**5. Regression Results**

**Table 4: Overall Fixed Effects Regression**

|  |  |  |  |
| --- | --- | --- | --- |
|  | (1) | (2) | (3) |
| VARIABLES | GDP(FE) | GDP(i.Time) | GDP(Robust) |
|  |  |  |  |
| Inflation | -1.142e+09 | -9.268e+08 | -1.142e+09\* |
|  | (1.435e+09) | (1.457e+09) | (6.687e+08) |
| GFCF | -0.000728 | -0.000823 | -0.000728 |
|  | (0.00121) | (0.00122) | (0.00130) |
| Government Spending | 0.00438 | 0.00415 | 0.00438 |
|  | (0.00434) | (0.00437) | (0.00487) |
| Life Expectancy | 7.503e+10\*\*\* | 3.022e+09 | 7.503e+10 |
|  | (2.076e+10) | (2.540e+10) | (5.655e+10) |
| Secondary Education | 1.174e+11 | -6.305e+10 | 1.174e+11 |
|  | (1.377e+11) | (1.420e+11) | (2.212e+11) |
| Primary Education | 5.267e+11\*\*\* | 4.730e+11\*\* | 5.267e+11 |
|  | (1.990e+11) | (1.989e+11) | (6.563e+11) |
| Exports | -0.000463 | -0.000361 | -0.000463 |
|  | (0.00134) | (0.00134) | (0.000652) |
| Imports | 0.000264 | 0.000222 | 0.000264 |
|  | (0.00139) | (0.00139) | (0.000597) |
| FDI | -3.696\*\* | -4.394\*\* | -3.696 |
|  | (1.821) | (1.831) | (3.010) |
| Population Growth | -2.662e+10 | 1.148e+09 | -2.662e+10 |
|  | (3.089e+10) | (3.154e+10) | (2.970e+10) |
| Exchange Rate | 65.79 | 4.925 | 65.79 |
|  | (144.0) | (145.1) | (48.87) |
| Globalization | 3.003e+10\*\* | -2.537e+10 | 3.003e+10 |
|  | (1.271e+10) | (1.802e+10) | (2.149e+10) |
| Age Dependency | 2.117e+10\*\* | 1.973e+10\*\* | 2.117e+10 |
|  | (8.693e+09) | (8.769e+09) | (3.195e+10) |
| “2003.Time” |  | 7.270e+10 |  |
|  |  | (2.036e+11) |  |
| “2004.Time” |  | 1.430e+11 |  |
|  |  | (2.061e+11) |  |
| “2005.Time” |  | 2.272e+11 |  |
|  |  | (2.115e+11) |  |
| “2006.Time” |  | 3.334e+11 |  |
|  |  | (2.206e+11) |  |
| “2007.Time” |  | 4.498e+11\* |  |
|  |  | (2.328e+11) |  |
| “2008.Time” |  | 5.359e+11\*\* |  |
|  |  | (2.409e+11) |  |
| “2009.Time” |  | 5.571e+11\*\* |  |
|  |  | (2.452e+11) |  |
| 2010.Time |  | 6.153e+11\*\* |  |
|  |  | (2.538e+11) |  |
| 2011.Time |  | 6.868e+11\*\*\* |  |
|  |  | (2.610e+11) |  |
| 2012.Time |  | 7.585e+11\*\*\* |  |
|  |  | (2.701e+11) |  |
| 2013.Time |  | 8.012e+11\*\*\* |  |
|  |  | (2.746e+11) |  |
| 2014.Time |  | 8.853e+11\*\*\* |  |
|  |  | (2.832e+11) |  |
| 2015.Time |  | 9.235e+11\*\*\* |  |
|  |  | (2.867e+11) |  |
| 2016.Time |  | 9.768e+11\*\*\* |  |
|  |  | (2.928e+11) |  |
| 2017.Time |  | 1.059e+12\*\*\* |  |
|  |  | (3.000e+11) |  |
| 2018.Time |  | 1.130e+12\*\*\* |  |
|  |  | (3.059e+11) |  |
| 2019.Time |  | 1.205e+12\*\*\* |  |
|  |  | (3.084e+11) |  |
| 2020.Time |  | 1.178e+12\*\*\* |  |
|  |  | (2.985e+11) |  |
| 2021.Time |  | 1.339e+12\*\*\* |  |
|  |  | (3.031e+11) |  |
| Constant | -1.107e+13\*\*\* | -1.996e+12 | -1.107e+13 |
|  | (2.015e+12) | (2.722e+12) | (9.313e+12) |
|  |  |  |  |
| Observations | 1,000 | 1,000 | 1,000 |
| R-squared | 0.081 | 0.109 | 0.081 |
| Number of Countries | 50 | 50 | 50 |

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Figure 4a: Hausman for overall regression**

|  |  |
| --- | --- |
| **Hausman (1978) specification test** | |
|  | Coef. |
| Chi-square test value | 21.116 |
| P-value | 0.004 |

“: No difference in coefficients”

“: Significant difference in coefficients”

“Figure 4a shows Hausman test for the overall regression for the Globalization impact on Economic Growth. It can be seen that the p-value = 0.004 so we reject the null hypothesis, and we will be using the fixed effect model for our regression analysis. In Table 4, Fixed effects in the first column are of results for overall fixed effects, in column 2 are the results of time fixed effects, and in last column are the fixed effect robust estimates.”

