Pakistan Journal of Applied Economics, Vol.25 No.2, (179-192), Winter 2015

AIR-TRANSPORT AND MACROECONOMIC PERFORMANCE IN ASIAN COUNTRIES: An Analysis

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Factors of growth have always been the attention of development economists. This research work investigates the role of air-transport in macroeconomic performance of Asian countries from 1970 to 2014. For this, we resort to econometric techniques, such as Pesaran Cross-Sectional Dependence Test, Cross-Sectional Augmented IPS, Mean Group (MG), Common Correlated Effect Mean Group (CCEMG), Augmented Mean Group (AMG), and Panel Granger Causality. Empirical results confirm the hypothesis that air- transport has a significant role in economic growth of sample countries. Moreover, a feedback effect also exists from macroeconomic performance and air-transport. It is recommended that air-transport sector should be given formal incentive so as to augment its macroeconomic contribution to economic growth.

I. Introduction

It is well said that 'transport is civilization'. Transport sector plays a pivotal role in social and economic life of a country. A properly established transport system with well-equipped infrastructure is considered an input in the production process. A proficient transport system contributes to the economic growth by snow-balling the area of division of labor and specialization, accelerating the movement of raw material from their production centers to the place of their usage; as a result, it also enables the trade of goods from their manufacturing center to consuming centers between countries.

A usefulness of transportation is that it helps in maintaining balance between areas where there is a shortage and those with surplus by exporting goods from the areas where there is a surplus to those areas where there is a shortage of goods. It stimulates integration of markets all over the world by reducing distance between countries. In this manner, it increases the comparative advantage of economy in goods' production, and thus, facilitates trade. Transportation plays a pivotal role in connecting markets and the people. Recently, the world saw the birth of global economy which brought the national markets of different countries closer and

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merged into a single global market due to technological advancement in the global transportation. It is impossible to put an economy on the high growth trajectory with an inefficient transport system.

Air-transport is one of the major modes of contemporary transportation besides road and sea transportation. It is also known as ‘Real World Wide Web’. Air-transport plays its role in many sectors which ultimately contribute towards the national income of an economy. According to the Air-Transport Action Group (ATAG) 2012, if air-transport was a country, it would rank 19th in the world in terms of GDP, generating about US$ 540 billion worth of products and services per year. From this we can infer that there is a substantial role of air-transport sector towards the service-sector and in the economic growth. Air-Transport Action Group (ATAG) 2012, further points out that over 56 million people were employed world-wide in air-transport and the related tourism in 2011. By 2026, it is forecasted that air-transport will contribute about US$ one trillion to the world GDP. Based on these facts, it can be argued that air-transport is a sector which is capable of generating employment, product and services, stimulating growth. Therefore, empirically investigating its impact on growth for different countries is a worth-while task. In this paper, the study of macroeconomic impact of this mode of transportation is undertaken. A cross-country framework for analysis of relationship between demand for air-transport and economic growth is also constructed. The rationale for considering Asian countries is that the strongest air-travel markets are in Asia with India and China’s domestic markets growing at double the rates. Within Asia the international travel is also growing strong.

The objective of the paper is to build limitations of existing empirical research. The paper examines the impact of air-transport on national income of Asian countries, while considering the concerns which were previously overlooked in the empirical research. The hypothesis is HA, where there exists a long-run causal relationship between air-transport and macroeconomic performance in Asian countries.

Following Section I (Introduction), Section II deals with the review of literature available on air-transport and its role in macroeconomic performance. Section III presents the theoretical framework, while the methodology is developed in Section IV. Empirical analysis is examined in Section V, and finally, dicussion on recommendations on air transport are presented in Section VI.

