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Trade, Tourism and Economic Growth Relationship – A Cross Section Analysis

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ABSTRACT

This study investigates the relationships between trade, tourism and economic growth for 74 cross-sectional log linear regressions. The finding suggests that trade and tourism has positive relationship to economic growth. Tourist arrival contributed 6 percent, while total trade contributed 37 percent to every change in economic growth. The finding can be a valuable guide for the policy maker in the area of trade, tourism and development economics.

Keywords: Trade, Tourism, Growth, Cross-section

INTRODUCTION

International tourism was seen as a chance for a country to enhance its growth. The linkages between tourism and economic growth believed to have a positive relationship through tourism generation of income in the form of foreign exchange, investment and reduction in unemployment. Schubert, Brida and Risso (2009) argued that local and foreign investment on tourism related industry including accommodation and infrastructure will be more attractive if demand in tourism is increasing and speeding up. Frankel and Romer (1999) believed that trade is able to increase capital accumulation through spurring physical and human capital. Moreover, countries that have large opportunities by openness in international trade will have higher income and appearing to growth faster (Frankel & Romer 1999, Krueger, 1997). Countries that realized the prospects of international trade have built or join their free trade zone to expand the integration, tariff liberalization and barriers elimination.

Previous studies supported the positive relationship between trade and tourism to economic growth. In principle, economic growth may be induce by trade and tourism or in specific term is tourism led growth, growth led tourism or other reciprocal causality. Trade is not only the exchange of goods and services across borders, but also provided the movement on technology transfer, physical and capital accumulation. Tourism has been considered an export product (service) of international trade since term of tourist expenditure counted as export revenue. Further, this study will combine these two sectors together and examine their impact on the economic growth in a linear regression to the growth.

The main objective in this paper is to investigate empirically the relationship between trade, tourism and economic growth for 74 countries over the period of 2004-2008 using average cross sectional data. This study is important to gain the understanding of interrelationship between trade and tourism sector and economic growth. The significant impact of trade and tourism led growth (or can be conversely) is important due to policy perspective for several countries in order to improve the supporting pillar to ensure these sectors are growing up.

The paper is structured as follows. Section 2 introduces the background of international trade and tourism also review on the empirical literature. Section 3 will be model specification and methodology. Section 4 discusses the interpretation result. Finally, section 5 summarizes and conclusion.

BACKGROUND AND LITERATURE REVIEW

In the past 30 years, the dynamism of trade organization has been made international trade flows have expanded dramatically and, generally, at a rate faster than global output, with a doubling of the value of trade in a 10-year period since the mid-1990s and raising total world trade to over US$14 trillion

(UNCTAD, 2008). In general, with the existence of trade board has made the trade value increase whether in develop country, developing country or transition country because the liberalization of trade has been made limitation of trade barriers and tariffs. Liberalization in term of trade orientation of import-substitution and export (outward) promotion has widely accepted as a role in growth prospects for developing country. Greenway, David, *et al* (2002) has setting up tariff liberalization will affect on lowered nominal tariff and increase average effective protection.

However, the opinions of causality between international trade and growth were noted in most economic research both theoretical and empirical. Liberalization may become bridge transition towards the open economy. Kaneko, A. (2000) has emphasized endogenous growth model with adding the human capital accumulation to the dynamic trade model in accordance with trade growth rate and specialization pattern of capital and consumption commodities.

In empirical research, Awokuse (2007) used Vector Error Correction Model (VECM) for the long run relationship between export, import and growth in Bulgaria, Czech Republic and Poland. His result was found in the contribution of export and import to economic growth. Thus his Granger Causality Test suggests that Bulgaria existed for both export-led-growth and growth-led-export. In Czech Republic, both of export and import has significant in supporting growth. Whereas in Poland there is only exists causality for import-led-growth.

