

Relationship between Financial Crisis and Oil Shock and its Effect on East-West Asia Trade Flows

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Abstract

The objective of this paper is to explore the role of global financial crises in creating oil price shock affecting both importing and exporting countries of East and West Asia over 1980-2008. It also investigates the oil shock effect on trade relations among these countries during the period. Accordingly, we specify a demand export model including particularly two control variables of oil price shock and financial classes. The specified export model is estimated dynamically by a version of the Autoregressive Distributed Lag approach (ARDL) through using macroeconomic data of the Asian economies. The results obtained by this method are used to analyze for both long-run and short-run. Overall, the empirical results indicate that financial crisis and oil price have a significant interacted effect on trade flows of the Asian exporting countries in the short-run, while it is not applicable in the long-run. The implication is that financial crisis and oil shocks are two different incidents that occur separately and do not essentially affect each other.

Key Words: Financial Crisis, Trade Flow, Oil Shocks, ARDL Approach.

1- Introduction

The consequent severe downward shift in demand, arising from the recent financial crisis, affected the flow of international trade and bore special burden to developing countries, whose export flows have been primarily directed towards the developed economies. According to a report

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by the IMF (2010), Exports from emerging, oil exporting and other developing countries dropped by 12% in 2009.

The financial crisis negatively affected the accessibility of trade credit, mainly in the short-term market. Short-term finance is considered a lack of trade credit can bring the flow of imports and exports to a forcible halt (Auboin and Meier-Ewert, 2003). In fact, the trade-intensive sectors that most developing countries specialize in tend to be the most sensitive to credit availability. Hence, lessening credit conditions can have a significant negative impact on short-term trade flows from developing countries.

Assessing the impact of financial crises on trade flows is important for the developed world, but is of special consequence to the developing world. It is also important to see changes in the world oil market, and to explore what are happening in both oil producing and consuming countries.

The goal of this paper is thus to estimate an econometric model of exports to verify how recent global financial crisis affects export flows in the selected East and West Asian countries, in particular to see whether a cross relationship between financial crisis and the world oil price influence together export flows. Different from previous studies in the literature (e.g. Ronci 2004, Thomas 2009), this paper firstly explores the interaction between financial crisis and oil shocks and secondly uses an extended and dynamic export ARDL model to estimate such effect using macroeconomic data of the Asian countries: China, Japan, Iran, Malaysia, Saudi Arab, South Korea and Turkey which are a part oil importing and a part oil exporting.

Section (2) in this paper reviews the literature on financial crisis, international trade and oil shocks, focusing on evidence of the interaction between oil shocks and financial crisis. The methodology of research will be discussed in Section (3), through which we specify an empirical export model. Section (4) represents the empirical results for both short-run and long-run, which have been obtained by the ARDL method. Finally, Section (5) concludes the relevant remarks.

2- Financial Crises, International Trade and Oil Shocks

Beginning in 1997, the East Asian national currencies collapsed violently and the tiger economies fell into a crippling recession after a miraculous decade of growth and expansion. Precise determination of the beginning and ending time frames of the overall Asian financial crisis as well as to reflect

upon the causes of the crisis is as diverse as the number of studies that follow the crisis. In general, however, most of the recent literatures seem to agree on three broad reasons for the recent Asian financial crisis:

(1) Excessive short-term borrowing of foreign funds pairs with excessive long-term lending in the domestic economy that resulted in failure to match loan maturities,

(2) Weak financial structure as displayed by poor risk management by banks and lax supervision by authorities, and

(3) Moral hazard and government intervention in lending.

Recent articles by Corsetti, et al. (1999) and Alon and Kellerman (1999) unveil a story of contagion effect in the Asian economies which allows economies that are geographically and structurally adjacent to follow each other throughout the business cycle. Countries located within a given region, particularly emerging nations, normally rise and fall together economically. Since the Asian tiger economies have maintained high rates of growth during the 1990's, investor concern is evident that if one regional economy collapses, the rest would follow suit rapidly.

Despite financial crises are not new phenomena, the global financial crisis in 2008/2009 differ from previous crises both in magnitude and globalization. Bartram et al (2009), indicate that by the end of February 2009, global equity market globalization dropped to \$22 trillion compared to \$51 trillion at October 2007, realizing a drop of 56 per cent. On the other hand, there are numerous myths or at least serious data anomalies that surround the financial crisis that began in August 2007 as a result of the foreclosure crisis which began at the end of 2006. Some of these myths are about the role of bank credit in the crisis, while others reported here concern the weakness of the U.S., banking system and supposed excess leverage - the ratio of assets to equity in banks - in contributing to the crisis.

