

# Remote Sensing Evidence for Significant Variations in the Global Gross Domestic Product during the COVID-19 Epidemic

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## supplementary materials

To quantitatively analyze the possible factors for GDP variation trend, we selected Ireland representing developed countries and Vietnam delegating developing countries as sample areas. We obtained macroeconomic data from the World Bank for Ireland and Vietnam from 2015 to 2020. Four indicators closely related to GDP were selected as affecting factors including Commodity exports (CE), Adjusted net national income (ANNI), Imports of goods and services (IGS), and Net inflows of foreign direct investment (NIDI), respectively (Table S1 and Table S2). First, we analyzed the correlation between each influencing factor and GDP (Figure S1 and Figure S2). Secondly, we determine the fitting function between these influencing factors and GDP (Equation S1 and Equation S2).

According to the results of quantitative analysis, the influencing factors have a very close correlation with GDP. The driving force of GDP growth in Ireland mainly comes from CE, ANNI and NIDI based on the fitting function. In the discussion section, we have explained that Ireland's export trade and inward investment increased in 2020, which further proves the quantitative relationship between these influencing factors and GDP change. In Vietnam, the driving force of GDP growth mainly comes from ANNI and IGS. In 2020, Vietnam needs to import a large amount of raw materials and recruit many workers. These factors lead to a large increase in ANNI and IGS in Vietnam, which in turn drives the increase of GDP to a large extent.

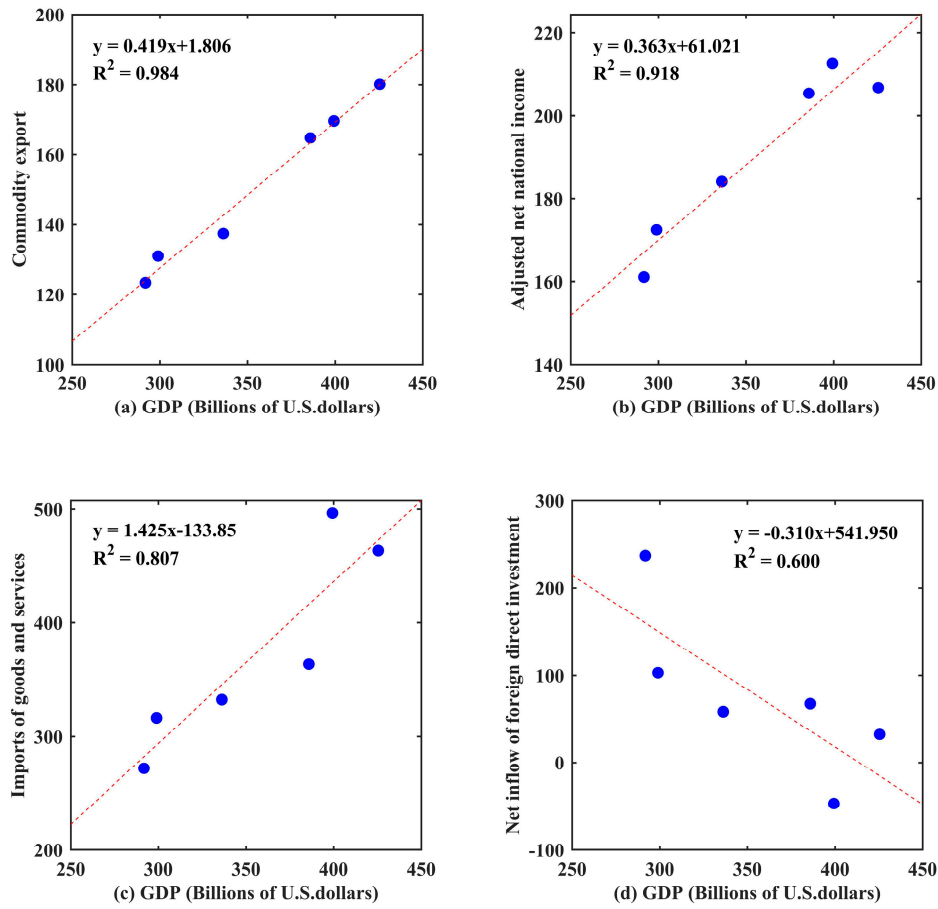


Figure S1. Results of correlation analysis between Ireland's GDP and the influencing factors