Onafowora & Owoye (1996) also used VECM in order to examine the trade liberalization factor toward growth in time series data of Sub Saharan Africa (SSA) countries. He found the growth of real output, trade policy, export and investment has given an important role in SSA economic growth. While Yanikkaya (2003) used the cross-country regressions apply to a panel of over 100 developed and developing countries observed from 1970 to 1997. His findings suggest wide variety of trade openness measures and the regression results for trade volumes provide substantial support for the hypothesis that trade promotes growth through a number of channels such as technology transfers, scale economies, and comparative advantage. However, in term of trade restriction it shows negatively but insignificantly correlated with growth, his finding rejected the majority hypothesis of the empirical studies which concluded that there exists a significant and negative relationship between trade restrictions and growth.

In 2009, tourism sector has been employed over 235 million people across the world and generating 9.4% of global Gross Domestic Product (GDP) (WTTC, 2010). A successful business trips possibly create direct flow of export and imports in subsequent periods (Khan & Lin, 2002). The reason behind why international tourism is encouraged to increase is the existing relationship between tourist receipt and national income will lead economic growth. It is commonly believed if the enhancement on tourist arrival obviously giving impact to the tourist receipt as revenue to national revenue and other multiplier effect. Further, if it combines with trade sector which is related to the exchange rate, it will make changes on balance of payment and then affecting economic growth itself.

Egdell, *et al* (2008) stated that the impact tourism has on the economy can be tremendous as it will create job, reduces employment, foster entrepreneurship, stimulates production of local product, demand effective communication, improvement on facility and infrastructure. This view is supported also by Schubert, Brida & Risso (2009) where tourism have five impacts to economic growth, which are, foreign exchange earner, stimulates new investment, stimulates economic industry, generate employment and positive exploitation in national firms.

Empirically, Kreishan (2010) research Jordan tourism used time-series techniques data with Augmented Dickey-Fuller (ADF) for unit root, Johanson and Juselius (JJ) for cointegration and Granger causality test. His finding shows the positive long-run relationship between tourism and economic development and presence unidirectional causality from tourism revenue to economic growth or tourism-led-growth (TLG). Ching & Chiou (2009) used EGARCH-M model to determine the causality between tourism and growth in Taiwan and South Korea. The result proves differentiation between those countries, when tourism-led-growth (TLG) in Taiwan and growth–led-tourism (GTL) in South Korea.

Norlida & Redzuan (2008) examined whether tourism-led-growth (TLG) or growth-led-tourism (GLT) in major ASEAN countries. The Granger causality has found if only unidirectional relationship for Thailand and Indonesia and it was growth-led-tourism (GLT), whether for Malaysia and Singapore it was tourism-led-growth (TLG).

Some researcher used panel data approach on their research, such as Fayissa, Nsiah & Tadasse (2007). Their examined tourism impact on economic growth in Africa Countries and proves increasing 10% in the international tourist spending leads to 0.4% increase in GDP per capita income and this is shows the tourism-led-growth (TLG). While Lee & Chang (2008) applied the new heterogeneous panel co-integration technique to determine the long run and causal relationship tourism and growth for Organization for Economic Cooperation and Development (OECD) and non-OECD countries. The

result proves that OECD countries have unidirectional causality on tourism led growth and for non-OECD countries it has bidirectional relationship.

Predominant research towards dynamic relationship of tourism, trade and growth has been doing by Tamat, S. & Norlida, H, 2009. They examined the data of Malaysia with major tourism partner in East Asia Countries using co-integration tests under autoregressive distributed lag (ARDL) and Granger Causality test. Their results find evidence that three variables are run in tandem and have long run relationship, and based on the causality relationship in the short run, there are unidirectional and bidirectional causality. Whereas, Khan & Lin (2002) has been research for Singapore time series data over 1978-2000 in term causality of total trade and business traveller. Their finding of the study provides strong support that there is a long term relationship between business travel and total trade and the causality between travel and trade may run two ways, business arrivals influence trade or vice versa.

