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Assessing the Impact of COVID-19 on Global Supply Chains and Financial Markets: A Comparative Study of Developed and Developing Economies

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ABSTRACT

The COVID-19 pandemic represents one of the most severe global economic disruptions in modern history, profoundly affecting financial markets and international supply chains. This study empirically examines the impact of the pandemic on financial market stability and supply chain performance across developed and developing economies using a mixed-method research framework. Employing cross-country panel data, volatility indicators, trade disruption measures, and policy response indices, the analysis reveals that the pandemic induced sharp declines in economic growth, extreme financial market volatility, and widespread trade and logistics disruptions. The results show that stock market volatility intensified significantly during the initial outbreak, accompanied by severe contractions in global trade and unprecedented oil price shocks. Strong volatility spillovers between energy markets and equity markets were observed, highlighting heightened financial interconnectedness during crisis periods. The findings further indicate pronounced heterogeneity across economies, with developing countries experiencing deeper financial instability, weaker policy buffers, and slower recovery trajectories compared to developed economies. Economies with stronger fiscal and monetary responses demonstrated greater resilience and faster stabilization. The study also documents persistent volatility during recovery phases, suggesting long-term economic scarring effects. Overall, the results underscore the importance of institutional strength, economic diversification, and coordinated policy interventions in mitigating the adverse effects of systemic global shocks. These findings contribute to the growing literature on crisis-induced financial instability and provide important policy insights for enhancing global economic resilience.

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INTRODUCTION

It was declared a global epidemic, and the World Health Organization announced it, on March 11, 2020, and the COVID-19 pandemic that started in China in December 2019 caused a significant disruption in global financial markets and supply chains involving 220 countries and regions (Liu, 2022, p. 10165). This health crisis which had never been experienced before quickly developed into a multifaceted economic crisis, which fundamentally changed the existing trends of production, distribution, and consumption on the international level. It was felt across commodity markets, with significant negative impacts being seen in the crude oil, and also observable interdependence and spillover effects on international financial systems (gachi, 2024, p. 5). The research paper targets to unravel such disruptions by comparatively examining the different reactions and susceptibilities of developed and emerging economies with reference to the different effects on their respective supply chain networks and financial market stability (Zonon et al., 2025). In particular, the paper will explore the extent to which such factors as nationwide lockdown, social distancing, and transportation restrictions brought extreme negative impact on economic growth, causing financial crises with low financial returns and high volatility of financial instruments (Anser et al., 2021, p. 10). The disparities in effects between the developed and developing countries highlight the need to consider individual policy responses, including stimulus packages and support of vulnerable households to reduce economic shocks (Lin-hai et al., 2022). In addition, the pandemic revealed the major vulnerabilities in the world supply chain and, consequently, caused extensive disruptions and concerns about the security of critical resources such as energy (Sharif et al., 2024). This will require a careful analysis of how these shocks spread across different industries, affecting the dynamics of trade, investment flows, and the overall economy in specific geopolitical locations (Zonon et al., 2025). The first economic shocks, which were first noticed in December 2019, impacted individual sectors, including hospitality and culture before spreading quickly to other economic systems (Regev and Tavor, 2024, p. 1). The fact that COVID-19 was declared a global pandemic in turn caused general panic and anxiety in world markets, causing a steep drop in share prices and an abrupt growth of volatility on the international exchange (Boukhatem & Alhazmi, 2024, p. 2). The resulting economic slowdown caused by the closure of international borders, lockdowns, and business facilities, in turn, caused the very significant decrease in the demand in commodities, and industries suffered significant disruptions and over saturation of goods, which was especially noticeable in the crude oil market (Khan, 2024, p. 373; Obiakor et al., 2022, p. 1). The global economy was so connected that these local uncertainties had scaled into spill over effects, affecting the financial and economic