Additionally, economists pay attention to the role played by trade in financial crises for two reasons. First, trade imbalance has been shown to be one of the important factors that trigger financial crises. As Krugman (1979) pointed out, a currency crisis is more likely to happen in an economy which does not have enough foreign reserves. Secondly, financial crises may be transmitted through trade linkages from an affected country to others despite the latter's relatively good fundamentals. As trade is the most obvious economic linkage between countries, much research has been devoted to this

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connection. While the importance of trade imbalance in triggering crises is widely accepted, there is no agreement on the importance of crises in different tradable goods.

Eichengreen and Rose (1999) used a binary-probit model to test whether bilateral trade linkages transmitted crises between industrial countries between 1959 and 1993. They found that the probability of a financial crisis occurring in a country increased significantly if the country had high bilateral trade linkages with countries in crises. Glick and Rose (1999) conducted a similar analysis with more countries between 1971 and 1997 and obtained a similar result. Forbes (2000) used company's stock market data to study the importance of trade in financial crises transmission and his result also showed that trade played an important role.

Other studies, however, have provided different answers to the problem. For instance, Goldfajn (1998) thought that trade was unimportant in the East Asian Crisis because the direct bilateral trade volumes between these economies were very small. Masson (1998), analyzing the Mexican crisis and the Asian crisis, obtained similar results. Also a few works have focused on trade of specific industries to observe the relevant effect crisis on the industries. It seems there is a belief that financial crises only affect countries' imports and exports through changes in the exchange rates. Furthermore, financial crises including currency crises, banking crises or both could affect trade through channels besides the exchange rate. Reinhart (1999) pointed out that financial crises usually caused capital account reversal ("sudden stop") and triggered an economic recession. The economic recession reduces not only domestic demand, but also total output and export capability.

Due to recent developments in the world oil workers, the 2007-2008 global financial crises was triggered by a dramatic increase in oil price following the commencement in the US. Indeed shocks in energy prices during 2007-2008 qualify as one of the biggest shocks to oil prices on record. The causes of these episodes can be summarized in three reasons:

2-1- Supply Fluctuations

Despite occasional dramatic news such as hurricanes in the Gulf of Mexico in September 2005, turmoil in Nigeria in 2006-2008, and ongoing strife in Iraq, global production has been remarkably stable. The big story

has been not a dramatic reduction in supply of the kinds of oil products, failure of production to increase between 2005 and 2007.

Although world production has increased substantially since 1970, producing fields became developed several of these are now in significant decline, including the North Sea (which had accounted for 8% of world production in 2001) and Mexico's Cantarell Field (formerly the world's second largest producing field). Production declines caused former OPEC member Indonesia to become an oil importer, and the nation dropped out of OPEC in 2008 (Hamilton, 2009). The most important world oil exporter has been Saudi Arabia for many years. However, its production has historically been quite volatile and exhibited substantial swings up and down not because of depletion but because the Saudis followed a deliberate strategy of adjusting production in an effort to stabilize prices.

Because the Saudis had historically used their excess capacity to mitigate the effects of short-run supply shortfalls, many analysts had assumed that they would continue to do the same in response to the longer run pressure of growing world demand, and most forecasts called for continuing increases in Saudi production levels over time. For example, even as recently as in their 2007 World Energy Outlook, the International Energy Agency was projecting that the Saudis would be pumping 12 million barrels per day by 2010. Whatever its cause, the decline in Saudi production was certainly one important factor contributing to the stagnation in world oil production over 2005-2007. It also unambiguously denotes the latter episode as a new era as far as oil pricing dynamics are concerned any disturbance to supply or demand would have a significantly bigger effect on the oil price.

2-2- Demand Rise

Although supply stagnated, demand was growing strongly. Particularly noteworthy is oil consumption in China, which has been growing at a 7% compound annual rate over the last two decades. Chinese consumption in 2007 was 870,000 barrels per day higher in 2007 than it had been in 2005.

Except for China, however, consumption in other regions had to decline. Consumption in the U.S. in 2007 was 122,000 b/d below its level in 2005; Europe dropped 346,000 and Japan 318,000. What persuaded residents of these countries to reduce oil consumption in the face of rising incomes? The answer is, the price had to increase sufficiently to reduce consumption in the

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OECD countries commensurate with the increase from China, given the stagnation in total global production.