DATA AND METHODOLOGY

In some recent studies, forming a model for growth are derived from new growth theory, where economic growth is function of explanatory variable constructed by human capital, physical capital and government expenditure. This study will follows the model worked by Greenway, Morgan & Wright (1997) & (2002) in term of their effort to observe the involvement trade to the growth for cross-section and panel data in the log-linear model.

$$\ln y_{it} = \alpha_o + \alpha_1 \ln y_{it-1} + \alpha_2 \ln INV + \alpha_3 \ln POP + \alpha_4 \ln EXP + \alpha_5 \ln LIB + u_{it} \quad 1)$$

Where y_{it} is percentage change in GDP per capita. y_{it-1} is initial GDP per capita for the time of study. INV is percentage change in investment as a proxy of capital stock. POP is a percentage change in labour force as a proxy of human capital. EXP is a percentage change of export as term of trade proxy. LIB is *dummy* effect from liberalization of developed and developing countries used to establish the presence or absence of liberalization on developed and developing countries to the growth. The index *i* as list of countries involves in the study and index t as time period. The use of index $it-1$ is as an initial income which is to capture the convergence process (Greenway, Morgan & Wright, 2002, Yanikkaya, 2003).

Linkage to the objective with include tourism sector are contributes to the growth, study by Sequeira & Campos (2007) has been added tourism specialization variable of tourist arrival, tourist receipt in percentage of GDP and tourist receipt in percentage of export in their study of international tourism and economic growth panel data. Thus, to conclude from previous study and data availability, our model will be added tourist arrival (TARR) as proxy of tourism sector. Further, the term export as total trade proxy may has to expand with import and this is supported with study by Sequeira & Campos (2007) where they used total export and import as trade openness in constant price which is used to measure impact for degree openness of the economy in its growth performance. Then, study by Phakdisoth & Kim (2007) has used the same variable where the total export and import is a positive proxy to determine the tourism sector at Laos which has positive impact to the growth. Thus our model will modified as follow:

$$\ln y_{\mathrm{it}} = \alpha_o + \alpha_1 \ln y_{it-1} + \alpha_2 \ln INV + \alpha_3 \ln POP + \alpha_4 \ln TRD + \alpha_5 \ln TARR + \alpha_6 LIB + u_{it} \quad 2)$$

Where y_{it} represents real GDP per capita, y_{it-1} represents GDP per capita at initial year of study, INV represents capital stock in term of gross fixed capital formation, POP represents population as proxy of human capital, TRD represents total export and import at constant price, TARR represents total tourist arrival, LIB represents dummy variable for developed and developing country and u_{it} represents random term error. The entire variable is modified into growth rate to avoid the difference unit in the regression result.

Data resources in this study were collected from secondary data and selected based on availability. This study will carry out cross-sectional data over 74 countries using average annual data within five years time range from 2004 until 2008 taken from *World Development Indicator* database. (See Table 1 Appendix)

The methodology is using Ordinary Least Square (OLS) which is the standard procedure to estimating the unknown parameter sign in a linear model. The linear model can be derived from independent and dependent (explanatory) variable. Further, OLS results regression has support three assumptions in term of economic criteria, statistic criteria and econometric criteria.

First, economic criteria attempt to show the exact relationship, it does not take into account the random elements that affect the relationship and do not reflect the value of the coefficient of economic relations. The elasticity of each variable from result test also can support those economic theories, whether it has a negative or positive relationship. The null hypothesis will be trade and tourist that have positive relationship to the economic growth. Second, statistic criteria are determined by the statistical theory which aims to see the accuracy of estimated parameters in a model that has been set level confidence. Analysis in this study is could be given the result of statistic characteristic such as R^2 and t-value. Third, econometric criteria will be examined in term of multicolinearity, heteroscedasticity, and autocorrelation. Multicolinearity is the existence of a perfect or high linear relationship among several or all explanatory variables of a regression model and it will be tested by correlation pair-wise correlation. While, heteroscidasticity is various variance of regression model and in this cross-sectional data it may encounter problem in such heterogeneity units in statistical account, the differentiation of size or scale data and White Test[1] is used to detect heteroscidasicity. Last, autocorrelation is correlation between members of series of observations ordered in time (in time series data) or space (in cross-sectional data) and it using Durbin Watson[2] and Breusch-Godfrey[3] (BG) Test is used to detect the existence of autocorrelation