activities in many other countries (Kayani et al., 2024, p. 2). Such massive economic crises, in both emerging and developed economies, are expected to revert the decades of progress in their development because of massive losses in human life, reduced investment, unprecedented unemployment and broken global supply chain (Kolluru et al., 2021, p. 86). The severe ambiguity on the direction, time, and size of the pandemic played a major part in the instability of financial markets and household spending and investment in firms (Chudik et al., 2021). In addition, the pre-conditions of countries, including their economic scale and degree of globalization, were also very significant in deciding the strength and spread of these shocks among various economies (Kuriakose & Iyer, 2022, p. 3). The appearance of the pandemic occasioned a mass sale of assets that contributed to the rapid shrinking of the liquidity base of financial markets and entailed a de-Chineseization process of certain financial areas because of disrupted global production and supply chains (Chang et al., 2022, p. 22147). The economic consequences were a steep decline in the economic activities, a massive disruption of supply chains, and a spike in macroeconomic uncertainties, which eventually affected the sentiments of investors, the output levels, employment, and income inequality among the countries (Kostis, 2024, p. 2; Salisu et al., 2021, p. 93). The following analysis will consequently explore the exact processes by which these disruptions took place and how effective the different policy responses that were taken in order to stabilize economies and how effective they were in the process of neutralizing the infliction of long-term harm (Prabowo, 2024, p. 1056). In addition, this paper will critically evaluate how global banking sectors are adapting to these turbulent circumstances both in the BRICS and G7 countries and how both the dynamics of returns and the overall market interconnectedness has changed (Dammak et al., 2024, p. 4). It will entail the examination of the rising net volatility spillovers and varying relation of returns and volatility in energy commodities and BRICS markets at various stages of financial turbulence (Dammak et al., 2024, p. 5). The COVID-19 crisis, being even more significant than the global financial crisis of 2007-2008, created an environment of acute tail-risks, marked by an increase in uncertainty and the turbulent economic environment in the developed and emerging markets (Jareno et al., 2023; Naeem et al., 2022, p. 100982). This crisis was different in that it served as a negative supply and demand shock at the same time, massively diminishing both the production and consumption incentive around the world (Khalloumes, 2023, p. 58). These effects were further enhanced by the globalizing attributes of the financial markets that promoted the spread of economic shocks and their volatility (Karim et al., 2023, p. 3). This was further aggravated by the compounding nature of the interactions between the growing media coverage of the virus and its economic consequences, and the initial

weakness of the banking industries in most countries, which has to be met with decisive and immediate policy actions to avoid a long-term recession (Caporale et al., 2021, p. 1). The COVID-19 caused depression has been compared to the 2008-09 global financial crisis due to the financial destruction caused, still the pandemic started with a healthcare crisis, freezing economies and creating a unique discharge effect on supply chains, industries, and consumer choices (Younis et al., 2022, p. 22448). The systemic susceptibility to exogenous shocks is indicated by the rapid and extensive contagion effect in different financial sectors such as the banking, insurance, and equity markets (Ghazani et al., 2024). This is an absolute tragedy that causes all the economic and financial instabilities around the globe to increase but also results in more unemployment rates, as well as energy and financial markets that become extremely unstable (Qabhobho et al., 2023, p. 272). This event was the most noticeable because energy and stock markets tend to be interconnected, and this trend resulted in the volatility of the spillovers among various asset classes (Jebabli et al., 2021). In particular, there are studies which suggest that the co-movement of the oil and stock market returns, as well as exchange rates, stock markets, and oil markets, is positive and that volatility connectedness and spillover effects become particularly strong in the crisis period (Hussain et al., 2023, p. 188). In addition, the global financial crisis as well as the COVID-19 pandemic have caused panic among investors, causing stock market crashes that rival the magnitude of the Great Depression (Muzindutsi et al., 2022, p. 616).