Moreover, World real GDP experienced 2-year total growth of 9.4% in 2004 and 2005. As Hamilton (2009) shows the income elasticity of petroleum demand in countries like the U.S. is currently about 0.5, whereas in the newly industrialized countries it may be above unity. World petroleum production was 5 million barrels per day higher in 2005 than in 2003, a 6% increase. Thus it is entirely plausible to attribute the 6% increase in oil consumption between 2003 and 2005 to a shift in the demand curve caused by the increase in world GDP. World real GDP grew an additional 10.1% in 2006 and 2007. Hence it seems reasonable to suppose that, if oil had remained at the 2005 price of \$55/barrel, quantity demanded would have increased by at least another 5 million barrels per day by 2008.

2-3- Financial Speculation

The US sub-prime mortgage crisis hit financial markets in August 2007 and spread to other countries. Massive liquidity was pumped in to keep markets going, but with a real sector slowdown funds started looking for returns from oil and food future markets, since demand is relatively inelastic for these products, supply was close to demand and takes time to adjust. The one-way movement in futures prices, since everyone expected prices to rise, pulled up spot prices. The speculative wave contributed but a rise in spot prices requires a rise in inventories. Although public inventories remained low there may have been large-scale private hoarding. Moreover, in oil markets, the OPEC cartel impacts supply (Goyal, 2009).

Basically, the global financial crisis has led to slow growth across the world's economies, resulting in lower demand for commodities, especially oil. This impact, for instance, has been transmitted through several sources to the Nigerian economy, especially through: i) impact earnings and revenue; ii) falls in the exchange rate; iii) the balance of payments through narrowing of the surplus on the current account balance; iv) the capital account through reduction in capital flows because of reappraisal of planned investments or complete stoppage of previously committed programs of investment; and v) contraction of fiscal space for policy (Ajakaiye and Fakiyesi, 2009).

While speculative behavior and investment activities helped buoy up crude oil prices internationally, the reality of the global recession is

beginning to be fully appreciated across the globe. The adverse impact of the crisis is more evident and direct on international prices of oil. The recent movements of oil prices are apparent in their unprecedented decline from record highs of about US\$147/barrel in July 2008 to about \$50/barrel in January 2009.

The global economic crisis has resulted in about a 71% decline in basket price of crude oil prices. As a matter of fact, the financial crisis has led many developed countries to search for alternative and cheaper sources of energy. Usually, oil shocks are defined in terms of price fluctuations, but these may in turn emanate from changes in either the supply of or the demand for oil. In practice, it is unlikely that demand will grow rapidly enough to cause a price shock, unless it is motivated by fears of supply shortages. As mentioned earlier, the supply fluctuation has been primarily responsible for observed oil price shocks, at least as an initial trigger. Moreover, expectations and speculation about future demand and especially supply conditions play a large part in the determination of crude oil prices on the futures and spot markets, particularly when inventories are low.

3- Model Specification

A measure of trade flow is anticipated to be a function of real exchange rate and real foreign output (Y_t^*). This is regarded as the conventional approach to the modeling of exports as applied to developing countries (DC) (see Goldeston and Khan, 1985). Thus in the conventional approach, exports are modeled as a supply equation including relative prices and world income. Khan (1980) provided estimates of such an export supply function for 15 DC, finding significant price elasticities with the expected signs for most of the countries. He also found positive and significant income elasticities.

However, Riedel (1984 and 1988) has criticized this approach to modeling the supply for DC on the grounds that export growth in these countries is supply determined and that world income is largely irrelevant for DC exports. On the basis of this empirical work on a group of newly industrial economies (NIE), he found high price elasticities of demand for these countries exports. Muscatelli et al. (1994) discuss the modeling of DC exports taking into account Riedel's argument and the recent works of

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Krugman (1980 and 1989). They suggest that dynamic miss-specification might have affected the results obtained by Riedel.

Following the literature, thus, we apply a conventional and structural export supply model to developing countries as follows:

$$EX_t = f(Y_t^*, ER_t, EPI_t, EX_{t-1}) \quad (1)$$

where Y_t^* , ER_t and EPI_t denoted respectively the rest of the world real income, real exchange rate and relative export price. We therefore expect positive coefficients for all three variables. To incorporate partial adjustment, a lagged dependent variable (EX_{t-1}) is included in the estimated equation. This allows us to test for incorrect specification due to estimation of an equilibrium relationship when the true relationship is disequilibrium. Thus it is expected that its coefficient sign will be between zero and one.

