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**IMPACTS OF MACROECONOMIC VARIABLES ON ECONOMIC  
GROWTH: A PANEL DATA ANALYSIS OF SELECTED ASIAN  
COUNTRIES**

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**ABSTRACT**

*Emphasis of the study is to empirically analyze the impacts of macroeconomic variables on economic growth in case of some selected Asian countries. For this purpose annual data is taken from 1990 to 2010. It is a panel data analysis and by estimating the model it is found that in case of the sample countries economic growth is positively affected by foreign direct investment and saving rate while exports in the sample period have negative impacts on economic growth and labor force and tax rate have no impacts on economic growth.*

**Key Words:** *Economic Growth, Macroeconomic Variables, Fixed Effects, Random Effects.*

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**INTRODUCTION:**

Whenever there is increase in real GDP of a country it will boost up the overall output and we call it economic growth. The economic growth is helpful to increase the incomes of the society, help the nation to bring the unemployment at low level and also helpful in the deliveries of public services. Over the last few decades the macroeconomic variables and the economic growth relationship became the hot issue amongst the researchers. Amongst these variables current study emphasis is on the foreign direct investment (FDI), exports of a country, savings, labor force and tax revenue. In this study we proxy the Real GDP for economic growth.

The GDP growth in India was recorded 9.5% in 2010 which was at the lowest level (3.8%) since the last six to seven years and this was mainly because of excessive expenditure by the government but again in 2009 showed increasing trend and reach 8.2% at the end of fiscal year. Similarly the GDP growth rate in Indonesia and Malaysia was 6.19% and 7.19% respectively. The GDP growth rate of Indonesia showed increasing trend since the last 10 years while that of Malaysia was in negative in 2009. Pakistan and Sri-Lanka also showed increasing trend in their respective GDP growth rates which showed that the countries were growing economically. In Pakistan it was found half past than 14% and in Sri-Lanka it was recorded 8% in 2010.

The other macroeconomic variables in the sample countries also showed increasing trend during 2010. As far as exports are concerned, taking as a % of GDP it were almost 23% in Indian economy, 24% was recorded for Indonesia, and for Malaysia, Pakistan and Sri-Lanka its growth as a %age of GDP were, 97%, 13%, and 22% respectively. FDI in the period from 2008 to 2010 in case of India declined considerably as it was 3.5% as a percentage of GDP in 2008 while decline to 2.6% as %age of GDP in 2009 and further goes down and touch the level of 1.43% (as a %age of GDP). In case of Indonesia it showed increasing trend since the last two years because it reach to 1.94%(as a %age of GDP) in 2010 which was 1.82 % in (as a %age of GDP) in 2008 and 0.90% in 2009.

The Malaysian economy was also attracted market for the foreign direct investment as it reached to 3.8% in 2010 while it was only 0.71% in 2009. In case of Pakistan the FDI during 2010 declined to 1.14% and this was mainly because of the uncertainty found in Pakistan and the investors were afraid of investing in such uncertain environment while the FDI were more or less remain same in Sri-Lanka.

Because of this uncertain performance of the macroeconomic variables in the sample countries the author is motivated to empirically check that how these fluctuations in macroeconomic variables affect the economic growth in these countries. Therefore the current study is conducted to fill the gap in the literature on the relationship between economic growth and key macroeconomic variables and it is believed that it will be helpful for the policy makers to formulate a suitable policy in light of this paper.

Rest of the paper is organized as following; section two review some previous studies, in third section there is methodology and description of the variables, section four consist of estimation and results interpretation and at the last there is conclusion and policy recommendation.

## **II-LITERATURE REVIEW:**

There are strong arguments that support the hypothesis that macroeconomic factors do have some effects on economic growth. Fischer named the following variables that have some impacts on economic growth, these are, budget deficit, inflation, balance of payments. Friedman (1977) is of the view that fluctuation in the price level leads to poor coordination of the economic activity. High inflation is an indicator that shows that the economy is not control properly and this leads to low growth of the economy. Barro (1976) is of the view that inflation causes the investment negatively and he said that because of inflation the rate of return on investment became difficult. Here are some empirical studies that have been conducted on the economic growth and macroeconomic variables nexus.