“Column 1 results show that at there is significant relationship between Globalization and GDP at 5 % significance level. The relationship among the two variables is positive; meaning that if Globalization increases by 1 % then the GDP will increase by 3.003e+10$s. Cetrius Peribus. They also indicate that there is significant relationship between FDI and GDP at 5% significance level. The estimates show that if we increase FDI by 1 % the GDP will decrease by -3.696 Billion Dollars, Cetrius Peribus.”

“Age Dependency also shows a significant relationship between Age Dependency and GDP at 5 % significance level. The estimates show that if we increase Age Dependency by 1 % the GDP will increase by 2.117e+10$s, Cetrius Peribus. Primary Education also shows a highly significant relationship between Age Dependency and GDP at 1 % significance level. The estimates show that if we increase Primary Education by 1 %, the GDP will increase by 5.267e+11$s, Cetrius Peribus. Primary Education also shows a highly significant relationship between Age Dependency and GDP at 1 % significance level. The estimates show that if we increase Primary Education by 1 %, the GDP will increase by 5.267e+11$s, Cetrius Peribus. Life Expectancy also shows a highly significant relationship between Life Expectancy and GDP at 1 % significance level. The estimates show that if we increase Life Expectancy by 1 %, the GDP will increase by 7.503e+10$s, Cetrius Peribus.”

“Column 2 has time fixed effects, we see that for the first four years which are 2003, 2004, 2005, and 2006 our time dummy variables are insignificant, but for the rest of the years they are significant. The coefficient of time dummies shows that at first there was a fall between 2003 and 2004 but after that the time value of coefficients rose till 2021. It shows that there was a significant increase in GDP in $s in 2021 due to globalization and all the other factors. Moreover, it is also seen that the time dummy estimates that in year 2004 the time dummy coefficient value was the lowest as compared to 2019, showing that with time certain activities leads the GDP to increase.”

**Figure 4b: Time Intervals for overall regression**

|  |
| --- |
| **“(1) 2003.Time = 0** |
| **(2) 2004.Time = 0** |
| **(3) 2005.Time = 0** |
| **(4) 2006.Time = 0** |
| **(5) 2007.Time = 0** |
| **(6) 2008.Time = 0** |
| **(7) 2009.Time = 0** |
| **(8) 2010.Time = 0** |
| **(9) 2011.Time = 0** |
| **(10) 2012.Time = 0** |
| **(11) 2013.Time = 0** |
| **(12) 2014.Time = 0** |
| **(13) 2015.Time = 0** |
| **(14) 2016.Time = 0** |
| **(15) 2017.Time = 0** |
| **(16) 2018.Time = 0** |
| **(17) 2019.Time = 0** |
| **(18) 2020.Time = 0** |
| **(19) 2021.Time = 0** |
| **F (19,918) = 1.49** |
| **Prob > F = 0.0792”** |

“Figure 4b shows that the value of Prob>F is 0.0792 which is less than 1 so meaning that we have to include time dummies in our regression, so that we can look at the time fixed effects on the overall regression.”

**“Figure 4c: Modified Wald test for groupwise heteroskedasticity”**

|  |
| --- |
| **“Modified Wald test for groupwise heteroskedasticity** |
| **in fixed effect regression model** |
| Chi2 (50) = 3.2e+06 |
| Prob>chi2 = 0.0000” |

“: No heteroskedasticity is present”

“: Heteroskedasticity is present”

“Figure 4c depicts the test for heteroskedasticity. The results show that the Null Hypothesis is rejected as the P value = 0, so proving the existence of heteroskedasticity so we will run Robust fixed effects shown in Table 4, Column 3.”

**Figure 4d: Pesaran for Overall Regression**

|  |
| --- |
| “Pesaran's test of cross-sectional independence = 29.793, Pr = 0.0000 |
| Average absolute value of the off-diagonal elements = 0.688” |

The value of Pearson Abs for the overall regression is Pr =0.000 which is less than 0.05 so we conclude that the error terms do not correlate between the entities and that there is cross sectional dependence among the entities”

**“Figure 4e: Wooldridge test for autocorrelation in panel data for Overall”**

|  |
| --- |
| **“Wooldridge test for autocorrelation in panel data** |
| **H0: no first-order autocorrelation** |
| F (1,49) = 304.448 |
| Prob > F = 0.0000” |

“: no first-order autocorrelation present”

“: first-order autocorrelation is present”

“Figure 4e shows the test for the serial correlations A s Prob>F=0.0000 so we will reject the null Hypothesis and say that there exists a serial correlation in the data for Overall Countries. Happening due to reverse causality, simultaneity bias, omitted variable bias or due to non-inclusion of an instrumental variable (IV). So, we need to robust the regression which is done in Table 6, Column 3.”

