*EFFECTS OF MACROECONOMIC UNCERTAINTY IN CHINA ON CHINA - MALAYSIA BILATERAL TRADE*

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EFFECTS OF MACROECONOMIC UNCERTAINTY IN CHINA ON CHINA–MALAYSIA BILATERAL TRADE

By

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Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfillment of the Requirements for the Degree of Master of Science

February 2015

DEDICATIONS

This work is dedicated to my parents and family

Abstract of thesis presented to the Senate of Universiti Putra Malaysia
in fulfillment of the requirement for the degree of Master of Science

EFFECTS OF MACROECONOMIC UNCERTAINTY IN CHINA ON CHINA–MALAYSIA BILATERAL TRADE

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February 2015

Chairman: Saifuzzaman bin Ibrahim, PhD
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This study attempts to examine the effects of macroeconomic uncertainty in China due to Chinese industrial production index (IPI) volatility on the conditional variations of China–Malaysia bilateral trade flows. Besides, causality–in–variance analysis is also applied between the volatility of Chinese IPI growth series and the variations of China–Malaysia bilateral trade flows. Obviously, the issue under concern has been the focus of voluminous academic researchers and policy gurus over the past few decades due to its importance in making bilateral trade between countries and policy–decisions. Despite the existence of adequate theoretical and empirical studies upon this context, these Asian developing countries have been partially studied due to a limited number of data observations on them for analysis. In that case, this study attempts to redress that imbalance. In model estimation, we exploits monthly time series data for the period from January 1991 to December 2013 and VAR(p)–MGARCH–M–BEKK econometric approach to assess the conditional variance–covariance specification. This is because it is convenient in terms of selection criteria, diagnostic checks in standardized residuals and the variance–non–causality analysis. Based on the model estimation of the study, several important conclusions emerge. First, macroeconomic uncertainty due to Chinese IPI volatility has insignificant impact on the conditional variations of China–Malaysia bilateral trade flows. Besides, causality–in–variance analysis indicates that there are continuously variance transmissions between Chinese IPI growth series and the conditional variations of China–Malaysia bilateral trade flows. By contrast, the variance transmissions from Chinese IPI growth series to the changes of China–Malaysia bilateral trade flows seems to be more prevalent compared to the variance transmissions from the variations of Malaysia's exports to China and Malaysia's imports from China to Chinese IPI growth series. In sum, the results of variance–non–causality analysis show that macroeconomic uncertainty due to Chinese IPI volatility has an explanatory power in determining the future movements of China–Malaysia bilateral trade flows.

KESAN KETIDAKSTABILAN MAKROEKONOMI DI CHINA KE ATAS PERDAGANGAN DUA HALA CHINA–MALAYSIA

Oleh

DILSHOD NURILLOKHANOVICH MURODOV

Februari 2015

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Kajian ini bertujuan untuk mengkaji hubungan antara ketidakstabilan makroekonomi dan aliran perdagangan dua hala di antara China dan Malaysia. Selain itu, sebab dan akibat varian di kaji di antara ketidakstabilan indeks pengeluaran perindustrian (IPP) dan aliran perdagangan dua hala China–Malaysia. Isu–isu yang dikaji ini telah menjadi fokus penyelidik akademik dan pembuat dasar dalam bidang ini sejak beberapa dekad yang lalu memandangkan kepentingannya dalam aliran perdagangan dua hala dan juga pelbagai hala. Walaupun hasil teori dan empirik bagi isu tersebut telah wujud, namun kajian di antara dua ekonomi tersebut adalah terhad di sebabkan kekurangan data. Kajian ini menggunakan data siri masa bulanan bagi tempoh 1991–2013 dan teknik VAR(p)–GARCH–M–BEKK kerana kaedah ini lebih mudah dari segi kriteria pemilihan, pemeriksaan diagnostik dalam sisa seragam dan analisis sebab dan akibat–dalam–varians. Berdasarkan anggaran model, beberapa kesimpulan penting boleh dibuat. Pertama ialah ketidaktentuan makroekonomi disebabkan turun naiknya persamaan IPP China tidak memberi kesan kepada aliran perdagangan dua hala China–Malaysia. Seterusnya, analisis sebab dan akibat, jelas menunjukkan bahawa terdapat perbezaan penghantaran terus turun naik antara IPP China dan variasi aliran perdagangan dua hala China–Malaysia. Sebaliknya, penghantaran varian dari IPP China ke variasi aliran perdagangan dua hala China–Malaysia seolah–olah tidak begitu ketara berbanding dengan penghantaran varian dari variasi China–Malaysia. Kesimpulannya, hasil kajian yang mengesahkan bahawa kesan ketidaktentuan makroekonomi akibat turun naik IPP China mempunyai kuasa penjelasan dalam menentukan pergerakan masa depan aliran perdagangan dua hala China–Malaysia.

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I certify that a Thesis Examination Committee has met on 13 February 2015 to conduct the final examination of Dilshod Murodov on his thesis entitled "Effects of Macroeconomic Uncertainty in China on China–Malaysia Bilateral Trade" in accordance with the Universities and University Collages Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Master of Science.

