CARBON DIOXIDE EMISSION, INSTITUTIONAL QUALITY, AND ECONOMIC GROWTH: EMPIRICAL EVIDENCE FROM MALSYSIA

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ABSTRACT

In view of Malaysia's status as a fast-growing economy with accelerating carbon dioxide emissions, a better understanding of the relationship between economic growth and pollution is vital to the policy makers. This paper, therefore, attempts to investigate the existence of long run relationship among carbon dioxide emission, institutional quality, exports, and economic growth and further examines the causal relationship among these variables in Malaysia for the period 1984-2008. For the purpose of this study, both autoregressive distributed lag (ARDL) bound testing approach and Granger causality tests are employed. From the bounds test, it is found that a long run relationship does exist among the variables, even using different conditioning information sets. A positive and significant interaction term between carbon dioxide emission and institutional quality indicator (i.e. law and order) implies that good institutional quality is important in controlling carbon dioxide emission in the process of economic development. The results for Granger causality tests further confirm the importance of institutional frameworks in reducing carbon dioxide emissions since institutional quality is found not only affects economic growth directly, but also indirectly via carbon dioxide emissions. This indicates that sound institutional frameworks are essential for Malaysia to achieve high economic growth without sacrificing its environment.

Keywords: Bounds test, carbon dioxide emission, economic growth, Granger causality test, institutional quality

INTRODUCTION

Over the past decades, economists have been studying and attempting to figure out which aspects of a country's economy are the determinants for economic growth as well as to explain the differences in income per capita among nations. Traditionally, the common factors analysed in growth models include labour, human capital, physical capital and technology. A great amount of literature has studied the subject, but empirical work has yet found what is behind the growth processes in a thorough manner. However, in recent years, some other variables such as CO2 emissions, exports and even institutional factors like property rights, legal system and political stability have been incorporated into growth models to complement the more traditional factors found in the neoclassical and endogenous growth models.

Since the last few decades, the increase in the emissions of greenhouse gases that causes global warming has become a major threat to humankind. Amongst several environmental pollutants, scientists have found carbon dioxide (CO_2) emissions as the main source causing climatic change. According to The World Bank (2007), carbon dioxide (CO_2) is held responsible for 58.8 percent of the greenhouse gases. In addition, Soytas and Sari (2009) also agree to the fact that other than natural factors, human activities that lead to the production of CO_2 is the major cause for global warming. This is due to the fact that more than 80 percent of the current global primary energy demand is fulfilled by fossil fuels such as coal, oil and gas (Energy Information Administration, 2004). CO_2 is produced as a joint product with the usage of fossil fuels. Most importantly, this pollutant is not only believed to be the major global scale pollutant that can cause irreversible adverse effects on climate but also on the world economy subsequently.

An abundant of researches has been done so far to examine the relationship between CO_2 emission and economic growth. Most of the empirical studies have suggested that there is an inverse U-shaped relationship between income and environmental quality in which environmental quality worsens at low levels of income, and then improves as income increases (Fodha & Zaghdiud, 2009)[143]. However, the studies about the impact of pollution on economic growth have been rare. Based on these limited researches[144], environmental quality can act as a determinant for income growth. Basically, it is found that an improvement in environmental quality leads to a higher economic growth particularly in developed countries. In other words, pollution has a negative impact on economic growth[145].

A number of studies have been conducted to study the empirical relationship between exports and growth in the past two decades in different countries. According to Giles and Williamson (2000), there are four different ways of viewing the causality between growth and exports after surveying more than 150 related papers. First of all, the causality could go from exports to growth or vice versa from growth to exports. Moreover, causality could hold both ways in a feedback fashion or another factor could be the cause of both. In other words, there is no clear agreement on whether exports cause growth or growth stimulates exports. However, most of the early studies using cross-section data support the former. Export expansion has been considered as a key factor leading to economic growth due to the positive externalities it produces. For instance, those firms who engage in export activities may be able to enjoy certain benefits such as efficient resource allocation, economies of scale, greater capacity utilisation, improvement in technologies due to stiff foreign competition. Besides, more foreign exchange can be earned via exports, which encourages the imports of more capital goods. This will in turn help to stimulate economic growth.