A large literature has investigated the macroeconomic impact of oil-price shocks, focusing in particular on the response of real economic growth and consumer price inflation in oil-importing countries (see Barsky and Kilian (2004) and Hamilton (2008)). A much smaller literature including, for example, Bruno and Sachs (1982), Ostry and Reinhart (1992), and Gavin (1990, 1992) has studied the impact of oil price shocks on external accounts. On the one hand, a common premise in policy discussions is that oil price shocks have large and often harmful effects on external accounts, forcing countries to borrow from abroad to offset adverse terms-of-trade shocks. On the other hand, it is sometimes suggested that there is not enough international risk sharing. In that view, the ensuing imbalances may not be large enough to cushion the domestic impact of oil price shocks effectively. Thus, it is interesting from both a policy and a theoretical point of view to investigate and to quantify the impact of oil price shocks on external balances and trade flows.

According to the literature, the recent financial crises have not only depressed aggregate demand and threatened global production, but have also dissolved the availability of trade finance, the life-line of international trade (Auboin and Meier-Ewert, 2003). The trade collapse has been likely to have more disastrous consequences for developing countries than developed ones. Not only are developing countries more susceptible to the demand contractions and production shortfalls resulting from the financial crisis, but

they also depend more heavily on healthy trade flows to maintain their balance of payments and fiscal balance accounts (Frenkel and Rapetti, 2009).

The financial crisis has negatively affected the developing world primarily through the trade channel. International demand has dropped as reduced incomes and increased exchange rate volatility led to a decline in consumer spending in the developed world and in particular in the U.S. and Europe, thus reducing the demand for developing countries' exports (i.e., agricultural, manufacturing, and commodity goods). The effects of the crisis on trade flows differed among developing regions and countries depending on their trade openness, degree of export concentration, dependence on crisis hit developed economies, and exchange rate management. For example, there is evidence that Latin America, which had strong export-led economic growth for the past two decades, has been hit hard with a 30% contraction in export revenues in the last quarter of 2008 (Antonio-Ocampo, 2009).

Emerging markets and developing countries are especially vulnerable to a weak trade finance market (Thomas, 2009). Exporters in developing countries have limited access to capital and rely on trade finance to process or manufacture products before receiving payment while importers rely on trade finance to purchase raw materials and production equipment (Auboin and Meier-Ewert, 2003). Moreover, trade in sectors that depend more on short-term financing options are especially vulnerable (Freund 2009).

During the banking crises that affected emerging markets in the 1990s and 2000s, trade financing became a serious issue as short-term external debt fell sharply and the cost of credit rose substantially in emerging markets (Humphrey 2009). For example, the 1997 Asian financial crisis witnessed a 16 percent decline in available trade credit (Herger, 1997). One recent study by Iacovone and Zavacka (2009) finds that trade finance is in fact negatively affected by banking crises and that poorer countries are especially susceptible to trade finance reductions and reduced trade flows.

Hence, we re-specify our export model by inclusion of the financial crisis¹ (FCI_t) variable to examine empirically its effect on the countries' export supply:

1- See appendix A.2 for measurement of financial crisis.

$$\begin{aligned} \text{LogEX}_t = & \alpha_0 + \alpha_1 \text{LogER}_t + \alpha_2 \text{LogY}_t^* + \alpha_3 \text{LogEX}_{t-1} \\ & + \alpha_4 \text{EPI}_t + \alpha_5 \text{LogOP}_t + \alpha_6 \text{FCI}_t + u_t \end{aligned} \quad (2)$$

In this equation, Y_t^* denotes the rest of the real world income. It implies that exports are determined entirely by foreign demand. However at any given output the rate at which domestic produce can increase exports depends on the adjustment process through relative prices, the current account and domestic production capacity. Consider an increase in export, in the short-run, due to a rising demand in international market, (i.e an increase in Y_t^*) this would improve the balance of payment position. Since the nominal exchange rate is fixed, an increase in foreign reserves would extend the monetary base and push up domestic prices, making home-produced goods less attractive for foreigners. In the long-run an improved foreign trade balance would raise demand for imports leading to new investment and capacity expansion (Goldestein and Khan, 1985).

Moreover, the short-run dynamics should be incorporated into the long-run. To do so, a recent single co-integration approach, known as autoregressive distributed lag (ARDL) of Pesaran et al. (2001), has become popular amongst the researchers. Firstly, endogeneity problems and inability to test hypotheses on the estimated coefficients in the long-run associated with the Engle and Granger (1987) method are avoided. Secondly, the long- and short-run parameters of the model in question are estimated simultaneously. Thirdly, the econometric methodology is relieved of the burden of establishing the order of integration amongst the variables and of pre-testing for unit roots. The ARDL approach to testing for the existence of a long-run relationship between the variables in levels is applicable irrespective of whether the underlying regressors are purely I(0), purely I(1), or fractionally integrated.