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v

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This is to confirm that:

- the research conducted and the writing of this thesis was under our supervision;

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LIST OF ABBREVIATIONS

ADF	Augmented Dickey–Fuller
AIC	Akaike Information Criteria
ARCH	Autoregressive Conditional Heteroskedasticity
ARCH LM	ARCH Lagrange Multiplier
ARMA	Autoregressive Moving Average
ARIMA	Autoregressive Integrated Moving Average
ASEAN	Association of Southeast Asian Nations
BEKK	Acronym comes from Baba, Engle, Kraft, and Kroner
CEC	Comprehensive Economic Cooperation
CPI	Consumer Price Index
FDI	Foreign Direct Investment
FTA	Free Trade Agreement
G7	Great Seven Developed Economies
GARCH	Generalized ARCH
GARCH–M	GARCH–in–mean
GDP	Gross Domestic Product
GNP	Gross National Product
IMF	International Monetary Fund
IPI	Industrial Production Index
LL	Log–Likelihood ratio
MCFA	Malaysia–China Friendship Association
MGARCH	Multivariate GARCH
MGARCH–M	Multivariate GARCH–in–mean
ML	Maximum Likelihood
NAFTA	North America Free Trade Association
NBER	National Bureau of Economic Research
NBS	National Bureau of Statistics
PML	Pseudo–Maximum Likelihood
PP	Phillips–Perron
QML	Quasi–Maximum Likelihood
QQ	Quantle–Quantle plot
RATS	Regression Analysis of Time Series
RCEP	Regional Comprehensive Economic Partnership
SIC	Schwartz Information Criteria
TFP	Total Factor Productivity
UK	United Kingdom
US	United States
USD	United States Dollars
VAR	Vector Autoregression
WTO	World Trade Organization

CHAPTER 1

INTRODUCTION

1.1 Overview of the study

The economic recessions such as Southeast Asian Financial crisis of 1997–1998 and Global Financial crisis in 2008 were characterized with a number of unfavorable shocks and a rapid decline on cyclical economic variables notably output and foreign trade between countries (Novy and Taylor, 2014). The spilling over of economic shocks during the recessions sufficiently frustrated the economies through the wide–range fluctuations of macroeconomic variables. Thus, over the past few decades, numerous theoretical, empirical and policy–related works have been devoted to the issue on the relationship between macroeconomic uncertainty and trade flows (see, among others, Ruffin 1974; Young, 1984; Comin, 2000; Ewing and Thomson, 2008; Bloom, 2009; Mahadevan and Suardi, 2010; Taglioni and Zavacka, 2013; Novy and Taylor, 2014). Generally, these studies show that macroeconomic uncertainty due to output volatility lead to less trade flows between countries, and it has crucial impact on output growth of the economy (Mahadevan and Suardi, 2010).

The extensive debate upon macroeconomic uncertainty and trade flows has been started long ago. Since World Great Depression, this relationship has been underpinning to growth of research interests among the academic researchers and policy gurus (see, among others, Easterly, Islam and Stiglitz, 2001; Blackburn and Pelloni, 2005; Bloom, 2009; Handley and Limão, 2012; Limão and Maggi, 2013; *etc*). While numerous studies relatively have addressed to the issue under concern, macroeconomic uncertainty is mostly proxied by inflation and/or output volatility (Chapsa *et al.*, 2009). However, some works have been issued macroeconomic uncertainty through its source, such as trade flows and its impact on the dynamic relationship between volatility and economic growth (see, among others, Mendoza, 1997; Turnovsky and Chattopadhyay, 2003; Kose, Prasad and Terrones, 2004).

1.2 Macroeconomic uncertainty and trade flows

Trade flows can be generally defined as a transaction of intermediate inputs and final commodities between exporters and importers. However, it sometimes holds unpredictable scenario refers to economical and/or political shocks (Bloom, 2009). Obviously, uncertainty and risk have a relatively short history in the economic theory. However, these two concepts are differentiated for suitable conditions (Toma, Chițiţă and Şarpe, 2012). Risk emerges the situations in which probabilities' targets can be identified for possible results. With a word, it can be quantified, while uncertainty commonly states itself through the volatility of macroeconomic variables in which unidentified and unpredictable in terms of occurrence and evolution, such as frequent fluctuations of macroeconomic activity, exchange rates, inflation, *etc* (see, among others, Bredin and Fountas, 2007; Bredin, Elder and Fountas, 2009; Bloom, 2009; Taglioni and Zavacka, 2013; Novy and Taylor, 2014; *etc*).

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As noted by Bloom (2009), macroeconomic uncertainty dramatically emerges due to economic shocks and political risks in the economy. It spills over to other economy through the rapid fluctuations of the price of commodities. According to Novy and Taylor (2014), in the condition of a large uncertainty shock in foreign trade, firms optimally adjust their inventory policy by cutting orders of foreign intermediates more strongly than orders for domestic intermediates. Consequently, this differential response leads to a bigger reduction and subsequently a strong recovery in foreign trade than in domestic trade. Therefore, foreign trade exhibits more volatility than domestic trade. As a result, uncertainty shock magnifies the response of international trade, given the differential cost structure.