FINDING

Based on the log-linear regression model which has been described in methodology, the empirical result is presented as equation (refers to Table 2 Appendix):

$$\ln y_{\mathrm{it}} = \underset{(0.0458)^{**}}{0.095680} + \underset{(0.0000)^{*}}{0.503033}\ln y_{it-1} + \underset{(0.0044)^{*}}{0.257274}\ln INV - \underset{(0.0301)^{**}}{0.037111}\ln POP + \underset{(0.0026)^{*}}{0.365654}\ln TRD + \underset{(0.0158)^{**}}{0.060655}\ln TARR - \underset{(0.0048)^{*}}{0.115228} LIB + u_{it} \quad 3)$$

*Significant at level 1%, **Significant at level 5%

The regression shows the exact relationship between trade and tourism to the growth. As shown in Table 2 Appendix, the dependency between explanatory variable to the dependent variable shows has R^2 is 0.875273, which means all variable chosen has determine growth at 87%, thus the remaining 13% is come from other variable that did not include to the model. The relationship of tourism, trade and investment to growth has positive correlation signs with accepted statistically at 5% significant level. Whereas, for population has negative sign at 5% significant level. The estimated coefficients are interpreted as follows. The trade elasticity is 0.365654, suggesting that, holding variable are constant, if total trade goes up by 1 percent, the mean growth goes up by about 37 percent. The tourist arrival coefficient is 0.060655, meaning that if tourist arrival goes up by 1 percent, than growth goes up by 6 percent, again holding other variable constant. The coefficient of investment variable tells us that as the investment goes up by one percentage point, growth goes up by 26 percent, with assumption all variable ceteris paribus. The population coefficient is -0.037111 which means as population goes up by 1 percent, growth goes down by 4 percent, holding all variable ceteris paribus. All the regresses have signs that accord with prior expectation that is trade, tourist arrival and investment have a positive impact on growth but population has negative impact. Furthermore, dummy variable has negative sign coefficient which only impact developed country, briefly point out the differences between developed and developing countries.

In term of multicolinearity test, it examines by Pair-Wise Correlation **(**refers to Table 3 Appendix) which is comparing the correlation coefficients between dependent and explanatory variable with R^2 result. Several Pair-Wise Correlations are quite low, suggesting that may be a severe colinearity problem. The result of this study shows that Pair-Wise Correlation of trade, tourism, investment and population has multicolinearity problem in the model, but it is not serious because all pair-wise correlations is below R^2, but for initial real GDP per capita, it shows pair-wise correlation exceeds R^2, thus it is serious multicolinearity problem.

Heteroscidasticity test according to White Test test indicates if the chi-square value obtained exceeds the critical chi-square value at the chosen level of significance, there is heteroscedasticity in the model. Based on Table 4 Appendix, R^2 is 0.237851, further *n*. R^2 is equal to 17.59794 then compared with the chi-square distribution table with 6 degree of freedom at 1 percent critical chi-square is 18.475, we can conclude on the basis of the White Test, that there is no heteroscidasticity.

As expected for cross section data, autocorrelation problem is not detected in the estimation of equation 3). The Durbin Watson (DW) value of 2.11 indicates *no autocorrelations* in the model. In

order to support no autocorrelation test above, Breusch-Godfrey (BG) Test (Table 5 Appendix) has probability chi-square 0.7499, thus compared with the chi-square distribution table at 5 percent level with 2 degree of freedom (two lags value of residual) is 5.99147, it shows that probability chi-square are does not exceeds the critical chi-square, then there is no serial correlation of any order.

[1] White, H. 1980. A heteroscedasticity consistent covariance matrix estimator and a direct test of econometric *Econometrica*, Vol. 48, pp. 817-818

[2] Durbin, J & Watson, G.S. 1951. Testing for serial correlation in least-square regression. *Biometric*a, Vol. 38, pp. 159-171

[3] Godfrey, L.G. 1978. Testing against general autoregressive and moving average error models when the regressor includes lagged dependent variables. *Econometrica*, vol. 46, pp. 1293-1302

Based on the entire test econometric above, multicolinearity does exist but generally not a serious problem, while autocorrelation does not exist in the model, and lastly, heteroscidasticity does not exist in the model. For overall test result, the findings shows if trade and tourism has positive impact to growth and that is means the result and hypothesis are consistent.