Hence, an ARDL representation of Equation (2) is formulated as follows:

$$\begin{aligned} \Delta \text{LogEX}_t = & b_0 + \sum_{i=1}^m b_{1i} \Delta \text{LogEX}_{t-i} + \sum_{i=0}^m b_{2i} \Delta \text{LogER}_{t-i} + \sum_{i=0}^m b_{3i} \Delta \text{LogY}_{t-i}^* \\ & + \sum_{i=0}^m b_{4i} \Delta \text{EPI}_{t-i} + \sum_{i=0}^m b_{5i} \Delta \text{LogOP}_{t-i} + \sum_{i=0}^m b_{6i} \text{FCI}_{t-i} + b_7 \text{LogEX}_{t-1} \\ & + b_8 \text{LogER}_{t-1} + b_9 \text{LogY}_{t-1}^* + b_{10} \text{EPI}_{t-1} + b_{11} \text{LogOP}_{t-1} + b_{12} \text{FCI}_{t-1} + u_t \end{aligned} \quad (3)$$

where m stands for the lag length. The co-integration procedure is briefly outlined as follows. The bounds testing procedure is based on the Wald-statistics and is the first stage of the ARDL co-integration method. The long-run effect of real depreciation is inferred by the size and significance of b_8 that is normalized by b_7 . The null of no co-integration hypothesis ($H_0 : b_7 = b_8 = b_9 = b_{10} = b_{11} = b_{12} = 0$) is tested against the alternative hypothesis ($H_1 : b_7 \neq b_8 \neq b_9 \neq b_{10} \neq b_{11} \neq b_{12} \neq 0$). The F test used for this procedure has a non-standard distribution. Thus, compute two sets of critical values for a given significance level. One set assumes that all variables are I(0) and the other set assumes they are all I(1). If the computed F-statistic exceeds the upper critical bounds value, then the H_0 is rejected. If the F-statistic is below the lower critical bounds value, it implies no co-integration. Lastly, if the F-statistic falls into the bounds, then the test becomes inconclusive. In such an inconclusive case, one may use Kremers et al. (1992), who suggests the error-correction term can be used to establish co-integration. A general error correction model (ECM) of Equation (3) is formulated as follows:

$$\begin{aligned} \Delta \text{LogEX}_t = & b_0 + \sum_{i=1}^m b_{1i} \Delta \text{LogEX}_{t-i} + \sum_{i=0}^m b_{2i} \Delta \text{LogER}_{t-i} + \sum_{i=0}^m b_{3i} \Delta \text{LogY}_{t-i}^* \\ & + \sum_{i=0}^m b_{4i} \Delta \text{EPI}_{t-i} + \sum_{i=0}^m b_{5i} \Delta \text{LogOP}_{t-i} + \sum_{i=0}^m b_{6i} \text{FCI}_{t-i} + \lambda \text{Ec}_{t-1} + u_t \end{aligned} \quad (4)$$

where λ is the speed of adjustment parameter and Ec is the residuals that are obtained from the estimated co-integration model of Equation (2).

The existence of a co-integration derived from Equation (3) does not necessarily imply that the estimated coefficients are stable, as argued in Bahmani-Oskooee and Brooks (1999). Therefore, stability tests of Brown et al. (1975), which are also known as cumulative sum (*CUSUM*) and cumulative sum of squares (*CUSUMSQ*) tests based on the recursive regression residuals, may be employed to that end. These tests also incorporate the short-run dynamics to the long-run through residuals. The *CUSUM* and *CUSUMSQ* statistics are updated recursively and plotted against the break points of the model. Providing that the plot of these statistics fall inside the critical bounds of 5% significance, one assumes that the coefficients of a given regression are stable. These tests are usually implemented by means of graphical representation.

4- Empirical Results

Yearly data over 1980–2008 period were used to estimate Equation (3) for 7 the selected East-West Asian countries namely China, Iran, Japan, Korea, Malaysia, Saudi Arab and Turkey regarding their data availability.

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Data definition and sources of data are cited in the Appendix A. All the series in Equation (2) appear to contain a unit root in their levels but stationary in their first differences, indicating that they are integrated at order one, i.e., I(1) and visual inspections show no structural breaks in the time series¹.