II. Literature Review

Literature on macroeconomic role of air-transport is meagre. A few instances include Chang and Chang (2009) who applied Granger Causality Tests to examine causal relationship between air-cargo expansion and the economic growth in Taiwan. The results of data for the period 1974 to 2006 showed a bi-directional relationship between the two variables. Marazzo, et al. (2010) examined the empirical relationship between air-transport and GDP for Brazil. They used passenger-kilometer as a proxy of air-transport demand and found a long-run equilibrium between the two variables. Their findings disclose the strong positive causality from GDP to aviation demand but there was a relatively weaker causality the other way around. Robustness tests were applied through Hodrick and Prescott filter to capture the cyclical components of series and the results. Their interpretation of positive causality indicates the existence of multiplier effect. Percoco (2010) developed a framework for finding the impact of airports on Italian provinces. It was also found that elasticity of service sector employment to airport passengers was 0.045 and that of spillover effects due to neighboring airports is almost 0.017.

Kopsch (2012) analyzed demand for domestic air-travel in Sweden and estimated the price elasticity by using aggregated data on quantity of passengers and fares. Travelers are divided into business and leisure classes in order to enforce strength of the results. In his study classical linear regression analysis was used. Serial correlation was handled by the use of Prais and Winsten (1954) regression. Two models were estimated, one including and one not including the proxy for leisure travelers. The cross price elasticity is estimated for the main transport substitutes, i.e., rail and road. The aviation demand is found equitably elastic in the short-run and more elastic in the long-run for Sweden. Leisure travelers are found to be more sensitive to price, whereas business travelers are less sensitive to price as shown by strength of the test. Moreover, the cross-price elasticity between rail and air-travel is set up to lie between 0.43 and 0.5.

Chi and Baek (2013) examined the short- and long-run effects of economic growth and market shocks on air passengers and freight services. Results of ARDL show positive effect of air passengers and freight services on economic growth in the long-run, whereas, the air passengers service affects economic growth in the short-run. Moreover, shocks like terrorism also, negatively affects air passenger demand and air freight demand both in the short- and long-run, with former having more effect than the latter.

Mehmood, et al. (2013), empirically examined the hypothesis for aviation-directed growth for India, as well by challenging causalities between the aviation and economic growth. They resorted to econometric tests like unit-root tests (for stationarity) and test of co-integration (for long-run relationship) purposed by Johansen and Juselius (1990). To estimate the co-integration equation for the time span of 1970 to 2012 Fully Modified OLS (FMOLS), Dynamic OLS (DOLS) and Conical Cointegration Regression (CCR) were used. The empirical results revealed the existence of relationship between aviation demand and the economic growth. Graphic methods, such as, Cholesky Impulse Response function and variance decomposition were also applied for rigorous analysis. All these three estimation techniques forced the same conclusion that demand for aviation contributes positively to economic growth. These findings help to know, as to how important the aviation industry is to economic growth for developing country, like India.

Mehmood and Kiani (2013) empirically examined the aviation-directed growth hypothesis for Pakistan by challenging causality between aviation and the economic growth. They used econometric techniques, such as, unit root tests (for stationarity) and test of co-integration (for long-run relationship). Further, they incorporated FMOLS and DOLS to estimate the co-integration equations for time span of 1973 to 2012. Their results depicted existence of causality between aviation demand and economic growth. Both variables were co-integrated in the long-run as well as in the short-run.

Mehmood and Shahid (2014) tried to empirically examine the aviation-led growth hypothesis for the Czech Republic by checking causality between aviation and the economic growth. They employed econometric tests, such as, the unit root tests (to check stationarity) and test of co-integration (for long-run relationship). FMOLS, DOLS and CCR were used to estimate the co-integration equation for time span of 43 years from 1970 to 2012. Empirical results revealed co-integration between aviation demand and economic growth. Graphic methods, such as, accumulated and non-accumulated Cholesky impulse response functions and variance decomposition have also been applied to render the analysis rigorous. The positive contribution of aviation demand to economic growth is similar in all three estimation techniques of co-integration equation. Finally, Granger causality test was used to find the direction of causal relationship. The findings helped in lime-lighting the importance of aviation industry in economic growth for a developing country like the Czech Republic.

