



## IS COVID-19 PANDEMIC THE RESULTS OF OPENNESS? AN ECONOMETRIC STUDY

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**Abstract:** Now the world dynamics have been analysed into two aspects, pre covid- 19 era and the post covid-19 era. The scientists, economists, environmentalists, politicians etc all are mainly focusing only on this issue. Under these circumstances an attempt in this paper has been taken to investigate the possibilities of association between Covid-19 which is popularly known as Covid-19 Pandemic with globalization or openness of the global economy. Or whether the level of economic development is related somehow with this pandemic? Ordinal Logistic regression model is used in this study and the data are taken from WHO, World Development Report, World Development Indicators etc. This study shows that degree of openness is positively affects the log of Odds of cumulative probability of covid-19 infections.

**Key Words:** Covid- 19 , Ordinal Logistic regression, Degree of Openness, Level of Development, consciousness

### INTRODUCTION

Only one thing that stops the rat race of the human civilization globally is the Corona virus disease (COVID-19). This is a super infectious disease caused by a newly discovered corona virus. Starting from Wuhan province of China in last December and reaches almost all the areas of the world. People believe it is intentionally created a modern version of cold war through the spread of virus by one of the rich nations in the world , just to establish its supremacy all over the universe. But it is believe without having any solid proof. The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes, experience mild to moderate respiratory illness and it affects all people irrespective of income, colour, and power. Older people and those

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with underlying some common medical problems (age related) are more likely to attack . At present there have been 6,912,751 confirmed cases of COVID-19, including 400,469 deaths all over the world (WHO). Initially it was observed that the most affected nations are developed nations with respect to number of cumulative infections, cumulative deaths etc. Therefore it was expected that does it affect only the highly developed nations compared to nations with low or medium development. But as time passes on it is seen that except USA other developed nations to some extent have controlled the number of new cases and new deaths or at least likely to reduce this upward trend. But the developing nations like India, Brazil, etc are accelerating the pace of tempo in terms of new cases and deaths. Therefore from an economic point of view it is pertinent to enquire the association of this pandemic with respect to level of development, degree of openness, government expenditure on health, education level of the nation etc.

### **HYPOTHESIS OF THE STUDY**

1. Covid19 infections and the level of development are related
2. Covid 19 infections and degree of openness are related
3. Covid19 infections and consciousness reflected by at least some amount of secondary education of the people are related

### **DATA SOURCES AND VARIABLES OF THE STUDY**

Data related to level of development are taken from World Development Report published by UNDP. On the basis of HDI value countries are classified as low, medium, high and very high level of development. Similarly, consciousness of the people is measured through % of people with some secondary education, up to 25% is taken as very low, 25 to 50% is taken low, 25 to 75 % is taken as medium and more than 75% is taken as high. Openness is measured through merchandise trade as % of GDP(data taken from world development indicators) classification are done in the same way as education, and covid19 infections data are taken WHO's website. All the variables are classified interms of ordinal variable scale, though some of the classifications are done heuristically that is without following any literature review or scientific manner, just by introspection of the range or variability of data after converting in terms of percentage.

### **METHODOLOGY OF THE STUDY**

In this study Ordered Logistic Regression model has been applied. Since all the variables and specially the dependent variable is converted in to

ordered nominal scale hence we can apply this technique that is Ordinal Logistic Regression: covid infections versus level of development, education, degree of openness etc. covid infections are converted in terms of percentage of total for each nations given in the data set of WHO. Now on the basis of the percentage it is classified into three parts low level, medium and high level of infections. From 0 to 1 % of total is taken as low level, from more than 1 to 3% is taken as medium and more than 3% is taken as high level.

## EMPIRICAL FINDINGS

Ordinal Logistic Regression: infections versus HDI, education and openness

**Table 1**  
**Link Function: Logit, Response Information**

<i>Variable (infections)</i>	<i>Value</i>	<i>Count</i>	<i>%</i>
Low (0 to1% of total)	1	133	86.93
Medium(more than1 to 3% of total)	2	12	7.84
High (More than 3% of total)	3	8	5.23
	Total	153	100%

Response information shown in the above table is the number of observations that fall into each of the response categories ,hence total observations are 153 in which low infection level are 86.93% (% of total infection is up to 1 percent), 7.84% nations are medium range level and finally 5.23% covid 19 infected nations are at high level.

Logistic regression table (2) shows the estimated coefficients, standard errors of the coefficients, Z values and P values and a 95% confidence interval for the odds ratio. The values labeled Const.(1) and Const.(2) are estimated intercepts for the logit of the cumulative probabilities of low and medium label infections respectively. Since the reference category is high, there is no need to estimate an intercept for this category.

The estimated coefficient when the predictor is human development reflected by human development index is negative that is -0.411664. This implies the estimated change in the logit of the cumulative probability of infections (both low and medium) decreases by 0.4117 with respect to reference category when the level of human development increases, keeping other predictors fixed. Since the odds ratio is 0.66 it implies as a nation moves towards development through an increase of HDI value its level of covid 19 infections declines by 0.66 times in comparison to high infections nations. Though there is no sufficient evidence for statistical significance of this relation since the P value is greater than 0.05.