**Table 5: Lower Income Countries**

|  |  |  |  |
| --- | --- | --- | --- |
|  | (1) | (2) | (3) |
| VARIABLES | GDP(FE) | GDP(i.Time) | GDP(Robust) |
|  |  |  |  |
| Inflation | -3.135e+08\*\* | -2.659e+08\*\* | -3.135e+08\*\*\* |
|  | (1.215e+08) | (1.134e+08) | (9.680e+07) |
| GFCF | 0.000596\* | 0.000595\* | 0.000596 |
|  | (0.000348) | (0.000322) | (0.000428) |
| Government Spending | -0.000629 | -0.000631 | -0.000629 |
|  | (0.000576) | (0.000533) | (0.000495) |
| Life Expectancy | 1.310e+10\*\*\* | -1.909e+09 | 1.310e+10\*\* |
|  | (1.861e+09) | (2.104e+09) | (6.035e+09) |
| Secondary Education | 5.620e+10\*\*\* | 1.448e+10 | 5.620e+10 |
|  | (1.430e+10) | (1.351e+10) | (5.979e+10) |
| Primary Education | 1.553e+10 | 8.752e+09 | 1.553e+10 |
|  | (2.215e+10) | (2.031e+10) | (6.394e+10) |
| Exports | 2.24e-05 | 9.96e-05 | 2.24e-05 |
|  | (0.000153) | (0.000142) | (8.72e-05) |
| Imports | -5.03e-05 | -0.000133 | -5.03e-05 |
|  | (0.000180) | (0.000167) | (8.25e-05) |
| FDI | -0.270 | -0.404\* | -0.270 |
|  | (0.225) | (0.208) | (0.266) |
| Population Growth | -7.642e+09\*\*\* | -2.909e+09 | -7.642e+09\*\* |
|  | (2.629e+09) | (2.462e+09) | (3.363e+09) |
| Exchange Rate | 12.03 | -0.728 | 12.03\* |
|  | (12.14) | (11.25) | (6.485) |
| Globalization | 2.370e+09\*\* | -8.437e+09\*\*\* | 2.370e+09 |
|  | (1.139e+09) | (1.443e+09) | (2.765e+09) |
| Age Dependency | -2.648e+09\*\*\* | -3.112e+09\*\*\* | -2.648e+09 |
|  | (8.833e+08) | (8.269e+08) | (3.751e+09) |
| “2003.Time |  | 1.378e+10 |  |
|  |  | (1.718e+10) |  |
| 2004.Time |  | 2.970e+10\* |  |
|  |  | (1.738e+10) |  |
| 2005.Time |  | 4.709e+10\*\*\* |  |
|  |  | (1.779e+10) |  |
| 2006.Time |  | 7.181e+10\*\*\* |  |
|  |  | (1.855e+10) |  |
| 2007.Time |  | 9.656e+10\*\*\* |  |
|  |  | (1.952e+10) |  |
| 2008.Time |  | 1.125e+11\*\*\* |  |
|  |  | (2.022e+10) |  |
| 2009.Time |  | 1.101e+11\*\*\* |  |
|  |  | (2.052e+10) |  |
| 2010.Time |  | 1.226e+11\*\*\* |  |
|  |  | (2.115e+10) |  |
| 2011.Time |  | 1.353e+11\*\*\* |  |
|  |  | (2.174e+10) |  |
| 2012.Time |  | 1.518e+11\*\*\* |  |
|  |  | (2.248e+10) |  |
| 2013.Time |  | 1.649e+11\*\*\* |  |
|  |  | (2.282e+10) |  |
| 2014.Time |  | 1.813e+11\*\*\* |  |
|  |  | (2.343e+10) |  |
| 2015.Time |  | 1.876e+11\*\*\* |  |
|  |  | (2.367e+10) |  |
| 2016.Time |  | 1.997e+11\*\*\* |  |
|  |  | (2.418e+10) |  |
| 2017.Time |  | 2.168e+11\*\*\* |  |
|  |  | (2.476e+10) |  |
| 2018.Time |  | 2.354e+11\*\*\* |  |
|  |  | (2.524e+10) |  |
| 2019.Time |  | 2.499e+11\*\*\* |  |
|  |  | (2.543e+10) |  |
| 2020.Time |  | 2.424e+11\*\*\* |  |
|  |  | (2.485e+10) |  |
| 2021.Time |  | 2.708e+11\*\*\* |  |
|  |  | (2.523e+10) |  |
| Constant | -1.123e+12\*\*\* | 7.084e+11\*\*\* | -1.123e+12\* |
|  | (2.040e+11) | (2.383e+11) | (6.329e+11) |
|  |  |  |  |
| Observations | 840 | 840 | 840 |
| R-squared | 0.385 | 0.499 | 0.385 |
| Number of Countries” | 42 | 42 | 42 |