Mehmood, et al. (2014a) and Mehmood, et al. (2014b) conducted similar types of empirical studies for Romania and Bangladesh, respectively, and found similar results for time series data. Baker, et al. (2015) conducted analysis of economic impact of regional aviation. They provide short- and long-run causality between regional aviation and the economic growth by analyzing 88 regional airports in Australia for 1985 to 2011. A significant bi-directional relationship was found between airports' activity and regional economic growth. Profillidis and Botzoris (2015) analyzed correlation between air passenger transport and economic activity using global data in terms of geographical orientation. Results reveal a stable demand for air travel in future, as compared to the past three decades.

Empirical research on constructive role of aviation in macroeconomic performance is still limited. There is a literature gap of cross-country evidence on aviation-led growth. Moreover, empirical models in previous studies have been deprived of other important contributors of economic growth that may lead to econometric issues like omitted variable bias. Researches reviewed above lack multiple cross-sections and hence its statistical concerns for instance cross-sectional dependence. This research attempts to address these issues.

III. Theoretical Framework

Air-transport is a contemporary mode of transportation, besides road and sea transportation as it renders positive economic impacts. Economic impacts can be divided into three categories: direct, indirect and induced. When combined, they measure the importance of air-transport industry in terms of employment and generate products and services. Ultimately what they produce is contributed to national income.

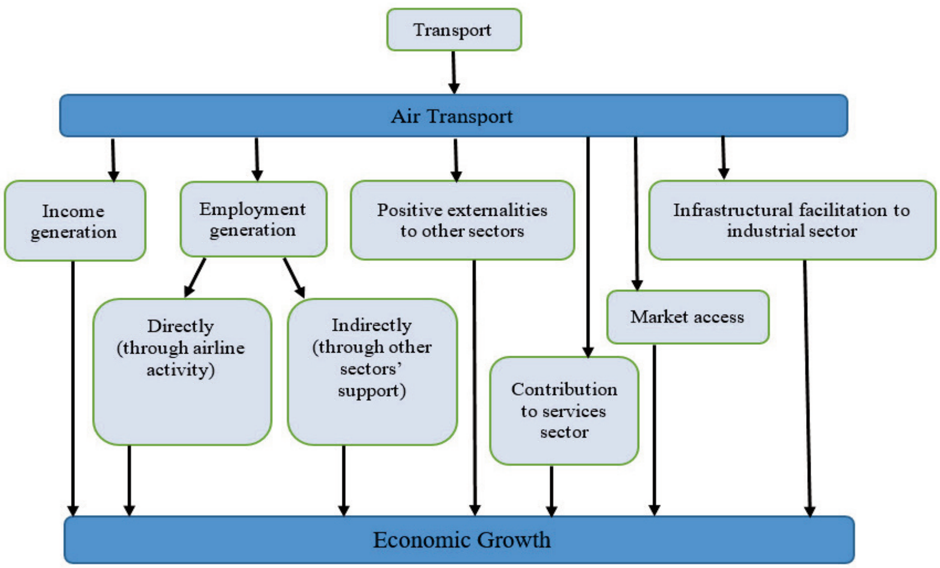
Direct economic impacts are consequence of the first-tier economic activities carried out by industry in the local area. In air-transport industry, both the airports and airlines provide economy and local communities with a direct economic impact. For example, salary of airline personnel, fuel expenditures, landing fee, salary of airport personnel and, other purchases and expenditures. According to one of the reports, Memphis, an airport located at the United States, generates one job for every departure or in other words one additional daily flight would generate approximately 365 new jobs for the region. This strengthens our point that air-transport industry is a potential employment generator.

Indirect impacts can be referred as off-site economic activity of air-transport industry. Indirect impacts include services provided by travel agencies, rental car companies, hotels, restaurants and retail activities. From this, it can be inferred that air-transport is one of the contributors in services sector of an economy. Usually, a causal relationship is found between an indirect impact and the industry, e.g., hotel industry has strong indirect economic impact relationship with aviation. For example, if there is a reduction in air travel for a community, the hotel industry in that community is likely to face a fall in occupancy rates, as well.

