the point will be reached eventually, when the impact of trade on growth will become negative due to the reason to be explained below.

The reason behind the growth-reducing impact of trade openness is that as trade openness increase, more production will be forthcoming. With limited resources, more stress and strain will be exerted on resource input being used, resulting in a decline in marginal product or productivity. Consequently, the output growth rate will decline as trade openness increases beyond certain level.

In this paper, the author employed an ARDL model to estimate the relationship between output growth and the variables that are considered to have impact on growth. Particular focus is on the degree of openness (OPEN), where its impact on growth is assumed to be nonlinear. That is, both OPEN and OPEN- squared are entered as regressors in long run relationship equation.

Each and every variable is tested for stationarity, using ADF test for the presence of unit root. The optimal lag model is selected to be ARDL (3,1,3,0,3,0). The results from the estimation can be summarized as follow.

The long run relationship, which was confirmed to exist by using Bound Test, indicates the following results: All parameters are statistically significant at 1% and 5% levels. The factors

that have negative impact on output growth (GROWTH) are Bank Credit (BANKCREDIT), change in Broad Money (D(BM)) and the square of Trade Openness ($OPEN^2$.). On the other hand, the variables that have positive effect on GROWTH include Private Investment (INV) and Trade Openness (OPEN).

The focus of attention is on the case of Trade Openness where it is entered in equation in nonlinear form. The result indicates that the parameter of OPEN is positive, while that of its square, $OPEN^2$, is negative. This result suggests that growth rate is a concave function of Trade Openness and hence the growth-maximizing level of the Trade Openness can be found. With a simple maximization of GROWTH function with respect to variable trade openness (OPEN), the optimal level of OPEN is found to be 91.57%, with the associated maximum output growth rate at 9.74%.

In terms of risk and sustainability of trade-dependent economy, we can say that, for the case of Thailand, the risk that they are confronted at the moment is the risk from growth slowdown as the trade openness keeps expanding. However, with the existing conditions, the economic system of Thailand is still stable. This can be judged from the value of the coefficient of the Error Correction term in Short Run Error Correction equation, which is – 1.59. With this value, it is guaranteed that, when the system deviates from equilibrium in short run, it will revert back to its the long run equilibrium for certain, although at slow pace due to the oscillations in adjustment.

The result from our finding provides policy recommendation as follow. It is necessary that the policy maker must find the optimal level of trade openness that maximizes the growth rate of the economy. Too high level of trade openness might result in growth rate being slowing down to the point that could be detrimental to the economy. The growth rate that is too low might yield too few output that may not be adequate to service the debt, in particular if the increased production induced by trade expansion is financed by external borrowing

If, however, the country insists on increasing the level of trade openness for some reason, it is advised that the country must transform its production into technology-intensive in order to raise productivity so that the desired high level of output growth can be maintained.

The other way to avoid growth-reducing effect from trade is to restructure the country to be service-oriented economy, such as Singapore and Hong Kong. Being a service economy, the production of services in general will be technology-intensive. Consequently, the marginal product of the service-oriented economy will not go down quickly as compared with that of the economy that rely on labor-intensive production.

Acknowledgement

The author would like to thank the Research Institute of Rangsit University for providing financial support for this project. My thanks also go to Faculty of Economics for providing me with excellent working facilities and pleasant environment that encourage me to work hard on this project.

References

Asada, H. (2022), Effects of Foreign Direct Investment, Trade Openness, and Human Capital Development on the Economic Growth of Thailand, International Journal of Asian Business and Information Management Volume 13 Issue 1, 2022.

Awokuse, T.O. (2008), Trade openness and economic growth: is growth export-led or import-led?, Applied Economics, 40:2, 161-173.

Chang, R., Kaltani, L. and Loayza, N. (2005). Openness can be Good for Growth: The Role of Policy Complementarities. Paper Presented in Conference at Central Bank of Peru (2005).

Dickey, D.A. and W. Fuller (1981), Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root, Econometrica, 1981.

Diaoa, X., J. Rattsbb and H.E. Stokke (2005), International spillovers, productivity growth and openness in Thailand: an intertemporal general equilibrium analysis, Journal of Development Economics 76 (2005) 429 – 450.

Eva Paus, E., N. Reinhardt and M. Robinson (2003), Trade Liberalization and Productivity Growth in Latin
American Manufacturing, 1970-98, The Journal of Policy Reform, 6:1, 1-15.

Fatima, S., B. Chen, M. Ramzan and Q. Abbas (2020), The Nexus Between Trade Openness and GDP
Growth: Analyzing the Role of Human Capital Accumulation, SAGE Open October-December 2020: 1–18.