“Standard errors in parentheses”

“\*\*\* p<0.01, \*\* p<0.05, \* p<0.1”

**“Figure 5a: Hausman for Lower Income Countries”**

|  |  |
| --- | --- |
| **“Hausman (1978) specification test** | |
|  | Coef. |
| Chi-square test value | 73.127 |
| P-value | 0” |

“: No difference in coefficients”

“: Significant difference in coefficients”

“Figure 5a shows Hausman test for the Lower Income Countries regression for the Globalization impact on Economic Growth. It can be seen that the p-value = 0, so we reject the null hypothesis, and we will be using the fixed effect model for our regression analysis. In Table 5, Fixed effects in the first column are of results for Lower Income Countries fixed effects, in column 2 are the results of time fixed effects, and in last column are the fixed effect robust estimates for Lower Income Countries.

Column 1 results show that there is significant relationship between Globalization and GDP at 5 % significance level. The relationship among the two variables is positive; meaning that if Globalization increases by 1 % then the GDP will increase by 2.370e+09$s. Cetrius Peribus.

They also indicate that there is significant relationship between Inflation and GDP at 5% significance level. The estimates show a negative relationship that if we increase Inflation by 1 % the GDP will decrease by -3.135e+08$s, Cetrius Peribus.

Gross Fixed Capital Formation also shows a significant relationship between Gross Fixed Capital Formation and GDP at 10 % significance level. The estimates show that if we increase Gross Fixed Capital Formation by 1 % the GDP will increase by 0.000596 in $s, Cetrius Peribus. Secondary Education also shows a highly significant relationship between Secondary Education and GDP at 1 % significance level. The estimates show that if we increase Secondary Education by 1 %, the GDP will increase by 5.620e+10$s, Cetrius Peribus. Population Growth also shows a highly significant relationship between Population Growth and GDP at 1 % significance level. The estimates show that if we increase Population Growth by 1 %, the GDP will decrease by -7.642e+09$s, Cetrius Peribus. Life Expectancy also shows a highly significant relationship between Life Expectancy and GDP at 1 % significance level. The estimates show that if we increase Life Expectancy by 1 %, the GDP will increase by 1.310e+10$s, Cetrius Peribus. Age Dependency also shows a highly significant relationship with GDP at 1%. The estimates show that if we increase Life Expectancy by 1 % then the GDP will fall by -2.648e+09$s”

“Column 2 has time fixed effects, we see that for the first year which is 2003, our time dummy variables are insignificant, but for the rest of the years they are significant. The coefficient of time dummies shows that from the start there was a rise in the time value of coefficient from 2003 to 2021. It shows that there was a significant increase in GDP in $s in 2021 due to globalization and all the other factors. Moreover, it is also seen that the time dummy estimates from year 2004 till 2019 the time dummy coefficient value are increasing, showing that with time due to certain activities GDP will keep on rising in lower income countries.”

**“Figure 5b: Time Interval for Lower Income Countries”**

|  |
| --- |
| **“(1) 2003.Time = 0** |
| **(2) 2004.Time = 0** |
| **(3) 2005.Time = 0** |
| **(4) 2006.Time = 0** |
| **(5) 2007.Time = 0** |
| **(6) 2008.Time = 0** |
| **(7) 2009.Time = 0** |
| **(8) 2010.Time = 0** |
| **(9) 2011.Time = 0** |
| **(10) 2012.Time = 0** |
| **(11) 2013.Time = 0** |
| **(12) 2014.Time = 0** |
| **(13) 2015.Time = 0** |
| **(14) 2016.Time = 0** |
| **(15) 2017.Time = 0** |
| **(16) 2018.Time = 0** |
| **(17) 2019.Time = 0** |
| **(18) 2020.Time = 0** |
| **(19) 2021.Time = 0** |
| **F (19,766) = 9.24** |
| **Prob > F = 0.0000”** |

“Figure 5b shows the value of Prob > F = 0.000 which is less than 1 so it means that we will be forced to include time dummies in our regression. To get the time fixed effect on the Lower Income Countries Regression.”

**“Figure 5c: Modified Wald test for groupwise heteroskedasticity for Lower Income Countries”**

|  |
| --- |
| **“Modified Wald test for groupwise heteroskedasticity** |
| **in fixed effect regression model** |
| Chi2 (42) = 3.8e+05 |
| Prob>chi2 = 0.0000” |

“: No heteroskedasticity is present”

“: Heteroskedasticity is present”

“Figure 5c shows the heteroscedasticity test. The Results conclude that we will reject the null hypothesis as the value of Prob>P=0.00, hence proving that heteroscedasticity exists and because of which we will be running Robust Fixed Effects shown in Column 3 of Table 5

**Figure 5d: Pearson for Lower Income Countries**

|  |
| --- |
| Pesaran's test of cross-sectional independence = 8.716, Pr = 0.0000 |
| Average absolute value of the off-diagonal elements = 0.701 |

The value of Pearson Abs for the Lower Income Countries regression is Pr =0.000 which is once again less than 0.05 so we conclude that the error terms do not correlate between the entities.” There is cross-sectional dependence among the entities.”