CONCLUSION

The main objective in this study is to find the relationship between trade, tourism and economic growth for 74 countries. Based on cross section estimation result, our finding shows that trade and tourism has positive contribution to economic growth. Increase 1 percent in total trade it would be increase growth with the multiplier of 37 percent and increase 1 percent in tourist arrival will increase growth with the multiplier of 6 percent. In line with economic growth theory, our finding shows that tourism and trade are very vital to economic growth and cannot be neglected in any policy related to economic growth.

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APPENDIX

TABLE 1: List of Countries and Data

No.	Country Name	GDP	GDPt-1	INV	TRD	TARR	POP	Dummy
1	Botswana	0.2623	0.0398	0.2039	0.3323	-0.0265	1.25	0
2	Brazil	0.4101	0.2335	0.3778	0.3687	0.0853	1	0
3	Bulgaria	0.8671	0.8789	0.8029	0.4033	0.3598	-0.75	0
4	Cambodia	1.3385	1.8182	0.6895	0.6536	1.2581	2	0
5	Canada	0.1090	0.1965	0.1991	0.0825	-0.1652	1	1
6	Cape Verde	1.0160	1.3556	0.6544	0.6990	1.2250	1.5	0
7	Chile	0.4014	0.5071	0.5389	0.3644	0.7106	1	0
8	China	1.4621	1.4090	0.4041	0.5187	0.3396	1	0
9	Colombia	0.4544	0.3921	0.4932	0.4084	1.8238	1.5	0
10	Costa Rica	0.5401	0.4820	0.4775	0.3041	0.6343	1.5	0
11	Croatia	0.4713	0.4759	0.3315	0.1923	0.2728	0	0
12	Cuba	1.0105	1.3049	0.6503	0.5591	0.2383	0	0
13	Cyprus	0.2301	0.1528	0.3768	0.2583	0.0396	1	1
14	Czech Republic	0.5409	0.6775	0.1728	0.3977	0.1480	0.5	1
15	Denmark	0.1175	0.2073	0.1544	0.2490	0.0304	0.25	1
16	Dominican Republic	0.8238	0.9264	0.5884	0.1617	0.2367	1	0
17	Egypt, Arab Rep.	0.5891	0.3418	0.6420	0.8693	0.7113	2	0
18	El Salvador	0.3987	0.3500	0.1370	0.2159	0.6767	0	0
19	Estonia	0.6474	1.1450	0.3144	0.2932	0.2057	0	1
20	Ethiopia	1.5965	1.8426	0.4635	0.6143	1.1858	3	0
21	Finland	0.2866	0.2496	0.1585	0.3124	0.3889	0	1
22	France	0.0926	0.1270	0.1389	0.1244	0.0859	1	1
23	Germany	0.2022	0.0803	0.1461	0.2473	0.3133	0	1
24	Greece	0.2992	0.1928	0.0084	0.1932	0.2737	0	1
25	Guatemala	0.2640	0.0992	0.1930	0.0928	0.6592	2	0
26	Hong Kong	0.4632	0.6245	0.1401	0.2796	0.3599	0.75	1
27	Hungary	0.2892	0.4663	0.0110	0.4187	-0.5022	0	1
28	Iceland	0.2419	0.5392	0.1846	0.2211	0.5094	2.25	1
29	India	1.0372	1.2028	0.4399	0.6831	0.6972	1	0
30	Indonesia	0.6532	0.6167	0.3359	0.4077	0.2561	1	0
31	Ireland	0.1355	0.3682	0.0597	0.1670	0.2274	2	1
32	Israel	0.3222	0.3249	0.3465	0.2189	0.9306	2	1
33	Italy	0.0002	-0.0088	0.0125	0.0680	0.2038	1	1
34	Japan	0.1208	0.1807	-0.0019	0.1786	0.4893	0	1
35	Kenya	0.3932	0.5174	0.7289	0.4177	-0.0764	3	0
36	Korea, Rep.	0.3928	0.3870	0.0713	0.3228	0.2706	0	0