Induced economic impacts capture the multiplier effects that are caused by the direct and indirect economic impacts. Induced impacts accounts for increased employment and salaries which comes from the secondary spending, i.e., result of the direct and indirect economic impacts. Despite being highly capital intensive industry, air-transport employs a large number of people. It creates employment opportunities through numerous marginal jobs in the chain of supply and supports jobs in other industries through the induced impacts it generates. Air-transport supported jobs are more productive owing to the high capital intensity of this industry, because of high skill requirements in many job functions. As a result, people employed in the air-transport industry have relatively higher wages as compared to other sectors of the economy.

Apart from the direct and induced economic impacts generated by aviation, the industry plays a significant role in tourism sector. Tourism sector is supported in two ways, i.e., through business and leisure. Air-transport leads to increase in cinemas, restaurants, hotels, and small businesses due to an increase in tourism sector. Public sector is also supported strongly through air-transport in the form of tax generation. Hence, the sector contributes toward government expenditures leading to development of an economy.

Moreover, this sector makes a vital contribution to trade openness, i.e., a large amount of export earnings is found through this sector. Movement of goods and services is accelerated which promotes competition in goods and services market. Ultimately, this phenomenon leads to adoption of advance technology as a result of which high quality products are produced at low cost. The mechanism of impact of the air-transport sector is illustrated in Figure 1.



Source: Authors' formulation.

FIGURE 1

Theoretical Framework

IV. Methodology

The secondary data used in this research is taken from the World Development Indicators (WDI). A panel data set is developed and spread over 41 Asian countries and spans over 45 years, i.e., 1970 to 2014.[1] Demand for air traffic has been on rise in the Asian region. For instance, Asia Pacific airlines have witnessed continued ro-

[1] The countries include Thailand, Maldives, Bhutan, Japan, India, Malaysia, Bangladesh, China, Pakistan, Nepal, Sri Lanka, Armenia, Azerbaijan, Bahrain, Brunei Darussalam, Cambodia, Georgia, Hong Kong, Indonesia, Iran, Afghanistan, Yemen, Vietnam, Uzbekistan, United Arab Emirates, Turkmenistan, Tajikistan, Syria, Saudi Arabia, Iraq, Jordan, Kazakhstan, Kuwait, Kyrgyzstan, Lebanon, Mongolia, Philippines, Qatar, Singapore, Turkey and Cyprus.

bust demand during 2011 and since then the trend has continued. Global Market Forecast for aircrafts anticipates demand for 27,800 new aircrafts by 2030 to meet future demand of a growing market. From a geographical perspective, Asia-Pacific represents most of this new demand (33 per cent). Overall, it remains the largest air-transport market with 35.6 per cent share of the worldwide seat capacity. The intra-Asia Pacific region also retained its leading position in total seat volumes, growing 8 per cent to nearly 96 million seats in November 2011 as compared to November 2010, comprising 30.6 per cent of the worldwide seat share. Despite the economic downturn in Asian region, the increasing travel demand to and from, and within the Asia Pacific and other developing countries (including other Asian countries) is likely to sustain. In addition to the Asia-Pacific, China would also become the world's biggest aviation market within 10 years. Moreover, Asia and the emerging markets are the catalyst for strong air traffic growth. It is high time to investigate the role of demand of air travel in macroeconomic performance of Asian countries. The estimated model has four variables which are explained as follows:

Y = Gross national income (constant 2000 US$),
A = Air-transport, registered carrier departures worldwide,
K = Gross fixed capital formation (constant 2000 US$),
L = Labor force, total.

V. Empirical Analysis

In order to examine the empirical relationship of air-transport and macroeconomic performance, following analysis is conducted.

1. Cross-Sectional Dependence in Panel

Due to reasons like oil price shock, the global financial crisis and local spillover, the cross-section dependence (CD) is caused in real life. It is likely to be present across panels and can be expected in the current dataset. Therefore, we apply Pesaran (2004) test of cross-sectional dependence. The null hypothesis of this test is cross-sectional dependence against the alternative hypothesis among the respective countries.

$$\text{CD} = \sqrt{\frac{\text{TN(N-1)}}{2}\left(\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\hat{\rho}_{\text{ij}}\right)} \tag{1}$$

In the current analysis, its statistic is 13.129 with p-value = 0.000 implying cross-sectional dependence in the panel. Pesaran's CD test rejects the null hypothesis of spatial independence on one per cent level of significance. On average, the absolute correlation between the residuals of two stocks is 0.45.