The existence of macroeconomic uncertainty in domestic market may cause local producers to increase theirs exports refers to more stability in foreign market (Taglioni and Zavacka, 2013). On the other hand, uncertainty in foreign market can seriously harm exporters due to instable prices series. Besides, foreign products' prices are higher for local consumers, and they are associated with extra payments such as distribution services, *etc.* (Novy and Taylor, 2014). In sum, for exporter who intends to sell own goods and commodities in foreign market, uncertainty is serious matter.

1.3 Macroeconomic uncertainty and trade policy

The impacts of macroeconomic uncertainty on trade flows is also topical issue to policy–makers. Novy and Taylor (2014) argue that ever since 1930's trade war, world economy has faced with numerous crises which weaken the economies through the frequent fluctuations of the volatile macroeconomic variables. In order to make safe and predictable trade between countries, governments normally join for concession in trade agreements. However, trade agreements cannot regulate all types of trade polices, especially during the recessions (Limão, 2007).

Handley and Limão (2012) argue that trade policy is inherently uncertain in terms of time, and it is revised over the trade agreements. It is also ambiguous, because trade agreements will be adjusted over the negotiations and rounds. Unavailability of regulation upon several trade policies will generate macroeconomic uncertainty in the case of individual economy. Normally, trade policy–makers argue that predictable and secured trade is guaranteed form of trade flows. There are some reasons to be concerned about the taking trade policy under the uncertainty. The main one is an application of unfettered trade policy instruments that justify economic instability (Limão and Maggi, 2013). Hence, economic recessions are always caused to pay more attention in protectionism from the external trade shocks.

Limão (2007) argues that trade flows has a predictable scenario under the preferential trade agreements. In the case of China and Malaysia, sufficient beneficial trade agreements have been already signed between them. The advantages of preferential trade agreements are just not only certified form of access to foreign markets, but also they contain some reasons, such as being ensured about trade restrictions in other economies (Handley and Limão, 2012), and behaving self–confident about the trade shocks in breaking out from the rest of the world (Perroni and Whalley, 1996).

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1.4 Background of China–Malaysia economic relations

Prior to 1990, there were few studies on the economic relations between China and Malaysia (Yihong and Weiwei, 2004). Previously, these countries adopted two different economic systems. Malaysia was consistently an open economic system, while China was initially a centrally planned economic system and was not highly industrious especially during 1950s–1970s. Over the past three decades, China has succeeded to transform its economy to become an open and market–oriented economic system (Chan and Baharumshah, 2012). In 1990s, China recovered adequate diplomatic and economic relations with Southeast Asian countries and with Malaysia. These economic partnerships had been an impetus for trade surging between China and Malaysia. For instance, Comprehensive Economic Cooperation (CEC) was signed on trading in order to eliminate tariffs and establishing mechanism of an adjudication of China–Malaysia bilateral trade (Yihong and Weiwei, 2004). In the end, China–Malaysia bilateral trade was ensured by reduced–tariffs, and it affected to expand bilateral transactions of industrial commodities between China and Malaysia.

Obviously, regional and global integrations have already become the main factor for raising a number of bilateral and multilateral trade agreements between countries. The trade activities with foreign countries hold constructive effects in economic growth and trade flows of the economy (Yihong and Weiwei, 2004). In the course of the economic relations between China and Malaysia, these developing countries are highly associated with each other's through the several regional and global treaties, such as Malaysia–China Friendship Association (MCFA), Regional Comprehensive Economic Partnership (RCEP), World Trade Organization (WTO), *etc*. According to the official report of MCFA in 2011, China is considered as the largest export market of Malaysia with 90 billion USD in foreign trade of the economy.[1]

Since mutual trade dealings between them are being grown dramatically in last decades, it should be highlighted the components of bilateral trade. In general, Malaysia's exports to China comprise petroleum and liquefied natural gas, multifarious rubber, chemical products mainly hydrocarbon and their derivatives, carboxylic acids, metal primarily cathodes of refined copper and steel, electronic products, unprocessed wood, palm oil products, *etc*[2]. In turn, industrial products from China to Malaysia are also being increased, namely, textile yarn, electronic products, accessories, appliances and several machinery parts, cereal, vegetables, chemical products and clothing, *etc*[3]. Although, Malaysia has made remarkable changes in its exports composition and foreign markets over the past few decades, it is still remaining two focal challenges in increasing export performance of the economy. First, in the near future, the external demand is anticipated to be less due to rising of worldwide uncertainty, especially in developed countries. Second, the increasing participation of emerging economies, especially in Asia will be raised competition in external marketplace for possessions with low–cost and labor–intensive products.