**Table 2**  
**Logistic Regression Table**

<i>Predictor</i>	<i>Coef</i>	<i>SE Coef</i>	<i>Z</i>	<i>P</i>	<i>Odds Ratio</i>	<i>95% CI</i>	
						<i>Lower</i>	<i>Upper</i>
Const(1)	1.93319	1.11477	1.73	0.083			
Const(2)	2.97408	1.14650	2.59	0.009			
HDI	-0.411664	0.377687	-1.09	0.276	0.66	0.32	1.39
Education	-0.166642	0.400789	-0.42	0.678	0.85	0.39	1.86
*Openness	0.613998	0.294323	2.09	<b>0.037</b>	1.85	1.04	3.29

Similar explanation is applicable for the education variable also. Education (% of population with at least some secondary education) variable is taken just to act as a proxy of the consciousness of the people. It is expected that as the people becomes educated they should have minimum responsibility to take care for herself or himself or their families or communities regarding some pre- cautionary measures (say use of mask, wash hands through sanitizer maintaining social distancing etc.). The estimated coefficient of education is negative; it shows the estimated change in the logit of the cumulative probability of infections (both low and medium) declines by 0.166 as people's consciousness increases, keeping other predictor fix, in comparison to nations with high level of infections. The odds ratio is 0.85 reflects that level of infections declines by 0.85 times for the nations with low and medium level of covid 19 infections compared to reference category with the increases of education or consciousness of the people. Here again the p value is not statistically significant.

Finally the openness variable. Here the estimated coefficient is positive and the value is 0.613998. This implies the estimated change in the logit of the cumulative probability of infections (both low and medium) increases by 0.613998 times with the increases of the degree of openness compared to reference category, keeping other predictors fixed. The odds ratio is 1.85, it means as the degree of openness increases the level of infections increases by 1.85 times for the nations with low and medium level of infections in comparison to reference category. Since the p value for the estimated coefficient of openness is significant hence this relation is statistically significant.

Log-Likelihood = -68.980

**Table 3**  
**Test of All Slopes Equal to Zero**

<i>DF</i>	<i>G</i>	<i>P-Value</i>
3	7.613	0.055

The results of Table 3 shows the log likelihood from the maximum likelihood iterations along with the statistic G this statistic tests the null hypothesis that all the coefficient s associated with the predictors equal to zero or not. In our results  $G= 7.6$  with p value is significant indicating that there is a sufficient evidence to conclude that at least one of the estimated coefficients is different from zero.

**Table 4**  
**Goodness-of-Fit Tests**

<i>Method</i>	<i>Chi-Square</i>	<i>DF</i>	<i>P</i>
Pearson	99.1404	69	0.010
Deviance	65.0418	69	0.613

The results of goodness of fit tests (Table 4) through Deviance measure of Chi- square statistic is 65.0418 with p value 0.613 which reflects that that there is insufficient evidence to claim that the model does not fit the data adequately, however the Pearson measure reflects that there is insufficient evidence to claim that the model fit the data adequately. Hence the results regarding goodness- of- fit is mixed.

**Table 5**  
**Measures of Association :( Between the Response Variable and Predicted Probabilities)**

<i>Pairs</i>	<i>Number</i>	<i>Percent</i>	<i>Summary Measures</i>	
Concordant	1800	65.3	Somers' D	0.35
Discordant	835	30.3	Goodman-Kruskal Gamma	0.37
Ties	121	4.4	Kendall's Tau-a	0.08
Total	2756	100.0		

Measures of association between the Response Variable and Predicted Probabilities (Table 5) shows that 65.3% are concordant pairs and 30.3% are discordant pairs and ties are 4.4%. Similarly Somers' D is 0.35 , Goodman-Kruskal Gamma measure are 0.37 . These results reflect the predictive ability of the model is satisfactory but the Kendall's Tau-a measure does not reflect a better predictive ability of the model.

## **SUMMARY AND CONCLUSION**

One event that shattered that rhythm of human civilization is the covid-19 pandemic. Reported in December last by Chinese govt. which was first seen in Wuhan province of China and spreaded all most all nations of the world. It is assumed that free movement of labour, capital, and tourists are

primary responsible reason for this spread. Moreover global warming, el-nino, melting of ice and resulting misbalance in the ecosystem may be another reason for the spread of this highly contagious virus. Now covid crises surpass the world war, great depression etc. in terms of income, employment, standard of living and apprehension among people all over the world. In spite of high level of literacy, sound health care infrastructure it stuck the developed nations heavily initially but now the developing world (like India, Brazil) are also running neck to neck. The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes, experience mild to moderate respiratory illness and it affects all people irrespective of income, color, and power. Older people and those with underlying some common medical problems (age related) are more likely to attack. The scientists, economists, environmentalists, politicians etc all are mainly focusing only on this issue. Under these circumstances an attempt in this paper has been taken to investigate the possibilities of association between Covid-19 with globalization or openness of the global economy. Ordinal Logistic regression model is used in this study and the data are taken from WHO, World Development Report, World Development Indicators etc. This study shows that *degree of openness is positively* affects the log of Odds of cumulative probability of covid-19 infections. But the other variables that is level of development, education etc are not statistically significant with respect to expected number of covid infections.

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