2. *Cross-sectional Dependence in Variables and Stationarity Tests*

In the recent years, various panel unit root test methodologies have grown. For example, the first-generation panel unit root test methodologies [Im, et al. (2003), Levin, et al. (2002), Maddala and Wu (1999)] are based on assumption of cross-sectional independence across units. The second-generation unit root test methodologies [Bai and Ng (2004), Choi (2006), Moon and Perron (2004), Pesaran (2007), Smith, et al. (2004)] with assumption of cross-sectional dependence across units, and finally, the panel unit root test methodologies accounts for structural breaks in the panel. Therefore, this study initially employs cross-section dependence (CD) test developed by Pesaran (2004) to investigate contemporaneous correlation across countries and to appreciate the types of unit root test and the types of cointegrating methodology to be used.

Pesaran's (2007), cross-sectionally augmented IPS (CIPS) test for unit roots is applied in the current study. Considering the potential cross-sectional dependence, a second generation unit root test proposed by Pesaran is used to shed light on the findings. Pesaran's test is an extension of the CIPS test of Im, et al. (2003) and is explained as under:

$$\Delta y_{i,t} = c_i + \alpha_i y_{i,y-1} + \beta_i \overline{y}_{y-1} + \sum_{j=0}^{p} \gamma_{ij} \Delta \overline{y}_{t-j} + \sum_{j=1}^{p} \delta_{ij} \Delta y_{i,t-j} + \varepsilon_{i,t}$$

where $i=1,\ldots,n$ and c_i is a deterministic term, $\overline{y}_t$ is the cross-sectional mean at time t and ρ is the lag order. Let $t_i(N,T_m)$ denote the corresponding t-ratio of α_i. The average of t-ratios, denoted by CIPS is $CIPS(N,T_m) = \left(\sum_{i=1}^{N} t_i(N,T_m)\right) / N$. CIPS allows for cross-sectional dependence. These tests are estimated with a constant term at level and at first difference. Results of CIPS show that all variables are stationary at first difference; hence all variables are integrated of order 1, i.e., I(1).

TABLE 1

CD and Second Generation Unit Root Tests for Individual Variables

Variables	CD-test	Correlation	Absolute Correlation	CIPS Level	CIPS 1st Difference
Y	113.69[a]	0.657	0.812	-1.589	-3.785[a]
A	76.08[a]	0.396	0.654	-2.863	-5.627[a]
K	121.27[a]	0.682	0.684	-1.959	-3.698[a]
L	191.97[a]	0.999	0.999	-0.092	-2.980[a]

[a] represents statistical significance at 1%.

As a preliminary inquiry, the estimated static models namely; pooled OLS (POLS), fixed effects (FE), random effects (RE) and the first differenced fixed effect (FD-FE). The estimated coefficients on the demand for air traffic are statistically significant at one per cent in all four estimations. The range of coefficient is tight (0.2238 to 0.4331). Control variables also show desirable signs with one per cent level of significance. R^2 is above 70 per cent for all estimations showing inclusion of suitable control in addition to variables of main concern. However, CD test show the presence of cross-sectional dependence despite evidence of stationary residuals via CIPS test. Therefore, dynamic analysis with possibility of cross-sectional dependence (CD) can be preceded.

For dynamic analysis of heterogeneous panels, Pesaran and Smith (1995) proposed Mean Group (MG) estimator in which parameters are estimated separately for each cross-section. At the end, cross-section the average for each parameter is taken:

$$\grave{u}_i = \frac{1}{N}\sum_{i=1}^{N} u_i \qquad \grave{\theta}_i = \frac{1}{N}\sum_{i=1}^{N} \theta_i \qquad \grave{\phi}_i = \frac{1}{N}\sum_{i=1}^{N} \phi_i$$

For averages of parameters MG estimator will give consistent estimates. Thus, it allows all parameters to vary across countries, but it is not composed of the fact that some parameters may be the same across groups.