In addition, the studies on the role of institutions in fostering economic growth have become a prominent line of research in recent years. This could be due to the realization that all economic actors are affected by institutions. According to Gagliardi (2008), institutions matter because they help to minimise opportunism, to foster cooperative

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[143] The inverted-U shaped relationship is called the Environmental Kuznets Curve based on Simon Kuznets' Nobel-prize winning framework.
[144] Refer to e.g., Pearson (1994), Stern et al. (1996), and Dinda (2009).
[145] The studies include Porter and van der Linde (1995), and Hung and Shaw (2006).

behaviour among agents, and to enable agents internalise externalities. Thus, the improvement of institutional quality can provide a favourable environment for the adoption of cooperative solutions that will in turn help to enhance economic growth. Most of the researches find a positive relationship between institutional quality and economic growth[146]. However, the direction of the causality between the two variables remains ambiguous. A survey of the existing literature suggests that most of the current studies emphasize on the nexus of pollution-output, exports-output, and institutional quality-output. Very little effort has been made to examine these three relationships under the same framework. This study, therefore, intends to fill the gap by examining the existence of long run relationship between CO_2 emission, institutional quality, exports, and economic growth of Malaysia using bounds test.

Malaysia appears to be an appropriate case study in the sense that it is one of the countries which experiences robust economic growth among the developing nations despite gloomy global economic environment in the recent years. For instance, the Malaysian economy experienced an expansion in 2010 and 2011, with a growth rate of 7.2% and 5.1% respectively (World Bank, 2012). Furthermore, the country is pursuing an export-oriented growth strategy in which it relies significantly on exports for realising its economic development. According to the World Bank (2011), exports as a percentage of GDP have risen from 41% in 1970 to 97% in 2010. At the same time, growth in exports may have led to a rise in carbon dioxide CO_2 emissions in the country. According to World Development Indicators of The World Bank, carbon dioxide emissions in Malaysia have increased tremendously from 1.34 metric ton per capita in 1970 to 7.57 metric tons per capita in 2008. In view of the accelerating carbon dioxide emissions in Malaysia, a better understanding of the relationship between environmental degradation and economic growth with the presence of exports and institutional quality is essential. This is particularly important to the policy makers so that appropriate measures can be designed to reduce CO_2 emissions without retarding the economic growth.

The remainder of the paper is organized as follows: Section 2 provides a review on the inter-relationships between CO_2 emissions, institutional quality, exports and economic growth. In Section 3, data sources and variables selection are explained. Section 4 presents the model and econometric methodology. Section 5 discusses the empirical results and policy implication, and Section 6 concludes.

LITERATURE REVIEW

Basically, there are three main research strands in the literature on the relationship between CO_2 emissions, institutional quality, exports and economic growth. The first strand concentrates on the CO_2 emissions-economic growth nexus. A vast amount of researches have been done on economic growth-pollution nexus ever since the first empirical work by Grossman and Krueger (1991).The current literature on this nexus focuses mainly on examining the existence of the inverted U-shaped Environmental Kutnets Curve (EKC). Many have found an inverted U-shaped link between pollution and economic growth while others have failed to prove such a relationship. In other words, the results obtained from these studies have been mixed so far. Studies which support for the existence of EKC include Dijkgraaf and Vollebergh (1998); Schmalensee, Stoker and

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[146] See e.g. Aron (2000), Subramanian (2007), and Lee and Kim (2009).

Judson (1998); Kristrom and Lungren (2003); Martinez-Zarzoso and Bengochea-Morancho (2004); Galeotti, Lanza and Pauli (2005); Dinda and Coondoo (2006); Rezek and Rogers (2008); Jalil and Mahmud (2009); Lamla (2009); Pao and Tsai (2011); Han, Chang and Liu (2011). Others found monotonic, negative or even N-shaped relationship between income and CO2 emission[147].

In the case of EKC, it is suggested that the economic growth will lead to a gradual degradation of environment in its initial stages and then, after a certain level of growth, it leads to an improvement in environmental quality. According to Panayotou (1993), the inverted U-shaped can be explained by the fact that at the early stage of economic development, pure growth in the scale of the economy leads to negative environmental impacts if there were no change in the structure or technology of the economy. This is called the scale effect. At higher levels of development, structural change towards information-intensive industries and services, together with increased environmental awareness, enforcement of environmental regulations, better technology and higher environmental expenditures, lead to levelling off and gradual decline of environmental degradation (Panayotou, 1993).