37	Kyrgyz Republic	0.6732	-0.1609	0.4166	0.7219	3.3947	1	0
38	Latvia	0.8387	1.2599	0.3049	0.3418	0.7954	-0.75	0
39	Lithuania	0.8647	0.9678	0.4785	0.4780	-0.1830	-1	0
40	Macao	1.1684	0.4384	1.0247	0.5468	0.3831	2.5	0
41	Madagascar	0.5117	0.2987	0.8324	0.4936	0.9850	3	0
42	Malaysia	0.4345	0.4015	0.2271	0.2086	0.5090	2	0
43	Malta	0.2996	0.3690	-0.1464	0.1030	0.1979	1	0
44	Mauritius	0.3750	0.0504	0.3245	0.2331	0.4742	1	0
45	Mexico	0.2465	0.2461	0.2689	0.2461	0.1386	1	0
46	Moldova	0.9360	1.2375	0.7617	0.3821	-3.1595	-1.25	0
47	Morocco	0.4633	0.2441	0.4342	0.4064	0.5810	1	0
48	Mozambique	0.8889	1.0008	0.3810	0.3127	2.5149	2.25	0
49	Netherlands	0.2435	0.1770	0.2103	0.2039	0.0727	0	1
50	New Zealand	0.0293	0.2059	0.0216	0.0516	0.0619	1	1
51	Norway	0.1339	0.1909	0.3831	0.1463	0.2981	1	1
52	Pakistan	0.4606	0.7988	0.5410	0.3345	0.4469	2	0
53	Panama	0.8854	0.6202	0.8987	0.5009	1.2827	2	0
54	Paraguay	0.4078	0.1231	0.4562	0.5130	0.6386	2	0
55	Peru	0.8670	0.6971	0.7837	0.4724	0.7387	1	0
56	Philippines	0.4685	0.4341	0.1073	0.1089	0.5337	2	0
57	Poland	0.6156	0.4229	0.4519	0.3794	-0.1474	0	0
58	Romania	0.8778	0.5592	0.6020	0.5465	0.4697	0	0
59	Russian Federation	0.9136	0.8645	0.5541	0.4272	0.1041	0	0
60	Slovak Republic	0.8517	0.7279	0.3859	0.4235	0.4075	0	1
61	Slovenia	0.5005	0.4514	0.3485	0.3782	0.4666	0.25	1
62	Swaziland	0.2129	0.1863	0.1165	0.2899	0.9614	1	0
63	Sweden	0.1853	0.2668	0.2718	0.2297	-0.0411	0.75	1
64	Syrian Arab Republic	0.2793	0.1594	0.1904	0.3520	0.7724	2.25	0
65	Tanzania	0.6838	0.7341	0.6073	0.6319	0.5272	3	0
66	Thailand	0.4354	0.4515	0.1687	0.2385	0.3329	1	0
67	Tunisia	0.5170	0.3805	0.2550	0.2146	0.2579	1	0
68	Uganda	0.8561	0.4799	0.5972	0.8695	0.9423	3	0
69	Ukraine	0.7949	0.4961	0.5371	0.1376	0.7283	-1	0
70	United Kingdom	0.1348	0.1539	0.1045	0.1352	0.2345	1	1
71	United States	0.0900	0.1993	0.0073	0.1684	0.3227	1	1
72	Uruguay	0.7280	0.8044	0.7298	0.4552	0.1716	0	0
73	Venezuela, RB	0.7348	0.9627	0.7940	0.4334	0.8129	2	0
74	Vietnam	1.0029	1.1112	0.4705	0.2982	0.6157	1	0

*Source: World Development Indicator, World Bank

TABLE 2: Ordinary Least Square regression result

Dependent Variable: GDP
Method: Least Squares
Date: 05/05/11 Time: 03:37
Sample: 1 74
Included observations: 74

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.095680	0.047005	2.035528	0.0458
GDPT_1	0.503033	0.042331	11.88340	0.0000
TARR	0.060655	0.024483	2.477484	0.0158
TRD	0.365654	0.117061	3.123615	0.0026
INV	0.257274	0.087308	2.946735	0.0044
POP	-0.037111	0.016745	-2.216234	0.0301
DUMMY	-0.115228	0.039451	-2.920779	0.0048