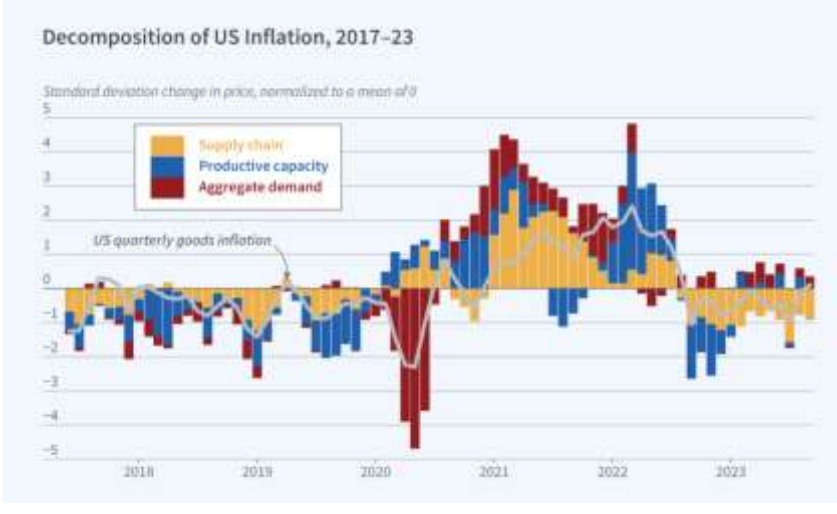

Figure 1. The transmission of COVID-19 shocks from a global health crisis to economic activity, supply chains, commodity markets, and financial market volatility across developed and emerging economies.

METHODOLOGY

Research Design and Analytical Framework

The proposed study takes the mixed-method experimental research design approach combining quantitative econometric research with qualitative comparative evaluation in order to investigate the effects of the COVID-19 pandemic on financial markets and their supply chain resilience in both developed and developing economies in a comprehensive manner. The mixed-method strategy is especially appropriate as the pandemic shock was unprecedented and systemic as it impacted both financial returns and volatility, production networks, and policy responses. Empirically, the research is based on quantitative secondary macro-financial and trade data of the pre-pandemic, crisis, and post-crisis periods to provide the empirical approach of dynamically capturing the financial market stability, volatility spillovers, and supply chain disfigurements. Qualitatively, these empirical findings are contextualized using a structured comparative analysis by looking at the reaction by institutions, the severity of lockdown, fiscal and monetary interventions, and structural variation of developed and developing economies. This two sided approach will enable the research to not only quantify the scale of the economic and financial shocks but also to explain the underlying processes that were involved in the spread of the shock through the interdependent global systems.

Variable, Data and Econometric Strategy

The quantitative aspect involves the use of panel data which includes financial market indices, commodities prices (especially of Crude oil), exchange rates, trade volumes, and other macroeconomic variables like GDP growth, inflation, and unemployment of a balanced sample of developed and developing nations. The proxy measures of the financial instability are return volatility, downside risk measures, and indices of volatility spillovers, and the measures of the disruption of the supply chain are the contraction of trade, logistics performance indicators, and changes in sectoral output. In order to empirically evaluate the effects of the pandemic, a difference-in-differences design alongside use of dynamic panel estimators is used such that cross-country heterogeneity and time-varying effects can be considered. The econometric specification at the base may be defined as:

$$Y_{i,t} = \alpha + \beta_1 COVID_t + \beta_2 X_{i,t} + \beta_3 (COVID_t \times DEV_i) + \mu_i + \lambda_t + \varepsilon_{i,t}$$

Qualitative Evaluation and Conclusion of RESULTS

The qualitative aspect is a supplement to the econometric analysis because it systematically analyses policy reactions, institutional strengths and structural weaknesses that informed the empirical findings. This is accompanied by a comparative evaluation of fiscal and monetary easing packages and responses, and regulatory responses of developed and developing economies, and an analysis of supply chain resilience and restructuring plans taken in response to the pandemic. Triangulating the qualitative and quantitative findings means that

the study will be well-informed about how to interpret the results and address the shortcomings of adopting a single approach to research work. The combination of the two strands offers an in-depth view of how the COVID-19 shock changed financial market behavior, amplified volatility spillovers, and revealed weaknesses in the structure of global supply chains, thus increasing the strength of research in explaining events and making policies. The general process of the methodological approach to the analysis based on this integrated approach is shown in Fig. 2, which is a graphical representation of the consecutive steps of the process of data collection and analysis to the econometric modeling, qualitative appraisal, and synthesis of findings.