However, the number of EKC literature on Malaysia has been limited. A study by Vincent (1997) on Malaysian states using data from the late 1970s to the early 1990s indicates that income and emissions of some pollutants are found to be related insignificantly. However, income and some other pollutants are proven to have a positive relationship. Since EKC hypothesis does not exist in this case, therefore, the researcher proposes that policy makers of developing countries should not make assumption that higher economic growth can automatically contribute to a reduction in air and water pollution. In addition, by employing causality tests, Ang (2008) conducts a research to study the existence of the long-run relationship between output, pollution, and energy consumption in Malaysia from 1971 to 1999. Pollution and economic growth are found to have a positive relationship in the long run. However, the causality running from pollution to output is rather weak. More recently, Lee (2009) applies Granger causality tests to check for the existence of short-run and long- run link between FDI inflows, pollution and output in Malaysia for the years between 1970 and 2000. A short-run relationship between both the FDI inflows and pollution on output is obtained.

The second strand of research focuses on the relationship between institutional quality and economic growth. Up to date, many researches have been done to study the role of institutions in promoting growth. Most of the studies suggest that institutional factors have a positive and strong impact on a country's economic growth. For example, as proposed by North (1990), property rights play a very important role in explaining growth. According to the researcher, property rights enable resources in the economy to be utilised more efficiently in the sense that it would be channelled towards productive investment instead of unproductive ones. Apart from that, Clague and Keefer, Knack and Olson (1995) suggest that the characteristics and stability of political regimes appear to be important determinants of the quality of economic institutions. In addition, Knack and Keefer (1995) employ the International Country Risk Guide (ICRG) rankings to derive an index based on the average of five institutional characteristics namely rules of law, bureaucratic quality, corruption, risk of expropriation and government repudiation of contracts for the period

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[147] See e.g., He and Richard (2009) (monotonically increasing relationship), Focacci (2003) (monotonically decreasing relationship),and Hu and Huang (2008) (N-shaped relationship).

between 1986 and 1995. The results indicate that the ICRG index is strongly correlated with economic growth in standard growth regressions even after controlling for variables such as education and initial income. Thus, the researchers argue that economic performance of a nation relies very much on its institutional quality.

Hasan, Wachtel and Zhou (2009) use a panel of provincial level data from China for the period 1986-2003 to investigate whether the changes in China's legal, economic and political institutions and its financial market can influence the economic performance of the country. It is proven that those regions with better development of financial market, better legal environment, higher awareness of property rights and more open political environment enjoy stronger growth. By focusing on Mexico, Angelopoulos, Economides and Vassilatos (2010) examine the role of institutions particularly property rights in explaining economic fluctuations in the emerging economies. The result of the study shows that changes in Mexico's productivity are related to shocks in institutional quality. As a conclusion, weak property rights are unfavourable for the performance of an economy. This conclusion obtained is consistent with the earlier research done by Bergoeing, Kehoe, Kehoe and Soto (2002) who proposed that improvements in institutional quality such as privatisation and regulation of banking system lead to total factor productivity movements, which in turn help to explain economic volatility in Chile and Mexico.

However, some other researchers believe that as nations experience better growth, institutional quality will tend to improve because when people become better off, they will demand more from their institutions. According to Barro (1996), a higher income will lead to a greater political freedom in a particular country. In other words, as nations experience better growth, they will become more democratic in the sense that more political freedom will be given to the citizens. Acemoglu, Johnson and Robinson (2001) also agree to the point of view that as income rises, institutions improve while studying on the impact of institutions on long-run growth. Furthermore, Rigobon and Rodrik (2004) conduct a study on Korea and found that as income grows higher in the country, the costs of doing business drop. Hence, it can be concluded that as income increases, the quality of institutions improves. In addition, by analysing the data from South and North Korea, Glaeser, Porta, Lopez-de-Silanes and Shleifer (2004) suggest that economic growth leads to better institutions such as democracy. Despite enormous amounts of literature on institutional quality and economic growth, the study of this nexus on Malaysia individually still does not exist according to our knowledge.