Table S1. Statistical results of GDP and various influencing factors in Ireland

Years	GDP(y)	CE (x1)	ANNI (x2)	IGS (x3)	NIDI (x4)
2015	291.81	123.36	161.05	271.70	237.06
2016	299.01	130.86	172.43	316.44	102.92
2017	336.26	137.36	184.00	332.16	58.30
2018	385.91	164.79	205.32	363.61	67.36
2019	399.37	169.63	212.56	496.54	-46.63
2020	425.51	180.10	206.73	463.53	32.45

Note: These statistics are totals in current dollars (Billions of U.S. dollars). Data source: World bank

The fitting formula of Ireland's GDP and each influencing factor is shown as follows:

$$y = -16.0102 + 2.1302x_1 + 0.2754x_2 - 0.0049x_3 + 0.0005x_4 \quad (S1)$$

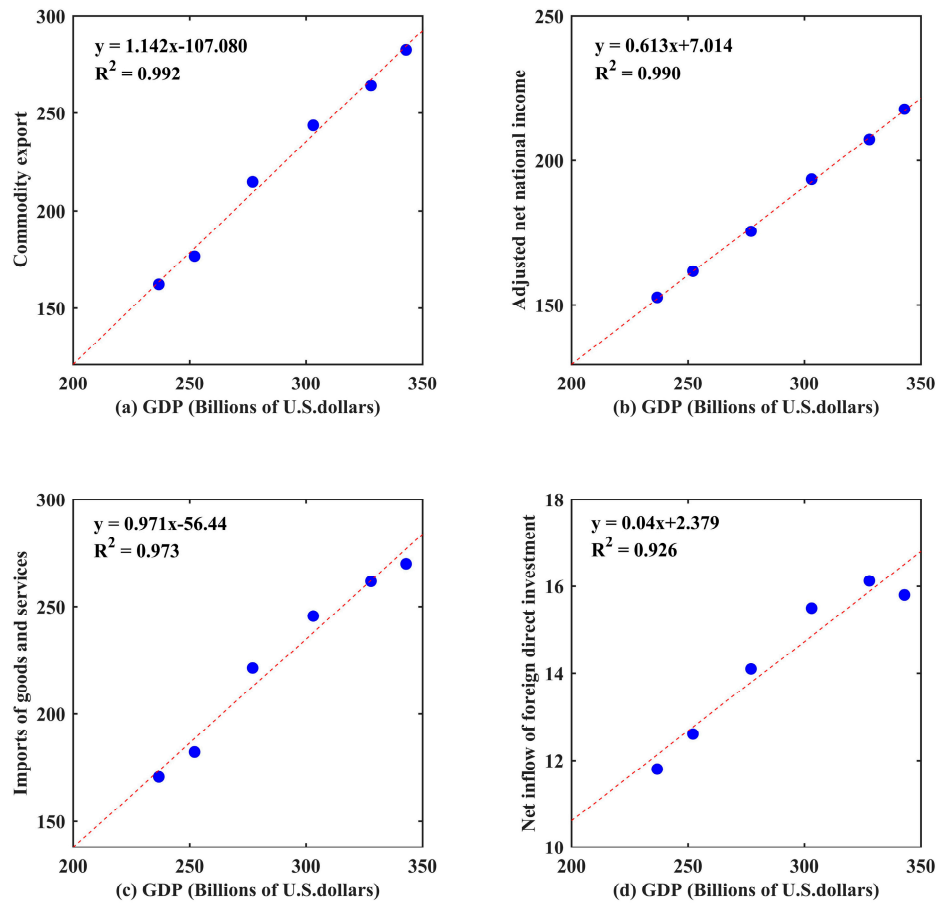


Figure S2. Results of correlation analysis between Vietnam's GDP and the influencing factors

Table S2. Statistical results of Vietnam's GDP and various influencing factors in Vietnam

Years	GDP(y)	CE (x1)	ANNI (x2)	IGS (x3)	NIDI (x4)
2015	236.79	162.07	152.59	170.66	11.80
2016	252.14	176.58	161.57	182.30	12.60
2017	277.07	215.01	175.59	221.37	14.10
2018	303.09	243.70	193.63	245.63	15.50
2019	327.87	264.27	207.24	261.68	16.12
2020	342.94	282.63	217.64	269.81	15.80

Note: These statistics are totals in current dollars (Billions of U.S. dollars). Data source: World bank

The fitting formula of Vietnam's GDP and each influencing factor is presented as follows:

$$y = -23.7524 - 0.4930x_1 + 1.8452x_2 + 0.5927x_3 - 3.5018x_4 \quad (S2)$$