Frankel, A. J., & Romer, D. (1999). Does Trade Cause Growth? The American Economic Review, 89(3),

379-399.

Greene, W.H. (2003), Econometric Analysis, Prentice Hall, 5th Ed.

Hamilton, J.D. (1994), Time Series Analysis, Princeton University Press.

Hussin, F. and N. Saidin (2012), Economic Growth in ASEAN-4 Countries: A Panel Data Analysis, International Journal of Economics and Finance; Vol. 4, No. 9; 2012.

Hye, Q.M.A. (2012), Long term effect of trade openness on economic growth in case of Pakistan, Qual Quant (2012) 46:1137–1149.

Hye, Q.M.A. and W.Y. Lau (2015), Trade Openness and Economic Growth: Empirical Evidence from India, Journal of Business Economics and Management, Volume 16(1): 188–205.

Hye, Q.M.A., S. Wizarat and W.Y. Lau (2016), The Impact of Trade Openness on Economic Growth in China: An Empirical Analysis, Journal of Asian Finance, Economics and Business, Vol 3 No 3 (2016) 27-37.

Huang, L.C. and S.H. Chang (2014), Revisit the nexus of trade openness and GDP growth: Does the financial system matter?, The Journal of International Trade & Economic Development, 23:7, 1038-1058.

İşcan, T. (1998) Trade liberalisation and productivity: A panel study of the Mexican manufacturing
industry, The Journal of Development Studies, 34:5, 123-148.

Keho, Y. (2017), The impact of trade openness on economic growth: The case of Cote d'Ivoire, Cogent Economics & Finance, 5:1.

Lutkepohl, H. and M. Kratzig (2004), Applied Time Series Econometrics, Cambridge University Press.

Mendoza, U. R. (2009). Trade and Growth in the Post – 2008/2009 Crisis World. World Economics, 11(4).

Nannicini, T. and A. Billmeier (2011), Economies in Transition: How Important Is Trade Openness for
Growth?, OXFORD BULLETIN OF ECONOMICS AND STATISTICS, 73, 3 (2011).

Pesaran, M.H., Y. Shin and R.J. Smith, Bounds Testing Approaches to the Analysis of Level Relationships,

Journal of Applied Econometrics, 16, (2001), pp.289-326.

Ramzan, M., B. Sheng, M. Shahbaz, J. Song and Z. Jiao (2019), Impact of Trade Openness on GDP Growth: Does TFP matter?, Journal of International Trade and Economic Development, Vol.28, 2019.

Kohpaiboon, A. (2003), Foreign trade regimes and the FDI–Growth Nexus: a case study of Thailand, The Journal of Development Studies.

Stone, S., & Strutt, E. A. (2009). Transport Infrastructure and Trade Facilitation in the Greater Mekong
Subregionde. ADB Working Paper No. 130.

Tahir, M. and H.O. Ali (2014), Trade Openness and Economic Growth: A Review of the Literature, Asian Social Science; Vol. 10, No. 9; 2014.

Tahir, M. (2015), The relationship between international trade openness and economic growth in the
developing economies Some new dimensions, Journal of Chinese Economic and Foreign Trade Studies, June 2015.

Thangavelu, S.M. and G. Rajguru (2004), Is there an export or import-led productivity growth in rapidly developing Asian countries? A multivariate VAR analysis, Applied Economics, 2004, 36, 1083–1093.

Willard, L. (2000). Does Openness Promote Growth? Agenda, 7(3), 251-26

BIOGRAPHY

วรรณกิตติ์ วรรณศิลป์

(Wanakiti Wanasilp)

Email: wanakiti@rsu.ac.th
Line ID: wanakiti
Google Scholar li nk:
https://scholar.google.com/citations?user=NdpTLaMAAAAJ&hl=en

Personal Data

Birth Date	: May 11, 1947
Birth Place	: Bangkok, Thailand
Sex	: Male
Marital Status	: Married with one child
Nationality	: Thai

Education

BA. (Accounting)	: Chulalongkorn University (1970)
MA. (Economics)	: Virginia Tech, Blacksburg, Virginia, USA. (1982)
Ph.D. (Economics) :	NIDA (2011)

Work Experiences

1970 – 1978	: Siam Commercial Bank
1979 – 1991	: Studied and worked in USA
1992 – 1994	: Cambodian Commercial Bank
1995 – 2004	: Siam Commercial Bank
2005 – present	: Faculty of Economics, Rangsit University
	: Certified Public Accountant (CPA)

Areas of Specialization

Accounting	: Financial Accounting, Auditing
Economics	: Macroeconomics, Econometrics, International Finances, Financial Economics, Money and Banking, Mathematical Economics, Economics of Big Data

Association

Economic Association of Thailand
Federation of Accounting Professionals