The third well-established strand of research concentrates on the link between exports and output. There has been an extensive research done on the relationship between exports and output in recent decades. However, there is no consensus reached yet on the issue of whether export-led-growth or growth-led-exports. By applying co-integration analysis, Granger Causality Test and Error Correction Model, Qiao (1998) finds that other than fixed investment, merchandise exports are the major determinant for economic growth in China from 1980s to 1990s. Awokuse (2006) examines the impact of export and import expansion on growth in three transition economies (Bulgaria, Czech Republic, and Poland) and found that exports stimulate economic growth. However, the arguments for exports-led-growth hypothesis has been criticised by a group of researchers who believe in inward oriented trade policies instead of outward oriented trade policies. They argue that exports cannot lead to growth due to a few reasons. The reasons given include worsening of terms of trade and inefficient demand for the products of less developed countries (Prebisch, 1962), unequal exchange (Emmanuel, 1972) as well as unpredictable global market (Jaffe,

1985). Reppas and Christopoulos (2005) investigate the relationship between exports and output growth for a sample of 22 less developed Asian and African countries over the period 1969-1999. The empirical findings suggest that output growth causes exports and not the reverse. Similarly, Love and Chandra (2004), using the Johansen's multivariate framework, found that the direction of both long and short-term causality is from income to exports.

In the case of Malaysia, the existing literature on the exports-output nexus is rather rare. For example, Lean and Smyth (2009) employ annual data from 1971 to 2006 to examine the causal relationship between aggregate output, electricity consumption, exports, labour and capital in a multivariate model for Malaysia. They find support for the export-led-growth hypothesis which states Granger causality runs from exports to aggregate output. Other researches examine Granger causality on the two variables in Malaysia include Furuoka (2007) and Mahadevan (2007).

In recent years, however, a new stream of research that considers pollution, institutional quality and economic growth has emerged. Based on the research done by Panayotou (1997), the quality of both policies and institutions plays an important role whereby it helps to reduce environmental degradation in a country even if the country's income is low. This means that countries can expect to enjoy improvements to the environment with higher future income levels. The policies mentioned include more secure property rights under the rule of law, better enforcement of contracts and effective environmental regulations. These policies can help to flatten the EKC and reduce the environmental cost of higher economic growth. Similarly, Torras and Boyce (1998) suggest that institutional factors such as a more equitable distribution of income contribute positively to the EKC relations as they analyse seven indicators of air and water quality with samples of 19 to 42 countries (changing depending on type of pollutant). Their study also shows that factors like literacy, political rights, and civil liberties impose strong effects on environmental quality in low income countries. Most recently, a study is done by Leitao (2010) to examine the effect of corruption on the income level at the turning point of EKC using sulphur emissions as the pollutant. A panel of 94 countries with different stages of development and with different levels of corruption are chosen for the purpose of the study. The results indicate that EKC hypothesis does exist for sulphur. Furthermore, it is shown that a country's degree of corruption has a positive effect on the income level at the turning point of the EKC. However, no existing literature can be found on Malaysia in regards to the study of the pollution-institutional quality-output nexus.

DATA SOURCES AND VARIABLES SELECTION

For the purpose of this study, annual data for real GDP per capita growth rate (GDPGR) (annual %), carbon dioxide emissions (CO_2) (metric tons per capita) and exports (X) (export value index) for Malaysia from 1984 to 2008 are obtained from the World Development Indicators, World Bank. The data set used in this study for institutional quality is obtained from the International Country Risk Guide (ICRG)—a monthly publication of Political Risk Services (PRS). According to Williams and Siddique (2008), ICRG is the most commonly used institutional data source today. In the growth literature,

institutional data set from ICRG has been widely adopted[148]. For the study, a common institutional variable from ICRG is adopted to represent the overall institutional environment. The variable applied is law and order[149]. According to ICRG, The "law" sub-component measures the strength and impartiality of the legal system, and the "order" sub-component assesses the popular observance of the law. Equal weights are given to two separate components, namely "law" and "order". Each sub-component comprises zero to three points. The index value for law and order is from 0 to 6, higher values indicate better law and order. Data set on law and order is available for the period 1984-2008.

MODEL AND ECONOMETRIC METHODOLOGY

Based on the theoretical arguments shown above, the link between output, CO2 emissions, institutional quality, and exports can be specified as follows:

$$LGDPGR_t = f(LCO2_t, LIQ_t, LEXPO_t)$$

where $LGDPGRG_t$, $LCO2_t$, LIQ_t and $LEXPO_t$ are real GDP per capita growth rate, per capita carbon dioxide emissions, institutional quality (where "law and order" is used as proxy) and exports respectively. All variables are expressed in the natural logarithms.