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[1]**Source:** The official report of Dato' Abdul Majid Ahmad Khan under the title "Reflections on Four Decades of China–Malaysia Enhanced Friendship and Partnership" in the web page of Malaysia–China Friendship Association, 2014. (www.ppmc.com.my)

[2]**Source:** Department of Statistics of Malaysia, 2014

[3]**Source:** Department of Statistics of Malaysia, 2014

Figure 1. GDP growth rate of China and Malaysia during 1990–2012

Figure 1 depicts GDP growth rate of China and Malaysia for the period from 1990 to 2012. Based on the World Bank database, Malaysia experienced several economic recessions over the last two decades. The sharpest happened during the Southeast Asian Financial crisis which caused about 8% decline in country's GDP growth in 1998. After the Southeast Asian Financial crisis, Malaysia has also experienced two moderate economic recessions in GDP growth rate of the economy. The first one was due to Dot.com in 2001, and the second one was due to Global Financial crisis of 2008. Khoon and Mah–Hui (2010) argue that the external shock of subprime crisis spilled over to Malaysia, because the country was an export–dependent economy and had enormous economic linkages with the rest of the world. As a result, GDP growth rate of the economy sharply declined again in 2009. By contrast, Malaysia's economy had better circumstance after Global Financial crisis of 2008 compared to Southeast Asian Financial crisis 1997–1998, because the relations of Malaysia's banks to the United States subprime loans were not strong.

The slight declines had also occurred in GDP growth rate of China during 1992–2000. This fall occurred, because agricultural output grew more slowly than other sectors. In the outset of 1990's, the government massively boosted foreign direct investment (FDI) inflows into the coastal areas to speed up the establishment of a modern enterprise system. At the same time, the share of tertiary industry grew double as service sectors proliferated. As a result, economic growth of China slightly recovered during 2000–2008. Despite efforts to cool the overheating economy, the estimated GDP growth rate was around 13% in 2007. In 2008, GDP growth rate sharply decline due to Global Financial crisis. In subsequent year, the stimulus succeeded in preventing a dramatic fall in economic growth and in providing a sustained recovery in 2010, when the real annual GDP growth rate rose to around 10%. As global conditions continued to deteriorate in late 2011, GDP growth rate fell to around 8% in 2012.

Table 1 reports the trade dynamics of Malaysia with China for the period from 1990

to 2013. The 3rd and 5th columns of the table indicate the changes of Malaysia's exports and imports with China in percentage as annual form, respectively. According to the official report of China Customs database and International Monetary Fund (IMF) database, Malaysia's exports to China have been expanded by 90 times and imports from China approximately 125 times over the last two decades.

Table 1. Trade dynamics of Malaysia with China during 1990–2013

Year	Malaysia's exports to China		Malaysia's imports from China	
	million USD	% change	million USD	% change
1990	668.0	—	370.1	—
1991	744.0	11.37	527.9	42.63
1992	828.0	11.29	645.5	22.27
1993	1083.9	30.91	704.2	9.09
1994	1623.0	49.72	1117.7	58.71
1995	2065.1	27.23	1281.1	14.61
1996	2245.1	8.71	1374.1	7.25
1997	2484.8	10.67	1921.2	39.81
1998	2674.7	7.64	1594.2	− 17.03
1999	3606.6	34.84	1673.6	04.98
2000	5480.1	51.94	2564.7	53.24
2001	6205.5	13.23	3223.3	25.67
2002	9295.5	49.79	4975.5	54.36
2003	13998.3	50.59	6142.3	23.45
2004	18162.3	29.74	8085.5	31.63
2005	20107.8	10.71	10617.7	31.31
2006	23576.8	17.25	13540.2	27.52
2007	28737.3	21.88	17701.8	30.73
2008	32130.8	11.80	21383.2	20.79
2009	32224.4	0.29	19635.7	− 8.18
2010	50396.2	56.39	23816.9	21.29
2011	62025.6	23.07	27901.5	17.15
2012	58252.8	− 6.09	36525.6	30.90
2013	60068.5	3.11	45935.3	25.76

Note: Malaysia's exports to China and Malaysia's imports from China are computed in million USD. An adjustment of variables in current prices, not seasonally adjusted. The changes in percentage obtained through the following algebraic equations: $((\frac{ex_t}{ex_{t-1}}) \times 100 - 100)$ is for Malaysia's exports to China, and $((\frac{im_t}{im_{t-1}}) \times 100 - 100)$ is for Malaysia's imports from China.
Source: China Customs database is for Malaysia's exports to China, and International Monetary Fund (IMF), Direction of Trade Statistics database is for Malaysia's imports from China.

Table 2 reveals trade openness ratio (the sum of total export and import over GDP) of China and Malaysia. According to the table, both countries show improving trade openness ratio since 1990 to 2006. The ratios are slightly decreasing afterward that may due to lower demand which caused by Global Financial crisis in 2008. Between

them, Malaysia persistently indicates greater openness ratio than China. This is because Malaysia has always adopted as an open and trade–oriented economic system, while China shows an increasing openness ratio ever since 1990, after the country decided to liberalize some parts of the economy to improve economic growth.