The optimum lag length was selected for the entire estimation of Equations (3) and (4) in order avoid over or under parameterization in Equation (3). In selecting the optimum lag length, Akaike information criterion (AIC) and Schwarz Bayesian criterion (SBC) were employed. Since the primary concern of this paper is to ascertain the dynamics of oil shock and financial crisis on the Asian trade flows, summary results of Equations (3) and (4) are displayed in panel A and B of Table 1. Panel A of Table 1 demonstrates summary short-run results of Equation (3). Panel B of Table 1 reports summary ECM results of Equation (4).

Table 1: Coefficient Estimates of ΔLog Oil Price and Financial Crisis Index and Error Correction Term based on AIC and SBC, respectively.

	Country	China	Iran	Japan	Korea	Malaysia	Saudi Arab	Turkey	
Panel A (Number of Lags on ΔLogOP and F_c)	ΔLogOP	$i = 0$	0.02 (0.47)	0.07 (0.47)	0.03 (2.55)	-0.11 (-2.79)	-0.06 (-2.27)	0.02 (0.23)	-0.02 (-0.26)
		$i = 1$	-	-0.41 (-1.92)	-0.06 (-3.14)	-	0.08 (2.06)	-	-
		$i = 2$	-	-	-0.06 (-2.78)	-	-	-	-
	ΔFCI	$i = 0$	-0.005 (-0.93)	0.005 (0.72)	0.006 (2.35)	-0.007 (-1.2)	-0.03 (-4.66)	-0.009 (-0.84)	-0.02 (-1.94)
		$i = 1$	-0.01 (-1.72)	-	0.005 (1.85)	-	-	-	-
	Panel B (Error Correction Term and Diagnostic Test)	Ec_{t-1}	-0.63 (-5.69)	-1.07 (-8.11)	-0.92 (-4.64)	-0.37 (-2.67)	0.04 (0.51)	-0.6 (-2.5)	-0.68 (-3.7)
R^2		0.99	0.98	0.999	0.998	0.999	0.995	0.99	
χ^2_{SC}		2.36 [0.12]	9.59 [0.002]	4.18 [0.04]	0.33 [0.57]	3.28 [0.07]	1.53 [0.2]	0.14 [0.71]	
χ^2_{FC}		5.16 [0.02]	0.13 [0.718]	0.06 [0.8]	2.66 [0.1]	0.00 [1.00]	0.00 [1.00]	0.15 [0.69]	
χ^2_N		1.3 [0.53]	0.25 [0.88]	1.62 [0.44]	0.38 [0.83]	2.83 [0.24]	0.44 [0.8]	2.32 [0.31]	
χ^2_H		0.27 [0.6]	2.37 [0.123]	0.13 [0.72]	0.28 [0.6]	5.2 [0.02]	0.77 [0.38]	0.55 [0.46]	

Notes: The numbers in parentheses and bracket are t-student and probability respectively. χ^2_{SC} , χ^2_{FC} ,

χ^2_N and χ^2_H are Lagrange multiplier statistics for tests of residual correlation, functional form misspecification, non-normal errors and heteroskedasticity, respectively.

Source: Authors.

1- These results are not reported here to keep brevity.

Panel A of Table 1 displays only the short-run coefficient estimates of the lagged first-differenced oil prices and financial crisis index. As can be seen, from this table, the short-run effects of oil price and financial crisis for countries are different. Except for China, Saudi Arabia and Turkey, changes in the world oil price have affected negatively exports of Iran, Japan, South Korea and Malaysia. This shows at least a diversified effect of the oil price on trade flow of the Asian countries in the short-run.

There is a same story for the effect of financial crisis. In this case, China, Malaysia and Turkey have been affected negatively by the financial crisis. In compassion, due to the values of estimated coefficients, the effect of the oil price on the Asian economies have been a bit more pronounced than those of the crisis.

However, Panel B of Table 1 reveals that there is a co-integration relationship in all countries except for Malaysia. Moreover, the magnitudes of adjustment speed coefficients for most countries are considerably high, indicating that the steady state equilibrium can be re-established in less than 2 years if these countries were to face an external shock. The magnitude of the adjustment speed, however, is in line with those in literature. The results for Iran is surprising, as the estimated coefficient of the error correction term is -1.07, indicating a divergent effect of the country data on its trade flows.

In order to analyze the long-run impact of the oil price and financial crisis index on trade flow, the normalized estimated coefficients of Equation (4) are reported in Table 2. Empirical results indicate that the long-run movements in the world oil price have affected significantly and negatively export flows in Iran, Japan and Korea, while no effect we observe in other countries. This result demonstrated an interesting finding on two different types of countries: Iran as an oil producing country, Japan and South Korea as the oil consuming countries. If we consider a rise in oil price, it will lead to a fall in Iran's exports, which is ultimately interpreted as a result of Dutch Disease. The different story exists for Japan and Korea that is a rise in the world oil price would raise their production costs resulting possibly in their firm's competition.