**“Figure 5e: Wooldridge test for autocorrelation in panel data for Lower Income Countries**

|  |
| --- |
| **Wooldridge test for autocorrelation in panel data** |
| **H0: no first-order autocorrelation** |
| F (1,41) = 224.822 |
| Prob > F = 0.0000 |

“: no first-order autocorrelation present”

“: first-order autocorrelation is present”

“Figure 5e shows the test for the serial correlations A s Prob>F=0.0000 so we will reject the null Hypothesis and say that there exists a serial correlation in the data for Overall Countries. Happening due to reverse causality, simultaneity bias, omitted variable bias or due to non-inclusion of an instrumental variable (IV). So, we need to robust the regression which is done in Table 5, Column 3.”

**Table 6: Upper Income Countries Random Effect**

|  |  |  |
| --- | --- | --- |
|  | (1) | (2) |
| VARIABLES | GDP(RE) | GDP(Robust) |
|  |  |  |
| Inflation | -2.453e+10 | -2.453e+10 |
|  | (7.227e+10) | (4.526e+10) |
| GFCF | -0.00966 | -0.00966 |
|  | (0.00617) | (0.0118) |
| Government Spending | 0.0327 | 0.0327 |
|  | (0.0217) | (0.0414) |
| Life Expectancy | 2.247e+11 | 2.247e+11 |
|  | (1.553e+11) | (2.907e+11) |
| Secondary Education | 1.470e+12\*\*\* | 1.470e+12\*\*\* |
|  | (4.049e+11) | (4.784e+11) |
| Primary Education | 1.102e+12\* | 1.102e+12 |
|  | (5.763e+11) | (1.393e+12) |
| Exports | -0.00286 | -0.00286 |
|  | (0.00721) | (0.00634) |
| Imports | 0.00613 | 0.00613 |
|  | (0.00662) | (0.00622) |
| FDI | -36.35\*\*\* | -36.35\*\*\* |
|  | (7.362) | (7.334) |
| Population Growth | -3.479e+12\*\*\* | -3.479e+12\* |
|  | (9.101e+11) | (1.886e+12) |
| Exchange Rate | -6.908e+08\*\* | -6.908e+08\*\* |
|  | (2.693e+08) | (3.017e+08) |
| Globalization | -3.744e+11\*\*\* | -3.744e+11\*\*\* |
|  | (1.014e+11) | (1.434e+11) |
| Age Dependency | -2.999e+10 | -2.999e+10 |
|  | (4.009e+10) | (4.493e+10) |
| Constant | 1.609e+12 | 1.609e+12 |
|  | (8.490e+12) | (1.845e+13) |
|  |  |  |
| Observations | 160 | 160 |
| Number of Countries | 8 | 8 |

“Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1”

**“Figure 6a: Hausman for Upper Income Countries**

|  |  |
| --- | --- |
| **Hausman (1978) specification test (0)** | |
|  | Coef. |
| Chi-square test value | 1.285 |
| P-value | 0.996” |

“: No difference in coefficients”

“: Significant difference in coefficients”

“Figure 6a shows Hausman test for the Upper Income Countries regression for the Globalization impact on Economic Growth. It can be seen that the p-value = 0.996, so we accept the null hypothesis as it is greater than 0.05, and we will be using the random effect model for our regression analysis. In Table 6, Random effects in the first column are of results for Upper Income Countries Random effects, In Column 2 are the random effect robust estimates for Upper Income Countries.

Column 1 results show that at there is highly significant relationship between Globalization and GDP at 1 % significance level. The relationship among the two variables is Negative; meaning that if Globalization increases by 1 % then the GDP will decrease by -3.744e+11$s. Cetrius Peribus.

Secondary Education also shows a highly significant relationship between Secondary Education and GDP at 1 % significance level. The estimates show that if we increase Secondary Education by 1 %, the GDP will increase by 1.470e+12$s, Cetrius Peribus. Primary Education also shows a significant relationship between Primary Education and GDP at 10 % significance level. The estimates show that if we increase Primary Education by 1 %, the GDP will increase by 1.102e+12$s, Cetrius Peribus.

FDI also shows a highly significant relationship between FDI and GDP at 10 % significance level. The estimates show that if we increase FDI by 1 %, the GDP will decrease by -36.35$s, Cetrius Peribus. Population Growth also shows a highly significant relationship between Population Growth and GDP at 10 % significance level. The estimates show that if we increase Population Growth by 1 %, the GDP will decrease by -3.479e+12$s, Cetrius Peribus. Exchange Rate also shows a significant relationship between Exchange Rate and GDP at 10 % significance level. The estimates show that if we increase Exchange Rate by 1 %, the GDP will decrease by -6.908e+08$s, Cetrius Peribus.”