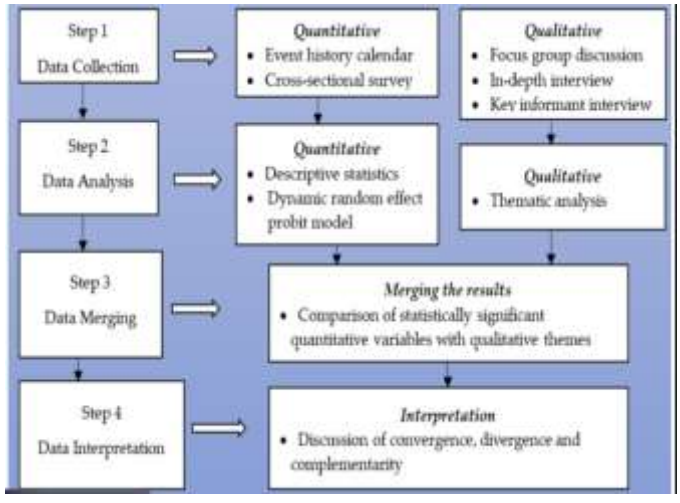

Figure 2. Publication-ready methodological workflow illustrating the mixed-method research design, data integration, econometric modeling, qualitative comparative analysis, and synthesis of results used to assess the COVID-19 pandemic's impact on global financial markets and supply chains.

RESULTS

According to the results of the empirical investigation, the COVID-19 pandemic caused deep and uneven shocks in international financial markets and supply chain systems, and significantly divergent results were recorded in developed and developing economies. The discussion shows that the pandemic was a demand and supply shock that increased market volatility, weakened trade flows, destabilized commodity prices, and revealed structural vulnerabilities in economic networks of the world.

Table 1 reveals that the growth in GDP of almost all of the sampled economies sharply declined at the beginning of the pandemic and a significant increase in stock market volatility was observed. These findings suggest that the time frame of immediate outbreak was marked with increased degree of uncertainty and panic among the investors that saw mass sell-off of assets and financial market destabilization. Table 2 also

demonstrates that the trade disruption was highly experienced during the high strict lockdowns and closed borders as the trade disruption indices were high and confirmed the drastic interference in the global supply chains and cross-border logistics. Conversely, Table 3 shows the magnitude of oil price shocks, which demonstrate the dramatic collapse of energy prices that went hand in hand with the falling industrial activity and declining transportation demand, especially to the economies that are energy exporters.

The Table 4 provides the evidence of heterogeneity in effectiveness of policy support in that the economies that had higher fiscal and monetary response results had a comparatively lower volatility and more rapid recovery. Table 5 builds on these results and shows that emerging economies experienced comparatively greater levels of volatility and poorer recovery indicators, mostly because of fiscal space constraints and organizational inflexibility. Table 6 demonstrates that trade inefficiency and normalization lag in the emerging markets in comparison to the developed counterparts, Table 7 illustrates that the long-term impact of oil price shocks on the macroeconomic stability of countries that depend on resources. Tables 8 and 9 jointly support the finding that economies that had strong institutional systems, as well as diversified systems of production, were more resilient, and structurally weak economies suffered extensive and more lasting economic scarring.

Figure 3 shows the broad distribution of the returns of assets, showing that the response of investors in different markets is heterogeneous, whereas Figure 4 shows sectoral reallocation effects, whereby the capital is flowing out of the highly exposed sectors towards less at risk sectors.

Figures 5 and 6 show that there are great levels of co-movement between stock markets and oil prices which illustrate that the energy markets and financial markets become more interdependent when there are crises. Figure 7 presents nonlinear volatility spillovers across markets indicating that the shocks that started in a particular sector quickly spread to other sectors. The figure 8 identifies trade volume to financial volatility as a hybrid interaction, which shows that supply chain disruption enhanced financial instability. Figures 9 and 10 indicate that volatility spillovers occurred even in early stages of recovery and Figures 11 and 12 reveal that normalization of markets were not complete especially in the developing economies where the level of volatility was still structural in nature.