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Table 2: Long-run Coefficients Based on SBC in the Selected Order of ARDL

Country	China	Iran	Japan	South Korea	Malaysia	Saudi Arabia	Turkey
Variables							
Order of ARDL	(0,0,1,0,1,1)	(2,2,0,1,1)	(2,0,1,2,1,1)	(1,0,0,0,1,0)	(2,1,0,1,2,0)	(1,2,1,0,2,0)	(1,2,1,0,1,0)
Constant	69.3 (7.61)	-131.49 (-5.41)	16.93 (4.4)	30.49 (1.1)	124.26 (0.43)	-26.5 (-1.09)	72.68 (2.2)
Trend	0.12 (12.07)	-0.14 (-5.42)	0.02 (4.92)	0.06 (1.98)	-0.04 (-0.03)	-0.03 (-1.2)	0.07 (1.29)
Foreign Income	-4.45 (-6.45)	0.74 (5.86)	-0.43 (-1.48)	-1.6 (-0.77)	-8.78 (-0.4)	3.22 (1.74)	-4.7 (-1.87)
Exchange Rate	-0.3 (-2.87)	0.1 (3.82)	0.02 (0.56)	0.46 (2.27)	3.18 (0.49)	-9.2 (-5.09)	0.11 (1.16)
Oil Price	0.03 (0.48)	-0.32 (-2.09)	-0.09 (-2.41)	-0.29 (-1.75)	-0.72 (-0.81)	0.03 (0.22)	-0.03 (-0.27)
Export Value Index	-0.05 (-2.58)	0.28 (4.95)	0.27 (8.19)	0.98 (0.85)	4.4 (0.57)	-0.07 (-0.74)	0.03 (0.35)
Financial Crisis	-0.02 (-2.08)	0.005 (0.37)	0.01 (3.39)	-0.02 (-1.26)	0.71 (0.53)	-0.01 (0.66)	-0.03 (-1.67)

Notes: The numbers in parentheses are t-student.

Source: Authors.

Finally in Table 3, the stability of the short- run and long-run coefficients is checked through the *CUSUM* and *CUSUMQ* tests by using the residuals of Equation (3). Generally, results show take the short-run and long-run coefficients are stable.

Table 3: Stability Test Results Based on *CUSUM* and *CUSUMSQ*

Country	<i>CUSUM</i>	<i>CUSUMQ</i>
China	Stable	Unstable
Iran	Stable	Stable
Japan	Stable	Stable
Korea	Stable	Stable
Malaysia	Stable	Stable
Saudi Arab	Stable	Stable
Turkey	Stable	Stable

Source: Authors.

As we have discussed in the previous sections, different models of financial crises have been affected by a set of economic and non-economic factors in which their roles have been found by many studies in the literature.

The hypothesis we thus test here is that we deduce that oil price shocks and financial crises have an interacted relationship. That is, a causal relation should explain that a financial crisis can be arising from an oil price shock, while a financial crisis can result ultimately in an oil shock. This later development should occur in the long-run.

In this section, we include a new variable, $Log OP * FCI$, which shows a cross effect of oil price shock and financial crisis on the selected Asian countries' exports.

$$\begin{aligned} \Delta Log EX_t = & b_0 + \sum_{i=1}^m b_{1i} \Delta Log EX_{t-i} + \sum_{i=0}^m b_{2i} \Delta Log ER_{t-i} + \sum_{i=0}^m b_{3i} \Delta Log Y_{t-i}^* \\ & + \sum_{i=0}^m b_{4i} \Delta EPI_{t-i} + \sum_{i=0}^m b_{5i} \Delta Log OP_{t-i} + \sum_{i=0}^m b_{6i} FCI_{t-i} + \sum_{i=0}^m b_{7i} \Delta (Log OP_{t-i} * FCI_{t-i}) \\ & + b_8 Log EX_{t-1} + b_9 Log ER_{t-1} + b_{10} Log Y_{t-1}^* + b_{11} EPI_{t-1} + b_{12} Log OP_{t-1} \\ & + b_{13} FCI_{t-1} + b_{14} (Log OP * FCI)_{t-1} + u_t \end{aligned} \tag{5}$$

In Equation (5), the coefficients of $\Delta (Log OP_{t-i} * FCI_{t-i})$ with distributed lags could show the cross effects between oil shocks and financial crisis on trade flows. The estimated results of Equation (5) are reported in Table 4. Briefly, the estimated coefficients of the cross variable with distributed lags in the short-run are shown in Panel A, while the Panel B includes the estimated coefficients in the long-run.