Zafar Iqbal and Ghulam Mustafa Khan (1998), “Macroeconomic Determinants of Economic growth” took primary education, physical capital, trade openness, budget deficit and external debt to analyze their impacts on economic growth. They found that trade openness, stock of physical capital, and primary education have significant impacts on economic growth while external debt and budget deficit have negative impacts on economic growth and they are of the view that to finance economic growth domestic resources has to be fully utilized.

Dr. Hazoor Muhammad Sabir and Safdar Hussain Tahir “the impacts of different macroeconomic variables on poverty in Pakistan” used annual data to empirically investigate macroeconomic variables impacts on economic growth in case of Pakistan and found that inflation have negative impacts on economic growth while openness and investment have positive impacts on economic growth.

Nick Cunningham (2008), “the effects of macroeconomic factors on economic growth within the former soviet union” concludes that foreign direct investment is helpful to enhance economic growth. This study also found that economic growth in the member countries of WTO are at higher level than the non-member countries as the member countries are engaged in internal trade which help to improve the economic condition of the country.

Serhan and Nermin (2008) “The relationship between economic growth and selected macroeconomic indicators in a group of Central and East European countries” conduct their study on the basis of panel data and found that domestic investment, trade openness, ratio of budget balance all have positive impacts on economic growth while inflation negatively affect growth of the economy.

M. Imam Hossain “The role of selective macroeconomic factors on sustainable economic growth in Bangladesh” found that inflation rate in Bangladesh have negative impacts on economic growth while the budget deficit have positive impacts on the growth of the Bangladesh economy.

Khalid Zaman (2012) “Macroeconomic factors determining Foreign Direct Investment impacts on Pakistan Growth” suggest that foreign direct investment has positive and significant impacts on economic growth. Trade liberalization has negative impacts in the long run while in short run trade liberalization has positive impacts on economic growth in Pakistan.

### **III-DATA AND METHODOLOGY:**

#### **a- Data:**

To collect the data on the selected variables various sources have been consulted. like the federal bureaus of statistics (Pakistan), various publication of central Banks of the four selected countries, the World Bank. The period of the study extended from 1990 to 2010. The data has the annual frequency.

#### **b- Variables Description:**

For the current study six variables has been selected to analyze the impacts of macroeconomic variables on growth in a selected Asian countries. These variables are then divided into dependent and independent variables. The dependent variable of the study is the real GDP while the other variables are taken as independent variables. A brief description (economic justification) with respect to dependent variable is given as;

**Dependent variable****Economic growth**

Our dependent variable is economic growth and this study used GDP growth rate as a proxy for economic growth which is consistent with the literature(Gagan Deep Sharma et al, Ming Yu Ching, Vladimir Ristanovićalso used the same variable for economic growth).

**INDEPENDENT VARIABLE**

In this study some key macroeconomic variables have been taken so that to empirically analyze their impacts on economic growth in the sample countries. These are;

**FDI:**The role of FDI to bring economic growth can be justified as it is helpful in bringing new technologies and funds. The new technologies mean a ways of innovation which further help in the production process. The flow of foreign direct investment is because of many factors like government policies, the investor's interest in a country etc.

**Exports:**Exports of a country are also important factor that might affect economic growth. More exports mean more allocation of resources and more utilization of resources means more production.

This is possible through technological development, new capital formation and employment creation which are pre requisites for accelerated economic growth.

**Saving:**Economic growth and savings have a close association with one another. Marginal propensity to save say that as the income increase the saving rate also increase so on the basis of this theory we can say that economic growth and savings a close relationship. Governments most of the time launch different savings schemes so that to encourage the savings in a country and as these schemes are tax exempted (mostly), so this leads to save tax and the government investment leads to earn capital and in this way economy grow.

**Labor Force:**Human capital plays important role in the economic development of a country as well. If the labor force is skillful then this will help to bring prosperity in the country. The quality of labor force is also important in the country. Mortensen (2004) emphasized the role of labor saying that the reforms improve labor performance and help to reduce unemployment on one hand and it encourages investment in research and development required for long-term growth, on the other.

**Tax Revenue:**Taxes and economic growth association can be described in many ways, e.g. if the tax rate is high it will leads to low investment which means the capital stock growth is low so

economy will not grow. Increase in tax rate leads to discourage the labor supply and distort working hours. Also if the tax rate is high it badly affect the productivity by discouraging the research and development in the risky projects of capital intensive industries. Fourth, tax policy can also influence the marginal productivity of capital by distorting investment from heavily taxed sectors into more lightly taxed sectors with lower overall productivity. And fifth, heavy taxation on labor supply can distort the efficient use of human capital by discouraging workers from employment in sectors with high social productivity but a heavy tax burden.