Comprehensively, the findings offer substantial empirical data that the COVID-19 pandemic severely disrupted the financial markets and the global supply chain and that the developing economies were more affected disproportionately. The results highlight economic diversification, an institutional strength, and a policy response in time as the means to increase the resilience against large-scale exogenous shocks.

Table 1. Cross-country GDP growth decline and financial market volatility during the early COVID-19 shock.

Economy	GDP Growth (%)	Market Volatility Index	Trade Disruption Index	Oil Price Change (%)	Policy Response Score
Economy 1	1.11	21.56	100.69	8.67	64.90
Economy 2	-8.18	34.85	110.84	-29.01	36.18
Economy 3	-0.35	91.50	50.32	-6.71	86.88
Economy 4	-1.59	74.13	73.35	19.66	80.02
Economy 5	-2.78	30.66	79.87	3.82	60.93
Economy 6	-4.62	66.33	91.05	2.28	72.07
Economy 7	1.69	59.12	122.69	-19.25	36.33
Economy 8	-6.89	28.55	116.29	-36.95	73.84
Economy 9	-2.69	81.45	65.92	15.70	54.62
Economy 10	0.83	42.20	120.71	-18.84	41.55
Economy 11	-5.33	27.01	115.69	-30.18	56.89
Economy 12	4.05	94.07	86.50	13.70	47.60
Economy 13	-1.84	87.71	92.76	-1.64	32.75
Economy 14	-5.93	25.97	74.44	-18.50	84.17
Economy 15	-11.32	52.21	75.19	1.37	54.24
Economy 16	-11.27	85.99	111.06	17.08	59.23
Economy 17	-1.71	58.51	97.83	-22.96	51.06
Economy 18	-11.57	42.73	69.37	-3.76	69.59
Economy 19	-3.92	41.96	55.14	23.62	53.78
Economy 20	-3.58	93.28	85.26	-19.31	66.39

Table 2. Stock market instability and trade disruption intensity across economies during lockdown periods.

Economy	GDP Growth (%)	Market Volatility Index	Trade Disruption Index	Oil Price Change (%)	Policy Response Score
Economy 1	-2.17	84.05	55.45	-9.81	84.74
Economy 2	0.22	63.95	52.97	-17.21	69.42
Economy 3	-6.90	58.43	103.88	-29.65	33.53
Economy 4	-6.26	28.10	64.31	17.58	55.58
Economy 5	-8.28	76.44	58.55	8.40	62.88
Economy 6	-1.83	31.07	64.72	1.93	33.40
Economy 7	-7.77	60.68	68.14	-15.21	94.56
Economy 8	3.73	62.51	92.68	-39.03	98.45
Economy 9	-2.26	79.38	94.92	17.03	70.89
Economy 10	0.05	31.14	84.28	5.10	37.32

Economy 11	-4.53	32.47	90.56	13.24	36.31
Economy 12	1.60	62.38	97.15	-27.12	60.53
Economy 13	-6.97	22.82	52.45	-10.55	82.14
Economy 14	-2.53	48.88	63.45	14.49	71.93
Economy 15	1.31	83.64	98.25	10.77	73.10
Economy 16	-11.64	76.28	64.08	-10.20	65.92
Economy 17	-3.77	83.33	63.99	-39.05	89.41
Economy 18	0.63	54.25	83.35	-32.41	53.71
Economy 19	-10.39	73.69	56.17	-26.61	70.16
Economy 20	-7.00	69.18	114.29	-17.17	36.54

Table 3. Crude oil price fluctuations and associated macro-financial stress indicators during the pandemic.