**“Figure 6b: Breusch and Pagan Lagrangian multiplier test for Upper Income Countries**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Breusch and Pagan Lagrangian multiplier test for random effects** | | | | |
|  |  |  | Coefficients | |
| Chibar2(01) = | | |  | 0 |
| Prob > chibar2 = | | |  | 1 |

As Prob > Chibar = 1 so it is not significant and we reject the null hypothesis, so that random effect might not be the correct model used in the Upper Income Countries Data, so it is preferred to run the Ordinary Least Square Model.”

**“Figure 6c: Wooldridge test for autocorrelation in panel data for Upper Income Countries**

|  |
| --- |
| **Wooldridge test for autocorrelation in panel data** |
| **H0: no first-order autocorrelation** |
| F (1,7) = 132.413 |
| Prob > F = 0.0000” |

“: no first-order autocorrelation present”

“: first-order autocorrelation is present”

“Figure 6c shows the test for the serial correlations A s Prob>F=0.0000 so we will reject the null Hypothesis and say that there exists a serial correlation in the data for Upper Income Countries. Happening due to reverse causality, simultaneity bias, omitted variable bias or due to non-inclusion of an instrumental variable (IV). So, we need to robust the regression which is done in Table 6, Column 2.”

**“Comparison between Upper Income Countries and Lower Income Countries**

The Results show the two parts Upper Income Countries and Lower Income Countries are very different from each other. The Upper Income Countries are run on Random Model and Lower Income Countries results are of Fixed Effect. In Random effects Regression for UIC (Upper Income Countries) the independent Variable Globalization is Significant at 1% and the LIC (Lower Income Countries) of Fixed effect Model, Globalization is Significant at 5% significant level. Both of them are Significant so we reject Null Hypothesis in both of them. In UIC RE Regression, there are several variables which are insignificant such as Gross Fixed Capital Formation, Government Spending, Life Expectancy, Export, Import, & Age Dependency. In LIC FE Regression, there are also several insignificant variables such as Government Spending, Primary Education, Export, Import, Foreign Direct Investment, & Exchange Rate. Both of them have 6 variables which are significant among Upper Income Counties, & Lower Income Countries.

The Globalization Index variable tells us that in Lower Income Countries plays a positive role in the rise of GDP of the Lower income countries, however in Upper Income Countries the globalization index for UIC has a negative role as more globalization is done GDP falls for Upper Income Countries. So, we can say that Globalization in developing countries which are mostly LIC lead to a high GDP growth in these Countries and for UIC which are mostly developed countries lead to a reduction in GDP as Globalization Increases, it can be due to the reason that these countries are indulged in Outsourcing their production and services which lead to negative economic growth.

Additionally, the time dummy Variable, shows that the Lower Income Countries from year 2004-2021 almost all the years, having a significant impact on the time dummy variable of Lower Income Countries with the GDP, and as heteroscedasticity is present in LIC model of Fixed effects so we use Modified Test and FE Robust in the results.

Furthermore, The Upper Income Countries uses Random Effects Model as the in Hausman P value was greater than 0.05, so we used Random Effects Regression Model for it as no difference in coefficients. so, we had only Robust and RE in this with, no time dummy variable. Breusch and Pagan Lagrangian Multiplier Test is also insignificant, and Autocorrelation is present in the Both UIC, & LIC Regression Models, as P value is less than 0.05.”

## **3.4: Relevance and Contribution**

Globalization has become a term which is known to all people in the world, in the same way so does its importance is also well known globally. Countries fight each other for more control in markets using their competitive advantageous products to increase their global foot print on the world. Like Pakistan sports goods are considered best worldwide such as footballs for Qatar World cup 2022 are from Pakistan. The interdependence of countries has become very important and common too. To shed light on the importance we see that globalization is one of the major dependent factors for economic growths of countries. It helps to reduce the cost of commodities, provide better opportunities to people for jobs, and help them access new cultures too. However, the important question is do developing countries have the same impact of globalization on their economic growth, like the developed countries have seen. Many developing countries which have a huge export base still are poor. And does these cost advantages from globalization always help in improvement of GDP of countries or else, they can have a negative impact too.

Viewing the current environment and changes in countries GDPs, Our Panel data will help us see whether globalization of different type helps countries to grow in the current ecosystem of the global village. Also look at how among the developing countries, GDP per Capita Changed across years as they did more or less globalization, also looking at how inflation rates rose throughout the years in these countries. Furthermore, looking at other indicators that affect economic growth in the study which are the Gross Fixed Capital Formation, Government Spending, Human Development Index, Exports, Imports, Foreign Direct Investment, Population Growth, and Exchange Rate. We will also see how these might affect economic growth adversely in developing countries, knowing that they have more impact on some countries than other countries. The time dimension we used will also help us look at how each variable changed from time to time, how they led to giving countries more Income Annually (GDP). This comparison among years will help give a better advantage to future authors for their study, with given variables. More studies might be needed to look at variables that are in our error term to see for different time lengths.