**Methodology:**

In order to show the impact of exports, foreign direct investment, labor force, savings and tax revenue on economic growth the following model have been used.

$$GDP_{it} = \beta_0it + \beta_1FDI_{it} + \beta_2X_{it} + \beta_3S_{it} + \beta_4LF_{it} + \beta_5TR_{it}.....1$$

Here

FDI= is foreign direct investment. it shows foreign direct investment net inflow as % of GDP

X= is export of goods and services as % of GDP

S= is gross domestic saving as % of GDP

Lf= is logarithm of total labor force

TR= it shows tax revenue as % of GDP

t = the subscript “t” is used for time series

While the estimated model is;

$$lGDP_{it} = \beta_0it + \beta_1lFDI_{it} + \beta_2lX_{it} + \beta_3lS_{it} + \beta_4lLF_{it} + \beta_5lTR_{it}.....2$$

In equation 2 the “l” is used for “log” while the remaining notations are as discussed in equation 1.

Panel data have been used in order to show the impact of exports, foreign direct investment, labor force, savings and tax revenue on economic growth.

We go for panel data analyses whenever cross sectional and time series data exist simultaneously .there are three model in panel data analyses.

Common effect model assume that intercept is constant across sectional and time series data.

Fixed effect model assume that intercept is not constant but it is group specific.

Random effect model assume that intercept is not constant but it is group specific.

F- Test is used when we take decision between common and fixed effect model selection. Here if probability of Chi square is insignificant mean it is greater than 5%. Then common effect model will be used and if probability of Chi square is less than 5% then fixed effect model will be used. The above statement can also be checked by using the following formula.

$$F = [(R2FE - R2CC)/(N-1)] / [(1- R2FE)/(NT-N-K) ]$$

Here if value of F calculated is less than F critical than common effect model will be used and if it is greater than fixed effect model will be used.

Hausman test is used when we take decision between fixed and random effect model selection. If probability of Chi square test is greater than 5% than fixed effect model will be used and vice versa.

**Empirical Results**

Table 1 presents descriptive statistics of data. This table shows that India has high GDP growth rate. Average growth rate of India is 6.48% annual. Maximum value of growth rate is 9.80%. it was during 2007 while minimum growth rate of GDP is 1.05 which was in 1991. Malaysia has second position in GDP growth rate. Its maximum GDP is 10.01%. this value of GDP was obtained during the period of 1996. On the other hand its minimum GDP during stated period is - 7.36.

**Table 1**

	Mean	Median	Std Deviation	Minimum	Maximum
<b>Pakistan</b>					
GDPGR	4.31	4.27	2.37	1.01	7.70
EXP	15.44	15.67	1.38	12.85	17.37
FDI	1.33	1.14	.99	.42	3.91
LLF	17.58	17.58	.22	17.28	17.91
SAV	14.83	15.41	2.37	10.16	17.62
TAX	11.41	10.79	1.61	9.28	13.82
<b>India</b>					
GDPGR	6.48	6.66	2.36	1.05	9.80
EXP	14.09	12.39	5.23	6.94	23.61

FDI	.99	.76	.91	.03	3.55
LLF	19.83	19.84	.13	19.62	19.98
SAV	25.99	24.19	4.31	20.92	34.02
TAX	9.54	9.34	.93	8.21	11.90
<b>Sri Lanka</b>					
GDPGR	5.27	5.6	1.99	-1.55	8.02
EXP	32.28	33.82	4.90	21.33	39.02
FDI	1.25	1.13	.54	.42	2.85
LLF	15.86	15.89	.09	15.71	15.98
SAV	16.34	15.91	1.77	12.76	19.51
TAX	15.34	14.58	1.96	12.72	19.03
<b>Malaysia</b>					
GDPGR	6.09	6.78	4.29	-7.36	10.01
EXP	100.68	103.19	15.31	74.54	121.31
FDI	4.35	4.05	2.10	.60	8.77
LLF	16.07	16.11	.17	15.78	16.30
SAV	41.35	42.15	3.88	34.13	48.68
TAX	17.01	16.73	2.24	13.66	19.75
<b>Indonesia</b>					
GDPGR	5.03	5.70	4.58	-13.12	9.01
EXP	30.92	29.44	6.86	24.15	52.96
FDI	.85	1.20	1.47	-2.75	2.92
LLF	18.40	18.42	.15	18.16	18.58
SAV	30.50	30.82	3.30	19.46	34.06
TAX	13.69	14.02	1.72	10.89	16.00