A more recent cointegration test proposed by Pesaran, Shin, and Smith (2001) known as bounds test or autoregressive distributed lag (ARDL) model is applied in the study to test for cointegration. In comparison to other widely used traditional approaches such as Engle and Granger (1987), Johansen (1988) and Johansen and Juselius (1992), bounds test is more reliable for studies with small sample sizes (less than 100). Besides its small sample properties, bounds test is also considered as more superior if compared to other tests in the sense that it can be used no matter whether the variables are in the same order of integration. Thus, problem concerning the robustness of the cointegration tests can be minimized with the application of bounds test when dealing with small observations.

Bounds test can be estimated by ordinary least squares (OLS), as follows:

$$\Delta LGDPGR_t = \beta_1 + \beta_2 LGDPGR_{t-1} + \beta_2 LCO2_{t-1} + \beta_3 LIQ_{t-1} + \beta_4 LEXPO_{t-1}$$

$$+ \sum_{i=1}^{p} \alpha_{1i} \Delta LGDPGR_{t-i} + \sum_{i=0}^{p} \alpha_{2i} \Delta LCO2_{t-i} + \sum_{i=0}^{p} \alpha_{3i} \Delta LIQ_{t-i} + \sum_{i=0}^{p} \alpha_{4i} \Delta LEXPO_{t-i} + \varepsilon_t$$

(1)

There are two steps involved in the procedure for examining the long-run relationship between economic growth, carbon dioxide emissions, institutional quality and exports. First, we estimate Equation 1 by ordinary least squares technique. Second, the existence of a long-run relationship can be traced by imposing a restriction on all estimated coefficients of lagged level variables equating to zero. Hence, bounds test is based on the F-statistics (or Wald statistics) with the null hypothesis of no cointegration (

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[148] For example, Barro (1996), Bhattacharyya (2009), Brunetti and Weder (1995), Chong and Calderon (2000), Knack and Keefer (1995),and Rigobon and Rodrik (2004).

[149] ICRG law and order index is also applied in Alesina and Dollar (2000) and Bhattacharyya (2009).

$H_0 : \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$) against its alternative hypothesis of a long-run cointegration relationship ($H_1 : \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0$).

Since the F-statistics used for this test has a non-standard asymptotic distribution, Pesaran et al. (2001) have generated two different sets of critical values for given significance levels. The first set assumes that all variable are integrated of order zero, I(0) and the second set assumes all variables are integrated of order one, I(1). If the computed F-statistic is greater than the upper critical bounds value, then the null hypothesis is rejected. In contrast, if the computed F-statistic is smaller than lower critical bounds value, it indicates no long-run relationship between variables. If the computed F-statistic lies between lower and upper bounds values, then the test becomes inconclusive.

RESULTS AND INTERPRETATIONS

We start to run a simple bivariate regression between carbon dioxide emissions and economic growth, using autoregressive distributed lag (ARDL) model[150]. The results are shown in Model 1, Table 1. It is found that carbon dioxide emission has a positive effect and statistically significant at 10% significance level on the economic growth. However, the result is questionable as the simple regression has often been criticized resulting from the omission of the important explanatory variables. This is evident by the Ramsey RESET's Mis-specification test as the test statistics is highly significant.

Hence, to ensure the sensitivity and robustness of the result, we use different conditioning information sets. This is to reduce the probability that the growth regression either omits a relevant variable or includes a select group of explanatory that produces a favored result. The first conditioning information set includes two main explanatory variables, namely exports (*EXPO*) and institutional quality (*IQ*). The results of the estimation are reported in Model 2. The coefficient of carbon dioxide emission remains positive and statistically significant at 1% significance level on the economic growth. Similarly, both exports and institutional quality have a positive and significant effect on the economic growth. This indicates that the importance of institutional quality should not be neglected as good institutional framework matters for economic growth. The significance of exports on the economic growth is in line with the previous studies such as Knack and Keefer (1995), Hall and Jones (1999) and Demetriades and Law (2006).