TABLE 2

Static Analysis – POLS, FE, RE and FD-FE Estimates

Y	POLS	FE	RE	FD-FE
A	0.4331[a]	0.4017[a]	0.4331[a]	0.2238[a]
	(0.019)	(0.019)	(0.019)	(0.050)
K	0.4099[a]	0.4978[a]	0.4099[a]	0.4845[a]
	(0.018)	(0.022)	(0.018)	(0.062)
L	0.0217[a]	0.0129[a]	0.0217[a]	0.0981[a]
	(0.004)	(0.004)	(0.004)	(0.025)
Constant	10.0759	8.6053	10.0759	-0.0223
Observations	1665	1665	1665	1628
Number of Countries	37	37	37	37
R^2	0.7485	0.7106	0.7485	0.7217
CD	15.07[a]	13.13[b]	15.07[a]	21.35[a]
CIPS	-2.355[a]	-2.424[a]	-2.355[a]	-5.989[a]

[a] and [b] represent statistical significance at 1% and 5%, respectively, standard errors are in parentheses.

In case of the dynamic analysis, presence of CD requires implementation of improved versions of MG approach. Pesaran (2006) argues that coefficient of Common Correlated Effects Mean Group (CCEMG) model, $\beta_j = \beta + \omega_j$ which implies a common parameter β across the countries, while ωj~IID(0,V_ω). CCEMG has the tendency to asymptotically eliminate CD. Moreover, it allows heterogeneous slope coefficients across group members which are captured simply by taking the average of each country's coefficient. The estimator of CCEMG is $\hat{\beta}_{CCEMG}=J^{-1}\sum_{i=1}^{J}\hat{\beta}_j$. Attributed to Eberhardt and Teal (2010), Augmented Mean Group (AMG) is a surrogate to CCEMG, which also captures the unobserved common effect in the model. Moreover, AMG estimator also measure the group-specific estimator and takes a simple average across the panel. The highlight of AMG is that it follows the first difference OLS for pooled data and is augmented with year dummies.

In functional form, the estimable model can be written as follows:

$$(National\ Income)_{j,t} = \alpha_j + d_j t + \beta_{j,1}\ (Demand\ for\ Air\ Travel)j,t \\ + \beta_{ji} Controls_{j,i,t} + \varepsilon_{j,t}$$

where, j stands for cross-sectional dimension $j = 1, \ldots, J$ and time period $t = 1, \ldots, t$ and α_j represents country specific effects and $d_j t$ denotes heterogeneous country specific deterministic trends. Note that α_j is related with the coefficient of respective independent variables like $(\beta_{j1} = \alpha_{j1})/(1 - \alpha_{j1})$ and $(\beta_{j2} = \alpha_{j2})/(1 - \alpha_{j2})$.

Results of Table 3 are analogous to Table 2. The sign of all independent variables are desirable. Only labour turns out statistically insignificant in case of AMG estimation but remain statistically significant in all other estimation techniques. Positive relationship between air-transport and national income remain in all estimation techniques, i.e., MG, CCEMG and AMG. However, CD and CIPS tests strongly argue for superiority of AMG, over the MG and CCEMG. It allows to find the residual based best fitted model to scrutinize the long-run relationship between demand for air-transport and national income. The AMG estimator is 0.1029 with statistical significance at one per cent level of significance. Therefore, confirming the long-run relationship between demand for air-transport and national income.

3. Panel Causality Test

Existence of cointegration calls for the check for cause and effect relationship between air-transport and macroeconomic performance. The Panel Granger Causality is resorted to figure it out, as shown in Table 4.