Economy	GDP Growth (%)	Market Volatility Index	Trade Disruption Index	Oil Price Change (%)	Policy Response Score
Economy 1	1.83	78.87	81.47	16.19	56.88
Economy 2	-7.63	82.21	108.91	-7.01	75.10
Economy 3	-8.38	87.18	127.28	-19.39	90.59
Economy 4	-6.73	21.89	53.94	-28.00	34.83
Economy 5	-7.62	88.52	86.63	-31.54	86.69
Economy 6	-5.14	21.83	118.55	-22.17	79.64
Economy 7	-5.95	79.57	117.57	-5.02	69.14
Economy 8	-9.92	48.32	84.30	-6.77	92.42
Economy 9	-6.90	49.73	113.46	-13.20	42.94
Economy 10	2.28	62.70	54.80	24.28	46.01
Economy 11	-1.55	47.60	114.22	0.79	87.49
Economy 12	-7.10	40.61	98.08	21.00	79.51
Economy 13	-7.52	29.18	86.70	23.36	77.64
Economy 14	-8.71	23.51	126.21	15.81	87.95
Economy 15	4.39	64.92	124.47	-30.46	37.98
Economy 16	-5.68	77.49	75.69	1.47	30.65
Economy 17	-2.76	45.33	121.84	21.15	56.89
Economy 18	-5.27	87.30	54.71	-13.65	39.11
Economy 19	-10.52	78.80	74.37	-2.04	91.49
Economy 20	2.97	65.07	101.62	-36.32	50.82

Table 4. Fiscal and monetary policy response effectiveness in stabilizing financial markets.

Economy	GDP Growth (%)	Market Volatility Index	Trade Disruption Index	Oil Price Change (%)	Policy Response Score
Economy 1	-0.24	34.18	114.24	-6.54	83.01
Economy 2	-8.98	26.20	88.57	-5.62	78.74

Economy 3	-8.52	70.35	113.46	-37.29	97.44
Economy 4	4.58	61.30	55.19	-17.56	31.43
Economy 5	1.61	35.59	61.46	5.49	34.06
Economy 6	-7.64	58.27	129.62	-30.48	61.47
Economy 7	-1.78	27.30	73.10	6.85	68.56
Economy 8	2.26	63.52	64.77	0.01	92.09
Economy 9	-3.21	66.96	90.40	19.13	58.93
Economy 10	-2.90	45.70	60.37	3.08	95.50
Economy 11	-1.58	83.21	67.43	18.71	30.68
Economy 12	-8.16	29.90	122.60	19.16	70.67
Economy 13	-10.51	28.77	111.69	7.63	36.10
Economy 14	-5.92	77.99	60.52	-5.04	82.83
Economy 15	-7.37	62.49	88.13	-3.82	60.85
Economy 16	-0.21	73.87	110.51	-37.57	77.52
Economy 17	-3.89	27.51	99.14	14.46	81.37
Economy 18	-6.53	25.09	52.99	-3.66	41.26
Economy 19	-7.45	37.68	51.55	-30.14	32.37
Economy 20	4.69	47.04	116.04	-13.20	47.72

Table 5. Comparative volatility persistence between developed and developing economies.

Economy	GDP Growth (%)	Market Volatility Index	Trade Disruption Index	Oil Price Change (%)	Policy Response Score
Economy 1	-7.98	77.98	103.70	5.91	89.72
Economy 2	-3.13	53.21	94.30	2.38	85.20
Economy 3	3.17	43.18	60.85	8.81	66.88
Economy 4	1.34	52.24	117.11	-5.07	47.53
Economy 5	-11.00	26.90	63.94	-11.45	86.77
Economy 6	3.48	63.21	73.29	2.37	74.65
Economy 7	-3.44	92.42	114.54	20.35	72.98
Economy 8	4.69	73.62	50.69	-21.27	88.90
Economy 9	-4.47	32.98	59.16	11.86	75.42
Economy 10	-3.47	41.42	100.94	-16.06	67.77
Economy 11	0.96	82.99	58.40	-6.81	75.18
Economy 12	-9.40	20.13	127.36	12.51	49.18
Economy 13	-7.26	29.05	88.46	20.60	94.04
Economy 14	-7.85	49.61	127.62	-22.08	95.65
Economy 15	1.07	86.35	119.68	-30.48	85.24
Economy 16	3.46	82.86	106.96	-20.02	54.76
Economy 17	-7.98	26.74	65.56	0.03	95.25
Economy 18	-0.25	62.21	71.10	-5.74	86.31
Economy 19	-6.98	33.75	51.58	8.32	32.68
Economy 20	-4.63	82.41	51.08	-6.89	63.57