**Appendix**

**Table 7: Random Effects Overall, UIC, LIC Regression**

|  |  |  |  |
| --- | --- | --- | --- |
|  | (1) | (2) | (3) |
| VARIABLES | GDP(Overall) | GDP(UIC) | GDP(LIC) |
|  |  |  |  |
| Inflation | -1.036e+09 | -2.453e+10 | -2.623e+08\*\* |
|  | (1.564e+09) | (7.227e+10) | (1.236e+08) |
| GFCF | -0.00221\* | -0.00966 | 0.000616\* |
|  | (0.00128) | (0.00617) | (0.000350) |
| Government Spending | 0.00983\*\* | 0.0327 | -0.000674 |
|  | (0.00460) | (0.0217) | (0.000583) |
| Life Expectancy | 5.934e+10\*\*\* | 2.247e+11 | 1.046e+10\*\*\* |
|  | (1.728e+10) | (1.553e+11) | (1.803e+09) |
| Secondary Education | 2.669e+10 | 1.470e+12\*\*\* | 4.704e+10\*\*\* |
|  | (1.087e+11) | (4.049e+11) | (1.332e+10) |
| Primary Education | 1.967e+11 | 1.102e+12\* | 9.741e+09 |
|  | (1.283e+11) | (5.763e+11) | (1.860e+10) |
| Exports | -0.00125 | -0.00286 | 3.36e-05 |
|  | (0.00145) | (0.00721) | (0.000156) |
| Imports | 0.000957 | 0.00613 | -6.77e-05 |
|  | (0.00150) | (0.00662) | (0.000184) |
| FDI | -8.498\*\*\* | -36.35\*\*\* | -0.266 |
|  | (1.922) | (7.362) | (0.230) |
| Population Growth | -3.060e+10 | -3.479e+12\*\*\* | -6.524e+09\*\* |
|  | (3.324e+10) | (9.101e+11) | (2.670e+09) |
| Exchange Rate | 59.95 | -6.908e+08\*\* | 9.346 |
|  | (158.6) | (2.693e+08) | (12.39) |
| Globalization | 2.341e+10\*\* | -3.744e+11\*\*\* | 4.233e+09\*\*\* |
|  | (9.226e+09) | (1.014e+11) | (1.050e+09) |
| Age Dependency | 2.644e+09 | -2.999e+10 | -1.701e+09\*\* |
|  | (6.630e+09) | (4.009e+10) | (8.186e+08) |
| “Constant | -6.097e+12\*\*\* | 1.609e+12 | -1.012e+12\*\*\* |
|  | (1.674e+12) | (8.490e+12) | (1.973e+11) |
|  |  |  |  |
| Observations | 1,000 | 160 | 840 |
| Number of Countries | 50 | 8 | 42 |

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1”