TABLE 3

Dynamic Analysis – MG, CCEMG and AMG Estimates

Y	MG	CCEMG	AMG
A	0.2045[a]	0.0403	0.1029[a]
	(0.045)	(0.026)	(0.026)
K	0.5813[a]	0.3067[a]	0.3631[a]
	(0.066)	(0.067)	(0.066)
L	0.0216[a]	0.3860	0.0077
	(0.006)	(0.347)	(0.008)
Common Dynamic Process	–	–	0.0158[a]
			(0.004)
Constant	8.9022	-0.1397	13.5552
Observations	1665	1665	1665
Number of Countries	37	37	37
No. of Significant Trends	26	21	29
CD	12.59[a]	-2.07[b]	2.96[a]
CIPS	-3.553[a]	-4.323[a]	-3.819[a]

Note: [a]and [b]represent statistical significance at 1% & 5%, respectively, standard errors are in parentheses.

TABLE 4

Panel Granger Causality Test Results

Causality	F-Statistic	p-value	Remarks
Air-transport⇒National Income	18.8393	0.000	Bi-Causality
National Income ⇒Air-transport	13.1568	0.000	

Source: Authors' estimates.

Table 4 depicts the pair-wise panel Granger causality between air-transport and national income. Interestingly, there exists a bi-causal relationship between national income and the air-transport. This indicates that when national income increases people demand for more air-transport services. This implies that more goods and services are exported and imported which in turn contributes to the national income of the country. There exists a feedback effect in this case, since air-transport sector significantly contributes to national income via its direct, indirect, induced and catalytic effects. Percoco (2010) sequentially categorized the effects of airport (and hence air-transport) as direct, indirect, induced and catalytic impacts. Schematically putting:

Air-transport → Airport development → Direct impacts → Indirect impacts
→ Induced impacts → Catalytic impacts → National income

These include employment and income generated by the direct construction and operation of airports, indirect chain of suppliers of goods and services, expenditures of such income from employees created by the direct and indirect effects, and their role of productivity enhancers which in turn attracts new firms.

VI. Discussion and Recommendations

This study investigates the hypothesis that demands for air-transport plays an important and significant role in the economic growth of Asian countries, both in the long-run and in the short-run. Previous empirical literature based on impact of air-transport on economic growth is confined to time series analysis. But here, the cross country analysis which is a contribution to empirical analysis on this topic has been used. To make our estimates more realistic, cross-sectional dependence was considered. Moreover, in this research work the recently developed econometric techniques, such as, CCEMG and AMG have been used. These techniques are superior then the conventional time series analysis and the panel data techniques. Empirical results of this analysis advocate our proposition that there is a causal long-run relationship between the air-transport and macroeconomic performance in Asian countries.

Findings of this study are in conformity to the earlier studies; Marazzo (2010), Kopsch (2012), Mehmood, et al. (2013), Mehmood and Kiani (2013), Mehmood and Shahid (2014), Mehmood, et al. (2014a), and Mehmood, et al. (2014b). At the same time solidifying the previous findings *via* inclusion of control variables, broader cross-sectional dimension and, the effects of spillover and shocks are also similar.

This quantitative study solidifies the economic importance of air-transport. Positive contribution of aviation sector must not be solely attributed to itself only. Its backward and forward linkages that spur production of goods rendering services in concatenated sectors also contribute to national income. Air-transport is a capital intensive sector and creates substantial employment opportunities as well. Other concatenated sectors include tourism and trade. Feedback effect is also found, which shows that increased national income has a favorable effect on air-transport. Increased individual income would encourage people to use air-transport for travel within and out of the country. In technical terms, this bi-causality may be termed as 'air-transport accelerator effect'.[2]

Further research on efficiency of airports and airlines of individual countries, can be focused. In order to increase the macroeconomic contribution of aviation sector, a roadmap should be devised and more investments should be made. While

[2] The feedback effect can be explained in analogy to 'accelerator effect'. This theoretical concept, attributed to Samuelson (1939), advocates the effect of increased national income on investment.

formal incentives, such as, monetary rewards and non-monetary rewards should also be directed towards air-transport industry, so that its macroeconomic contribution could be sustained.

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