Table 2. Total trade to GDP ratios

Country/Time	1990	1994	1998	2002	2006	2010	2012
China	0.291	0.412	0.363	0.477	0.705	0.550	0.518
Malaysia	1.468	1.799	2.094	1.993	2.025	1.696	1.624

Note: These data are adjusted in current prices (million USD), not seasonally adjusted.
Source: World Development Indicators of Word Bank Database, 2013.

The increasing trade openness ratio shows that China and Malaysia are becoming more open in foreign trade with the rest of the world. Based on the table, it should be noted that the detrimental impact of external shock on Malaysia's trade flows seems to be plausible. Khong and Mahendiran, (2006) have examined the effects of trade openness on output growth and trade flows in the case of Malaysia. As a result, they found that Malaysia's trade openness has positive effect in its output.

Generally, there are two schools of thought in the impacts of trade openness on output volatility and export of commodities. Proponents of trade openness commonly argue that the higher trade openness improves export performance of the economy through the comparative advantage. They also consider that the participation of country in foreign trade holds gains from the spilling over of cheaper commodities. The scholars of second group often argue that the gains or losses from the foreign trade mainly depend on factors such as the scarcity of traditional factors of production, absorbability of human capital, innovative capability of local producers and unavailability of sufficient domestic institutions and infrastructures in production of the economy (Khong and Mahendhiran 2006).

Nowadays, Malaysia is making healthy trade dealings with the rest of the world. It has also succeeded to sign free trade agreements (FTA) to keep strong trade relations with other countries namely, China, Japan, Republic of Korea, United States, Australia, India, Pakistan, Germany and Southeast Asian countries, *etc.* In below, Figure 2 and Figure 3 describe major trading partners of Malaysia for the eighteenth consecutive year since 1996 which hold the most influential domain in foreign trade of the economy, notably China, Japan, Singapore, Thailand and the US.

According to Figure 2, Malaysia's exports to its major trading partners are in the increasing trend. In the middle of 1990's, China was the fifth largest export market of Malaysia with around 2 billion USD in foreign trade activities of the economy. Over the last two decades, Malaysia remarkably boosted its exports toward China. Even, during the Global Financial crisis, the transporting of industrial products and final commodities from Malaysia to China were kept as stable.
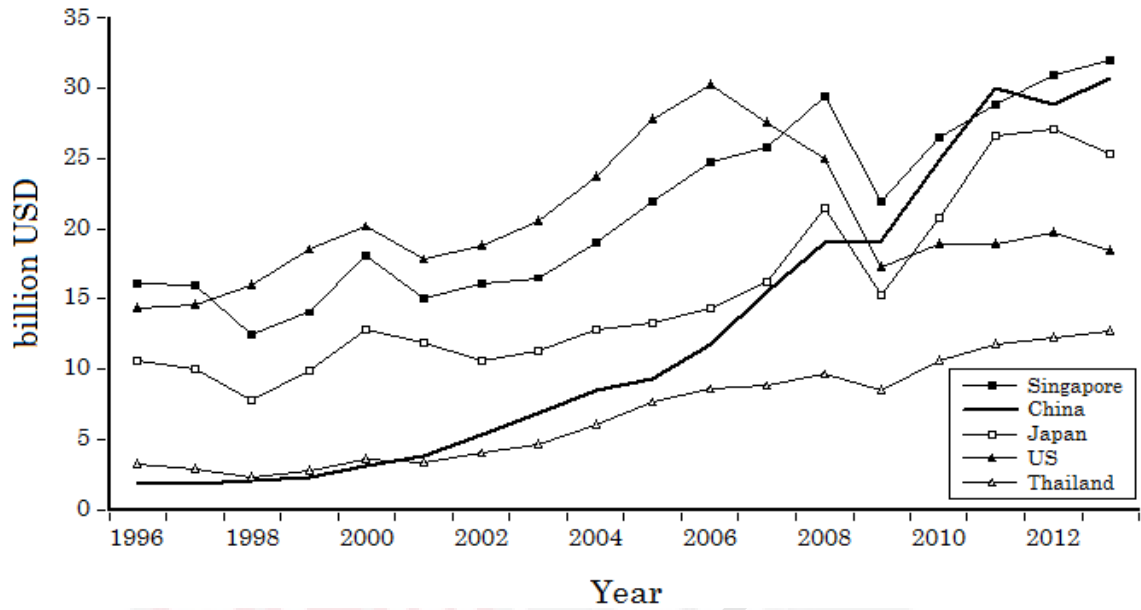
Figure 2. Malaysia's exports to five major trading partners