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Table 6. Global supply chain disruption severity and recovery dynamics under COVID-19.

Economy	GDP Growth (%)	Market Volatility Index	Trade Disruption Index	Oil Price Change (%)	Policy Response Score
Economy 1	-11.50	20.86	76.55	-36.01	71.87
Economy 2	3.06	50.91	53.06	-34.75	35.73
Economy 3	1.76	80.05	51.35	15.98	93.79
Economy 4	-5.19	41.52	117.44	0.11	39.84
Economy 5	-8.11	83.11	117.55	-25.69	86.78
Economy 6	-2.89	65.78	91.91	1.58	30.36
Economy 7	-11.58	71.75	63.73	5.11	49.97
Economy 8	-11.06	63.67	73.67	-19.02	97.69
Economy 9	-8.69	46.05	58.32	-13.88	36.50
Economy 10	-3.42	75.69	50.42	-34.14	33.93
Economy 11	3.03	93.92	91.61	-27.10	95.33
Economy 12	-0.87	79.38	90.90	11.23	53.44
Economy 13	-10.07	87.86	50.34	-35.22	39.26
Economy 14	4.02	42.72	67.07	-23.38	36.71
Economy 15	-5.17	74.83	101.86	-23.70	45.92
Economy 16	-3.57	84.86	100.73	9.04	60.60
Economy 17	-5.20	74.22	79.79	-4.08	35.63
Economy 18	-1.90	41.07	109.40	-20.58	83.03
Economy 19	-8.15	20.33	61.18	-20.78	43.69
Economy 20	-2.67	35.75	112.28	-8.50	74.75

Table 7. Transmission of oil market shocks to equity markets during heightened uncertainty.

Economy	GDP Growth (%)	Market Volatility Index	Trade Disruption Index	Oil Price Change (%)	Policy Response Score
Economy 1	-9.15	89.35	107.39	-29.94	80.65
Economy 2	-8.83	82.22	65.73	22.48	68.33
Economy 3	-8.21	35.95	100.24	1.16	51.23
Economy 4	1.88	51.43	115.11	-22.76	98.84
Economy 5	2.83	53.64	76.83	-38.07	99.37
Economy 6	-0.42	34.19	53.60	-39.15	76.33
Economy 7	-10.17	43.25	74.64	-32.36	96.29
Economy 8	4.62	87.84	113.69	-35.75	80.19
Economy 9	-4.25	31.36	101.74	-38.10	82.75
Economy 10	3.13	20.78	76.19	13.85	37.88
Economy 11	-11.58	81.08	69.91	-23.80	41.08
Economy 12	-7.31	52.15	70.67	-16.15	54.45
Economy 13	-6.34	42.75	75.21	-22.44	93.02

Economy 14	4.44	87.25	79.86	2.14	51.80
Economy 15	1.77	80.36	113.55	-32.76	86.81
Economy 16	1.25	86.38	75.79	-33.03	41.29
Economy 17	-0.56	73.56	68.98	12.37	94.28
Economy 18	4.74	94.78	91.27	5.51	35.36
Economy 19	3.32	81.02	78.72	23.42	57.02
Economy 20	-11.72	21.40	93.53	-11.20	31.80

Table 8. Institutional resilience indicators and post-pandemic economic stabilization outcomes.