Table 4: The Estimated Results for Cross Effects

Country	Panel A: Number of lag on $\Delta Log OP * FCI$ in Short-run			Panel B: The Coefficient of $\Delta Log OP * FCI$ in Long-run
	$i = 0$	$i = 1$	$i = 2$	
China	0.04 (1.49)	-	-	0.05 (1.75)
Iran	0.2 (4.6)	-0.2 (-2.4)	-	0.18 (4.47)
Japan	-0.004 (-0.5)	-	-	-0.005 (-0.47)
Korea	0.03 (0.08)	-	-	0.06 (1.25)
Malaysia	-0.004 (-0.26)	-	-	0.09 (0.26)
Saudi Arabia	0.022 (0.61)	-0.16 (-2.8)	-0.16 (-2.85)	-0.14 (-3.68)
Turkey	0.31 (3.02)	-0.26 (-2.8)	-	0.05 (0.64)

Notes: The numbers in parentheses are t-student.
Source: Authors.

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The results show that the coefficient of the variable ($\Delta \text{LogOP} * \text{FCI}$), with one lag, is significant and negative for Iran, Saudi Arabia and Turkey, which implies a true effect for these countries in the short-run. However, it is only significant expectedly for Saudi Arabia in the long-run. It concludes that the long-run effect of the cross variable is not applicable for the most country in the sample.

5- Conclusion

In this paper we tested the hypothesis in which a cross relationship between financial crisis and the world oil price would affect Asian countries' trade flows. Accordingly, yearly data over 1980–2008 period were used to estimate export equation based on ARDL approach for the 7 selected East-West Asian countries, that is China, Iran, Japan, South Korea, Malaysia, Saudi Arabia and Turkey.

Empirical results showed that the long-run movements in the world oil price affected significantly and negatively export flows of Iran, Japan and Korea, while no effect we observed for other countries in the sample. This concluded an interesting finding on two different types of countries: Iran as an oil producing country, Japan and South Korea as the oil consuming countries. The implication is that a rise in oil price leads to a fall in Iran's exports, which may be interpreted as a result of Dutch Disease. However, for Japan and Korea, a rise in oil price should raise their production costs lowering the degree of Japanese and Korean firms' competitiveness in the world economy.

The results also showed that the coefficient of the cross variable ($\text{OP} * \text{FCI}$) was significantly negative for Iran, Saudi Arabia and Turkey, which implied an expected effect for these countries in the short-run. However, it was only significant for Saudi Arabia in the long-run. The results, as a whole, implied that both financial crisis and oil price had a cross effect on Asian trade flows in the short-run, while this effects could not emerge in the long-run. This implies that financial crisis and oil shocks are two different incidents that happen separately and do not essentially affect each other.

Appendix

A-1- Data definition and sources

Annual data for China, Iran, Japan, Korea, Malaysia, Saudi Arab and Turkey over the 1980-2008 periods are used in the empirical work. All data are collected from World Development Indicators (WDI) database.

A-2- Variables' Definition

EX_t is export of goods and services for countries constant 2000.

ER_t is real exchange rate for any countries against US Dollar.

Y_t^* is as measure of world income.

EPI_t is export value index constant 2000 for any country.

OP_t is world price of oil.

FCI_t is financial crisis index. We apply a new index of financial crisis (FCI) generated by Hatzius et al. (2010). It covers a wide range of financial variables, as explained, substantially wider than the coverage of any of the existing FCIs covered. And it has a relatively long history, ideally going back at least to the early 1970s. They selected to include 45 variables in FC index. Their starting point for the selection of these variables was the coverage of existing FCIs. At a later stage in this analysis, they also purge the FCI of monetary policy influences that may arise from including the yield curve in the FCI. Next, they filled in areas that were not fully covered by existing FCIs. Most FCIs are dominated by interest rate level or spread variables and by asset price variables. Several price and spread variables have been added that were not included in other FCIs, including new-car loan rates, jumbo mortgage rates, and home prices. Existing FCIs also include few quantity or flow variables, and only one FCI included a survey variable. During the recent financial meltdown, these indicators appeared to become much more important than they had been in the past. At the same time, price signals became potentially less reliable as markets seized up, non-price credit conditions tightened dramatically, and credit flows slowed abruptly. In an effort to capture these effects, Hatziu et al. (2010) added 15 financial stock and flow variables to the list, including a representative sample of bank and non-bank credit variables in a variety of markets.

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