Source: Asian Development Bank database, 2014

It expresses that despite the impacts of recent decade recessions, China and Malaysia kept strong and healthy trade relations with each other's. During 2009–2011, Malaysia's exports to China dramatically increased and finally China became the largest external market of Malaysia. Since, the global conditions continued to deteriorate in late 2011, the exporting of industrial products slightly declined from Malaysia to China in the middle of 2012. Based on the graph, it can be concluded that China and Singapore concurrently hold the largest export markets of Malaysia in recent years.
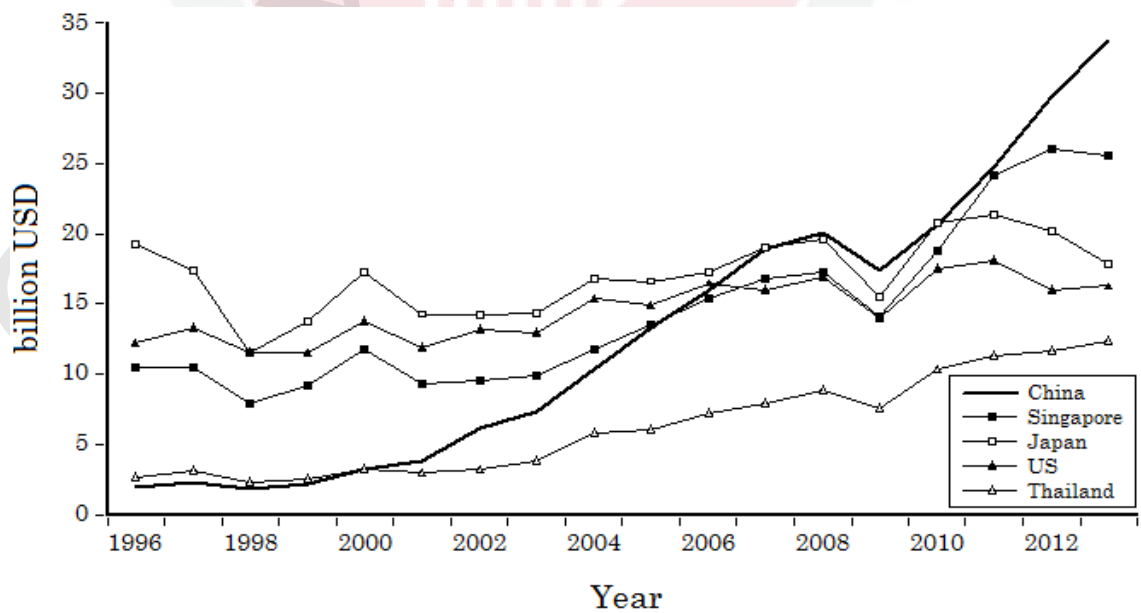

Figure 3. Malaysia's imports from five major trading partners

Source: Asian Development Bank database, 2014

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Figure 3 depicts Malaysia's imports from top five trading partners. According to the figure, in 1996 China was the fifth largest import market of Malaysia. Since China–Malaysia bilateral trade flows had extremely increased during 1996–2008, Malaysia not only boosted exports to China, but also the importing of industrial inputs and final commodities were surged from China. However, during the Global Financial crisis which began in 2008, Malaysia's imports gradually became less from China as well as from other top trading partners. As a result, China became major import source of Malaysia, and ever since collapse of Malaysia's imports in 2009 the importing of commodities are exceedingly surging from China. In sum, this figure sufficiently reveals that Malaysia should not be neglected in foreign trade with China, because recent decades bilateral trade dealings between them are tremendously increased.

1.5 Macroeconomic uncertainty in China

Gross domestic product (GDP) and industrial production index (IPI) are usually considered as standard measurements of the economic activities to track the business cycle (Moody, Levin and Rehfuss, 1993). Obviously, GDP includes whole domestic economic activities, while excludes factor payments and factor incomes from out sources of the economy. IPI is an economic indicator that is realized monthly and measures the amount of output from industrial production, such as manufacturing, mining, utilities, oil and gas industries, *etc.* However, GDP is accepted as a broader measure of economic activities than IPI. Besides, GDP can be computed and published on only a quarterly basis, while IPI is available as monthly time series.

Moody, Levin and Rehfuss, (1993) further note that there are some reasons are differentiated for common utilization of IPI rather than GDP in recent macroeconomic uncertainty and trade flow related works. First, it is more data available for IPI as a monthly time series than for GDP. Second, converting of IPI monthly time series data to upper frequencies is more convenient, and it is timely than GDP. Third, the IPI series are more judicious for a time series forecasting standpoint than GDP. Besides, IPI directly measures total output, and GDP is traditional production measure (Ewing and Thompson, 2008). Thus, IPI is wide–useable than GDP by academic practitioners and policy analysts for doing research and policy–making decisions.

In this work, macroeconomic uncertainty in China is proxied by the volatility of nominal index of Chinese industrial production. Figure 4 depicts Chinese IPI growth as monthly time series for the period from January 1991 to December 2013. It should be noted here that Chinese IPI growth series reflect the changes in local manufacturing in real terms, *i.e.*, variations in the volume of local production after discounting the effects of price changes. According to the figure, there is highly volatile period of Chinese growth series in the first half of 1990s. This is because China's eighth Five Year Plan of 1990–1995 reflected the goals of slowing the economy down to a manageable level after the excesses of the second half of 1980s.