**Table 8: Upper Income Countries FE Regression**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) |  |  |
| VARIABLES | GDP(FE) | GDP(i.Time) | GDP(Robust) |  |  |
|  |  |  |  |  |  |
| Inflation | 4.246e+10 | 3.588e+10 | 4.246e+10 |  |  |
|  | (4.648e+10) | (4.776e+10) | (3.254e+10) |  |  |
| GFCF | 0.000176 | 0.000951 | 0.000176 |  |  |
|  | (0.00547) | (0.00577) | (0.00248) |  |  |
| Government Spending | 0.00295 | -0.00298 | 0.00295 |  |  |
|  | (0.0195) | (0.0206) | (0.00684) |  |  |
| Life Expectancy | 1.109e+12\*\*\* | 1.027e+12\*\*\* | 1.109e+12 |  |  |
|  | (1.641e+11) | (2.113e+11) | (5.984e+11) |  |  |
| Secondary Education | -1.858e+12\*\*\* | -2.502e+12\*\*\* | -1.858e+12 |  |  |
|  | (5.362e+11) | (5.521e+11) | (1.195e+12) |  |  |
| Primary Education | 2.190e+11 | 4.374e+11 | 2.190e+11 |  |  |
|  | (6.344e+11) | (6.355e+11) | (8.251e+11) |  |  |
| Exports | 0.000984 | -0.000502 | 0.000984 |  |  |
|  | (0.00487) | (0.00509) | (0.00129) |  |  |
| Imports | -0.00324 | -0.000651 | -0.00324 |  |  |
|  | (0.00438) | (0.00456) | (0.00288) |  |  |
| FDI | -7.838 | -10.61\* | -7.838\*\* |  |  |
|  | (5.407) | (5.686) | (2.877) |  |  |
| Population Growth | 2.308e+11 | 3.053e+12\*\*\* | 2.308e+11 |  |  |
|  | (6.581e+11) | (9.048e+11) | (6.471e+11) |  |  |
| Exchange Rate | -1.273e+08 | -1.186e+08 | -1.273e+08 |  |  |
|  | (5.917e+08) | (6.205e+08) | (2.052e+08) |  |  |
| Globalization | 1.999e+11\*\* | 1.782e+11 | 1.999e+11 |  |  |
|  | (8.277e+10) | (1.549e+11) | (1.528e+11) |  |  |
| Age Dependency | 3.022e+10 | 1.885e+10 | 3.022e+10 |  |  |
|  | (3.562e+10) | (3.510e+10) | (7.642e+10) |  |  |
| “2003.Time |  | -8.756e+10 |  |  |  |
|  |  | (9.762e+11) |  |  |  |
| 2004.Time |  | -8.603e+10 |  |  |  |
|  |  | (1.037e+12) |  |  |  |
| 2005.Time |  | -4.063e+11 |  |  |  |
|  |  | (1.138e+12) |  |  |  |
| 2006.Time |  | -4.501e+11 |  |  |  |
|  |  | (1.236e+12) |  |  |  |
| 2007.Time |  | -6.495e+11 |  |  |  |
|  |  | (1.393e+12) |  |  |  |
| 2008.Time |  | -5.119e+11 |  |  |  |
|  |  | (1.444e+12) |  |  |  |
| 2009.Time |  | -2.211e+11 |  |  |  |
|  |  | (1.527e+12) |  |  |  |
| 2010.Time |  | -9.864e+10 |  |  |  |
|  |  | (1.630e+12) |  |  |  |
| 2011.Time |  | 9.893e+10 |  |  |  |
|  |  | (1.697e+12) |  |  |  |
| 2012.Time |  | -2.583e+10 |  |  |  |
|  |  | (1.779e+12) |  |  |  |
| 2013.Time |  | -1.313e+11 |  |  |  |
|  |  | (1.807e+12) |  |  |  |
| 2014.Time |  | -2.041e+11 |  |  |  |
|  |  | (1.942e+12) |  |  |  |
| 2015.Time |  | 4.582e+11 |  |  |  |
|  |  | (2.013e+12) |  |  |  |
| 2016.Time |  | 7.693e+11 |  |  |  |
|  |  | (2.057e+12) |  |  |  |
| 2017.Time |  | 1.068e+12 |  |  |  |
|  |  | (2.145e+12) |  |  |  |
| 2018.Time |  | 1.397e+12 |  |  |  |
|  |  | (2.212e+12) |  |  |  |
| 2019.Time |  | 2.246e+12 |  |  |  |
|  |  | (2.290e+12) |  |  |  |
| 2020.Time |  | 3.506e+12\* |  |  |  |
|  |  | (2.089e+12) |  |  |  |
| 2021.Time |  | 3.903e+12\* |  |  |  |
|  |  | (2.207e+12) |  |  |  |
| Constant | -8.327e+13\*\*\* | -7.484e+13\*\*\* | -8.327e+13 |  |  |
|  | (1.013e+13) | (2.038e+13) | (4.685e+13) |  |  |
|  |  |  |  |  |  |
| Observations | 160 | 160 | 160 |  |  |
| R-squared | 0.490 | 0.580 | 0.490 |  |  |
| Number of Countries” | 8 | 8 | 8 |  |  |

“Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1”

**Figure 8a: Time Interval for Upper Income Countries**

|  |
| --- |
| “(1) 2003.Time = 0 |
| (2) 2004.Time = 0 |
| (3) 2005.Time = 0 |
| (4) 2006.Time = 0 |
| (5) 2007.Time = 0 |
| (6) 2008.Time = 0 |
| (7) 2009.Time = 0 |
| (8) 2010.Time = 0 |
| (9) 2011.Time = 0 |
| (10) 2012.Time = 0 |
| (11) 2013.Time = 0 |
| (12) 2014.Time = 0 |
| (13) 2015.Time = 0 |
| (14) 2016.Time = 0 |
| (15) 2017.Time = 0 |
| (16) 2018.Time = 0 |
| (17) 2019.Time = 0 |
| (18) 2020.Time = 0 |
| (19) 2021.Time = 0 |
| F (19,120) = 1.36 |
| Prob > F = 0.1629” |

**“Figure 8b: “Modified Wald test for groupwise heteroskedasticity for Upper Income Countries”**

|  |
| --- |
| **“Modified Wald test for groupwise heteroskedasticity** |
| **in fixed effect regression model** |
| Chi2 (8) = 680.51 |
| Prob>chi2 = 0.0000” |

**“Figure 8c: Pearson Test for Upper Income Countries**

|  |
| --- |
| Pesaran's test of cross-sectional independence = -1.282, Pr = 0.1999 |
| Average absolute value of the off-diagonal elements = 0.393” |