R-squared	0.875273	Mean dependent var	0.541782
Adjusted R-squared	0.864103	S.D. dependent var	0.348469
S.E. of regression	0.128460	Akaike info criterion	-1.176577
Sum squared resid	1.105637	Schwarz criterion	-0.958625
Log likelihood	50.53336	Hannan-Quinn criter.	-1.089634
F-statistic	78.36221	Durbin-Watson stat	2.118981
Prob(F-statistic)	0.000000		

TABLE 3: Pair-Wise Correlation

	GDP	GDPT_1	TARR	TRD	INV	POP	DUMMY
GDP	1.000000	0.840943	0.188704	0.670635	0.675384	0.045997	-0.561772
GDPT_1	0.840943	1.000000	-0.006164	0.450456	0.469411	-0.026119	-0.342288
TARR	0.188704	-0.006164	1.000000	0.301231	0.109153	0.419519	-0.227506
TRD	0.670635	0.450456	0.301231	1.000000	0.647152	0.249316	-0.457826
INV	0.675384	0.469411	0.109153	0.647152	1.000000	0.204361	-0.548446
POP	0.045997	-0.026119	0.419519	0.249316	0.204361	1.000000	-0.204969
DUMMY	-0.561772	-0.342288	-0.227506	-0.457826	-0.548446	-0.204969	1.000000

TABLE 4: Heteroscidasticity Test

Heteroskedasticity Test: White

F-statistic	3.484889	Prob. F(6,67)	0.0047
Obs*R-squared	17.60098	Prob. Chi-Square(6)	0.0073
Scaled explained SS	32.04391	Prob. Chi-Square(6)	0.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/05/11 Time: 04:25
Sample: 1 74
Included observations: 74

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.000658	0.007359	-0.089484	0.9290
GDPT_1^2	0.009068	0.005428	1.670728	0.0994
TARR^2	-0.002113	0.001865	-1.133389	0.2611
TRD^2	-0.005248	0.027174	-0.193140	0.8474
INV^2	0.053922	0.019311	2.792285	0.0068
POP^2	0.001195	0.001560	0.766343	0.4462
DUMMY^2	0.001227	0.008535	0.143732	0.8861

R-squared	0.237851	Mean dependent var	0.014941
Adjusted R-squared	0.169599	S.D. dependent var	0.031704
S.E. of regression	0.028891	Akaike info criterion	-4.160790
Sum squared resid	0.055922	Schwarz criterion	-3.942838
Log likelihood	160.9492	Hannan-Quinn criter.	-4.073846
F-statistic	3.484889	Durbin-Watson stat	2.028822
Prob(F-statistic)	0.004656		

TABLE 5: Autocorrelation Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.254762	Prob. F(2,65)	0.7759
Obs*R-squared	0.575562	Prob. Chi-Square(2)	0.7499

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/05/11 Time: 04:26
Sample: 1 74
Included observations: 74
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.003911	0.048313	0.080944	0.9357
GDPT_1	-0.007541	0.044732	-0.168574	0.8667
TARR	0.000389	0.025050	0.015533	0.9877
TRD	-0.002480	0.121217	-0.020460	0.9837
INV	0.002222	0.088364	0.025142	0.9800
POP	-0.000926	0.016987	-0.054526	0.9567
DUMMY	0.002594	0.040117	0.064656	0.9486
RESID(-1)	-0.078711	0.133040	-0.591633	0.5561
RESID(-2)	-0.056452	0.133237	-0.423698	0.6732

R-squared	0.007778	Mean dependent var	-1.31E-16
Adjusted R-squared	-0.114342	S.D. dependent var	0.123068
S.E. of regression	0.129913	Akaike info criterion	-1.130332
Sum squared resid	1.097037	Schwarz criterion	-0.850107
Log likelihood	50.82227	Hannan-Quinn criter.	-1.018547
F-statistic	0.063690	Durbin-Watson stat	1.974218
Prob(F-statistic)	0.999833		