The growth rate of gross national product (GNP) was planned to average 6% per annum, and government investment to be drawn away from national construction programs towards agriculture, transportation and communications. However, the national economy also showed similar signs of stagnation. Although eighteen months

of austerity measures had lowered inflation to 2.1%, after eighteen months of rising unemployment, stagnation of industrial production and a breakdown of the Chinese financial system because of debt defaults, the government was forced to loosen the economic screws in the middle of 1990s.
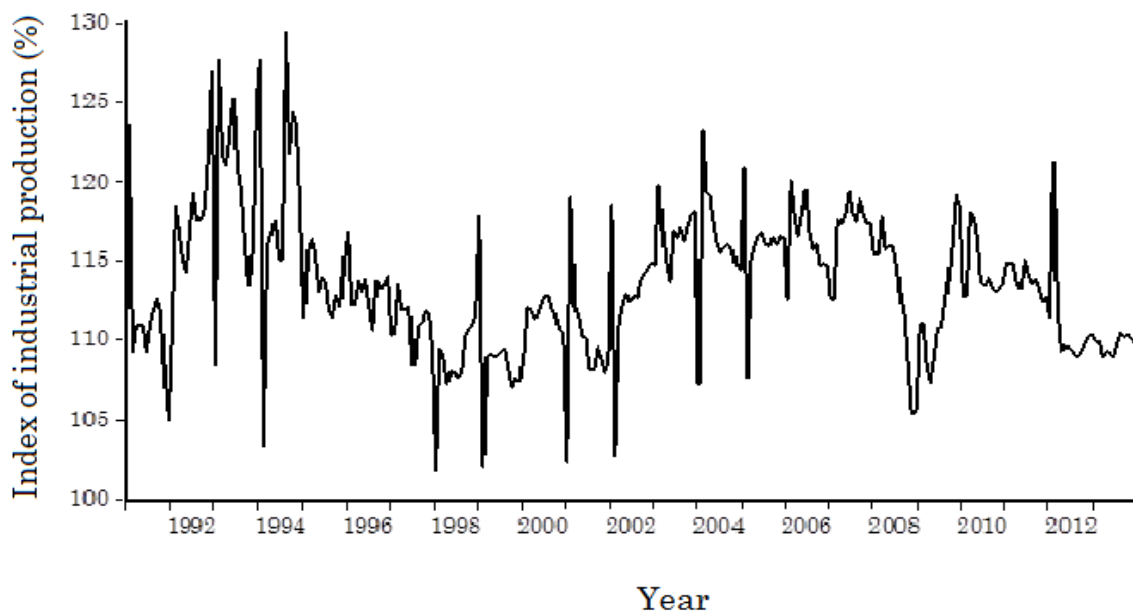
Figure 4. Nominal index of Chinese industrial production

Source: Chinese National Bureau of Statistics.

Figure 4 further shows that since 1998, there are periodically rapid declines in nominal Chinese IPI growth series. This is due to Chinese national holidays such as Chinese New Year, Chinese Spring Festival, because the number of working days in the outset of the year is less than in other months. In addition, similar to other world economies, China also suffered from the dramatic fall in industrial production during the Global Financial crisis. However, the great amount of foreign and domestic investments which were directed to the economy had been a stimulus to industrial production for recovering in short time. Nonetheless, since 2012, the trend of Chinese IPI is slightly declining due to slowing export and the falling of foreign and domestic demands for industrial products from the economy. In sum, the figure clearly shows that Chinese IPI growth series are continuously volatile over the last two decades.

1.6 Problem Statement

Macroeconomic uncertainty is considered as a crucial determinant of the variety of macroeconomic variables such as output and trade flows. Since, bilateral and multilateral trade dealings between countries have sufficiently increased in recent decades, awareness about the relationship between macroeconomic uncertainty due to output volatility and trade flows became vital. According to the vast literature, the extensive debate upon this relationship was started after the 1930's trade war. Ever since that time, world economy has been confronting with numerous highly–volatile episodes, such as Oil crisis of 1973–1974, Southeast Asian Financial crisis in 1997–1998, and recently Global Financial crisis of 2008 (see, for details, Mitchell, 1988; Barnes, 2009).

These highly–volatile episodes intensely cause to emerge of macroeconomic uncertainty refers to output volatility on trade flows.

Obviously, China economy was not highly productive prior to 1990s. However, it is now the second largest economy after the United States with annual GDP growth rate around 7.4% (2014). Besides, China is recently acknowledged as the largest exporter and the second largest importer of the world (Morrison, 2014). In the case of Malaysia, China is among the top three trade partner in term of trade volume. It is important for Malaysia to keep the bilateral trade with China high since it could have positive impact to the country economic well–being. Thus, the impact of macroeconomic uncertainty in China should be concerned on the conditional variations of China–Malaysia bilateral trade flows.

Generally, macroeconomic uncertainty creates obstacles to foreign trade refers to two main sources. First is the industrial output volatility (Bloom, 2009). If industrial sectors are more opened to the rest of the world, foreign trade is more vulnerable. Second, it is conventional that the trade openness is routinely associated with foreign trade and output volatility. The higher trade openness causes to more vulnerability in the economy to the external trade shocks. In turn, more vulnerability in external trade shocks is correlated with higher output volatility. For instance, likewise other countries, during the Southeast Asian Financial crisis and Global Financial crisis most Asian economies also witnessed dramatically decline in foreign trade, generally the sharpest since the Great Depression. Foreign trade plummeted more than 20% in most of the countries all over the world. These series of declines were remarkably synchronized across the economies (Novy and Taylor, 2014).