This value of GDP was achieved during 1997 when financial crisis came in Thailand and badly affected the currency of various Asian countries like Malaysia, Indonesia and many other



countries. Sri Lanka, Indonesia and Pakistan has third fourth and fifth position regarding GDP growth rate.

Malaysia exports more goods and services than other selected countries in the sample. Its export is 100.68 million as % of GDP. Sri has second position in export of goods and services.

Pakistan, Indonesia, India has third, fourth and fifth position respectively.

Table 2 shows common effect model. This model indicates that FDI and SAV shows positive and significant relation with GDPGR. If there is increase in any of these two variables then GDP will also increase. LLF and EXP shows negative and significant relationship with GDPGR. While TAX shows no effect with GDPGR. EXP, FDI, LLF, SAV and TAX explain 35% variation in GDPGR. The rest of variation in economic growth may be due to some other reasons. The value of F-statistics is greater than 5 which mean that this model is significant.

**Table 2 Common Effect Model**

<b>Variables</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>T-statistics</b>	<b>Prob</b>
<b>C</b>	28.199	10.169	2.273	0.007
<b>EXP_?</b>	-0.137	0.028	-4.975	0.000
<b>FDI_?</b>	0.852	0.185	4.609	0.000
<b>LLF_?</b>	-1.439	0.532	-2.707	0.008
<b>SAV_?</b>	0.336	0.080	4.212	0.000
<b>TAX_?</b>	-0.179	0.162	-1.106	0.272
<b>R-square</b>	0.351			
<b>Adjusted R-square</b>	0.318			
<b>F-statistics</b>	10.677			
<b>F-significance</b>	0.000			

**Table 3 Fixed Effect Model**

<b>Variables</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>T-Statistics</b>	<b>Prob</b>
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<b>C</b>	6.915	47.423	0.146	0.885
<b>EXP_?</b>	-0.189	0.045	-4.291	0.000
<b>FDI_?</b>	0.601	0.237	2.542	0.014
<b>LLF_?</b>	-0.248	2.618	-0.095	0.925
<b>SAV_?</b>	0.395	0.095	4.163	0.000
<b>TAX_?</b>	-0.077	0.217	-0.355	0.724
<b>IND-C</b>	-2.981			
<b>INDO-C</b>	-2.953			
<b>MALA-C</b>	4.647			
<b>PAK-C</b>	-1.103			
<b>SRI-C</b>	2.389			
<b>R-Square</b>	0.407			
<b>Adjusted R-Square</b>	0.349			
<b>F-statistic</b>	7.221			
<b>F-significance</b>	0.000			

Above table 3 shows fixed effect model. Results of the above table indicate that there is positive and significant relationship between FDI, SAV and GDP annual growth rate during 1990-2010. EXP has negative and significant effect on GDP during this period of study. LLF and TAX have no impact on GDP. These five variable explain 40% part of GDP and the remaining in GDP may due to some other variables that are not included in the sample.

**Table 4 F-test**

	<b>Chi-Sq. Statistic</b>	<b>Chi-sq.d.f.</b>	<b>Prob.</b>
<b>Cross-section Chi-square</b>	9.440891	4	0.051

F-Test is conducted in selection between common effect and fixed effect model. Here as we see that probability of F-Test is insignificant therefore common effect model is best model.

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**CONCLUSION AND POLICY RECOMMENDATION:**

In this study four Asian countries were selected to analyze the impacts of macroeconomic variables on economic growth. The nature of the data was annual and time period of the study ranged from 1990 to 2010. On the basis of the analysis made in this paper it is concluded that in case of the sample countries GDP growth is enhanced by attracting foreign direct investment, and saving rates while others selected variables have no or negative impacts on the economy of the selected countries. Therefore for policy makers it is suggested in the light of this study to improve the economic growth in these countries the investment friendly policies has to be formulated and also the government should encourage the saving habits of the inhabitants.

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