In order to examine the validity of the hypothesis that well-developed domestic institution system would help to reduce the omission of carbon dioxide, the interaction term between carbon dioxide omission and institutional quality (CO2IQ) is included, as shown in Model 3. It is found that the interaction term is positively correlated with the economic growth while the coefficient of carbon dioxide omission turns to negative and significant (-1.415). This provides strong evidence to support the hypothesis that a positive effect of carbon dioxide omission on growth can be transferred into negative if the domestic institution system has reached a certain minimum level of development. In other words, Malaysia may benefit from higher growth rate and at the same time reduce the level of

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[150] The results of unit root tests (ADF and KPSS) are not reported here, in order to conserve space. However, these are available upon request. Based on the tests, it is concluded that all variables are stationary at first difference.

carbon dioxide emission if domestic institution system has reached a certain level development and/or efficiency. This suggests that the relationship between carbon dioxide emission and economic growth is contingent on the country-specific characteristics, or absorptive capacity such as institutional quality.

Granger causality test

Table 2 shows results of the Granger causality tests within vector error correction model (VECM). The error correction term (ECT) is negative (-0.796) and statistically significant at 1% significance level. ECT implies that any disequilibrium or deviation from the long-run equilibrium between these variables is adjusted or corrected about 80% for each year and it takes about 1.3 years to restore the long-run equilibrium level. It is found that there is a unidirectional causality running from institutional quality, exports, carbon dioxide emissions and the interaction term between CO2 and institutional quality (CO2IQ) to economic growth without feedback. In addition, we found that institutional quality not only influences economic growth directly, but this effect also can be channeled via carbon dioxide emissions. In line with the findings from the long-run test presented in Table 1, it is concluded that it is possible to reduce carbon dioxide emissions without sacrificing economic growth provided that Malaysia has very good public institutional frameworks (in this case, laws and regulations) in controlling the emissions.

CONCLUSION

This study is aimed to examine the long run and causal relationship between economic growth, carbon dioxide emissions, institutional quality and exports in Malaysia for 1984-2008 period. Applying autoregressive distributed lag (ARDL) bounds testing approach and Granger causality tests, the results show a strong evidence of a long-run relationship between variables, regardless of different specifications / conditioning information sets. Initially, it appears that an increase in carbon dioxide emission will increase economic growth. However, when carbon dioxide emission is interacted with institutional quality indicator (measured by laws and regulations), the interaction term is positive and significant, which implies the importance of domestic institution framework in controlling carbon dioxide emission in the development process.

The results for the Granger causality test also found that the linkage between carbon dioxide emission and economic growth is sensitive to the quality of institutions. The policy implication is clear: in order to have sustainable positive economic performance and at the same time to reduce carbon dioxide emission in the country, policy makers should regulate and enhance the role and efficiency of domestic institutions.

TABLES

Table 1: Carbon dioxide emission, institutional quality and economic growth in Malaysia,

1984-2008

Variable	Model 1	Model 2	Model 3
$CO2_t$	0.255* (2.397)	0.940*** (5.450)	-1.415*** (-5.587)
$EXPO_t$	-	0.138*** (9.121)	0.074*** (6.208)
IQ_t	-	2.220*** (6.133)	2.290*** (4.828)
$CO2IQ_t$	-	-	3.269*** (4.278)
Constant	4.563*** (21.481)	9.100*** (8.419)	6.195 (1.815)
Diagnostic Checking			
Jarque-Bera Test	0.261 [0.877]	2.549 [0.279]	0.878 [0.644]
Breusch-Godfrey Serial Correlation LM Test	0.234 [0.675]	6.548 [0.132]	7.474 [0.120]
Heteroskedasticity Test: ARCH	0.064 [0.802]	2.207 [0.133]	1.751 [0.203]
Ramsey RESET Test	7.016** [0.029]	0.269 [0.639]	5.307 [0.313]

*** Significant at 1% confidence level; * significant at 1% confidence level. t-statistics are reported in parenthesis while probability values are reported in bracket.

Table 2: Results of Granger Causality Tests

Dependent Variable	F-statistics					ECT (t-statistics)
	ΔGDPGR	ΔCO2	ΔEXPO	ΔIQ	ΔCO2IQ	
ΔGDPGR	-	3.825*	7.161**	21.029***	6.698**	-0.796*** (-3.175)
ΔCO2	0.969	-	0.669	24.671***	74.170***	-0.006 (-1.057)
ΔEXPO	2.296	5.426**	-	1.040	7.208***	-0.290 (-1.346)
ΔIQ	2.067	0.345	1.524	-	0.024	-0.052 (-1.627)

Note: *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. Figures in parentheses are t-statistics.

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