Although, until now, many theoretical and empirical literatures have been addressed to the issue under concern, virtually it seems that none of them have been focused on the causal relationship between Chinese IPI volatility and the variations of China–Malaysia bilateral trade flows yet. The current work addresses this gap by holding causality–in–variance analysis between the variables of the study. As a result, this analysis will help us to better anticipate the causal relationship of the series.

1.7 Objectives of the study

The main objective of the study is to examine the effects of macroeconomic uncertainty on trade flows. The specific objectives of the study are as follows:

1. To examine the impact of Chinese IPI volatility on the conditional variations of China–Malaysia bilateral trade flows;

2. To test the causal relationship between Chinese IPI volatility and the conditional variations of China–Malaysia bilateral trade flows;

1.8 Significance of the study

Although there are numerous theoretical and empirical studies on the linkage between macroeconomic uncertainty due to output volatility and trade flows, this study differs

from earlier studies in several ways. First, it seems that limited number of studies has been focused on the issue on the relationship between macroeconomic uncertainty in China due to output volatility and China–Malaysia bilateral trade flows.

Second, as Grier and Perry (1998) note, several empirical works are applied the standard variation of explanatory variables to deal with measuring volatility. However, this application only represents the predictable fluctuations of impulsive components of the variables. Dealing with the measurement of macroeconomic uncertainty, this study applies more reliable method in dynamic structure with regard to assess the conditional variance–covariance specification. This is due to fact that if any greater volatility arises in external market with the concerning to the fluctuations of the variables, it will be recovered *per se* (Mahadevan and Suardi, 2010).

Third, this study scrutinizes the causal relationships in variance between the changes in nominal Chinese IPI series and the conditional variations of China–Malaysia bilateral trade flows by using a relatively recent economic methodology which proposed by Hafner and Herwartz (2004). Besides, unlike many earlier studies, we have adopted a heavy–tailed conditional density (multivariate Student t) in variance–non–causality analysis. Next, the minor contribution of the study is the modeling of Chinese IPI volatility on China–Malaysia bilateral trade flows.

The majority of earlier studies in which are related to the issue on the relationship between macroeconomic uncertainty due to output volatility and trade flows have been rarely utilized an industrial production data as monthly time series. Here, the contribution of Chinese IPI volatility is the most favorable indicator of output volatility in China economy. Finally, the results of the study present some policy implications and create alternatives in policy–making of China–Malaysia bilateral trade flows.

1.9 Organization of the study

This study contains five chapters which are organized as follows. Chapter one deals with overview of the study, and chapter two reviews theoretical and empirical literatures about the impact of macroeconomic uncertainty on trade flows. Chapter three presents data description and explains model specification of the study that holds comprehensive discussions of the applied econometric approaches. Chapter four reports summary statistics of data and overall discussion of the results of the study which are received from the model estimation. Chapter five concludes the whole summary of findings, policy implications and recommendations for future research as well as limitations of the study.

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BIODATA OF STUDENT

The student Dilshod Murodov was born on March 1986 in Varzik that one of the primeval village in northern part of Fergana valley, Uzbekistan. Initially, he attended to village primary school during 1992–1996. Lately, he continued his secondary school there for four years. In 2000, he was accepted to the boarding school of young Economists and Engineers under Namangan Engineering–Economy Institute for the specialization of Economics. He managed to graduate this school with distinction. After finished the boarding school, he applied for degree program at National University of Uzbekistan named after Mirzo Ulugbek, Tashkent. After joined his bachelor's program, he attempted to join in numerous programs and activities. For instance, in order to get the primary professional experience in own specialization, he served his internship at Department of the Foreign Investments Implementation and Projects Monitoring, Ministry for Foreign Economic Relations, Investments and Trade of the Republic of Uzbekistan. Besides, in 2010, he was found as a winner of Young Entrepreneurs Support Program, winter school was organized by Centre for Youth Initiative, Fund Forum. Subsequently, in that year, he finished his undergraduate studies with honours in Economics. After getting bachelor's diploma, he also succeeded to gain some working experiences from banking industry for a year in National Bank for Foreign Economic Activity of the Republic of Uzbekistan, Namangan province, Chust branch. Lately, he applied for master's program so as to follow academic career, and finally achieved to get an offer from Universiti Putra Malaysia in 2012. After joined his master's program, he has been vigorously attending in a number of academic courses, seminars, workshops and other activities.

LIST OF PUBLICATIONS

1. **Murodov, D. N.,** Ibrahim, S. and Hasanov, A. Sh. (2015). Does Macroeconomic Uncertainty in China Impacts on China–Malaysia Bilateral Trade Flows? *Journal of Development Economics.* (submitted)