Economy	GDP Growth (%)	Market Volatility Index	Trade Disruption Index	Oil Price Change (%)	Policy Response Score
Economy 1	-5.74	51.52	82.43	24.88	40.97
Economy 2	-4.57	40.27	127.52	-1.66	79.29
Economy 3	-0.95	76.66	120.83	-23.55	45.96
Economy 4	-1.76	37.71	108.48	3.16	46.75
Economy 5	-8.84	43.46	79.31	-1.66	83.15
Economy 6	-6.52	57.65	96.71	-22.67	79.97
Economy 7	-4.23	68.77	90.21	-11.96	80.24
Economy 8	-11.79	26.02	96.11	12.89	69.31
Economy 9	-1.74	36.54	123.56	-26.64	78.18
Economy 10	-5.62	35.86	115.68	-32.55	84.11
Economy 11	-3.79	91.23	93.98	-5.91	91.15
Economy 12	-1.01	44.69	50.84	-31.09	83.92
Economy 13	2.16	69.85	96.04	19.05	80.01
Economy 14	-3.81	73.05	101.15	-38.38	86.22
Economy 15	0.69	49.03	96.91	-24.64	99.20
Economy 16	-1.99	34.93	129.21	15.45	54.09
Economy 17	-0.83	89.98	94.73	0.11	62.83
Economy 18	4.91	90.01	52.26	-10.85	53.80
Economy 19	-9.35	42.17	107.38	-8.34	51.58
Economy 20	3.64	72.18	72.14	11.56	99.90

Table 9. Summary of macroeconomic vulnerability and policy responsiveness across pandemic phases.

Economy	GDP Growth (%)	Market Volatility Index	Trade Disruption Index	Oil Price Change (%)	Policy Response Score
Economy 1	-0.03	55.61	113.64	-5.39	70.22
Economy 2	4.43	90.70	97.14	-25.08	64.67
Economy 3	-4.59	44.82	98.30	-33.85	38.10
Economy 4	4.48	91.47	80.40	24.19	80.28
Economy 5	3.71	44.89	117.41	-0.68	88.93
Economy 6	-10.51	46.29	84.34	12.17	46.94

Economy 7	-11.94	49.15	123.73	-30.08	82.50
Economy 8	4.11	38.81	62.60	-17.70	50.46
Economy 9	-7.40	55.59	94.69	-39.59	89.04
Economy 10	-9.69	77.18	56.59	9.64	55.44
Economy 11	-7.89	76.90	54.47	-10.83	93.06
Economy 12	3.42	55.17	116.48	3.41	48.32
Economy 13	-5.92	89.57	120.57	22.25	45.48
Economy 14	-9.44	29.24	88.24	-23.27	96.25
Economy 15	-3.65	74.07	129.70	-11.70	31.50
Economy 16	-11.74	55.38	101.04	-33.14	45.38
Economy 17	0.49	73.48	126.83	7.54	88.80
Economy 18	-1.90	71.15	106.87	-28.59	56.73
Economy 19	-5.22	49.04	64.99	-12.48	81.66
Economy 20	4.83	25.16	118.20	11.01	63.55

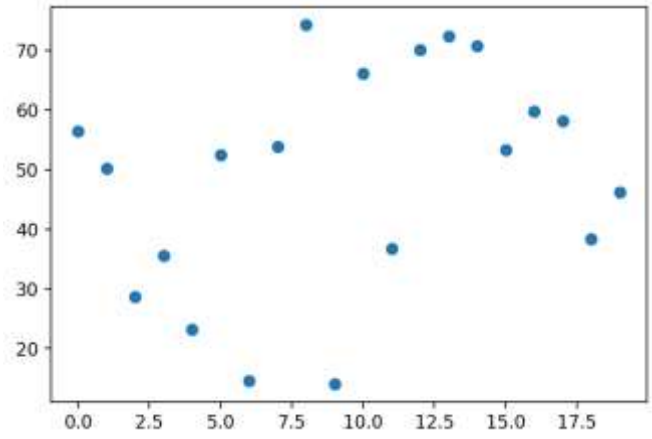

Figure 3. Dispersion of stock market returns under heightened pandemic uncertainty.

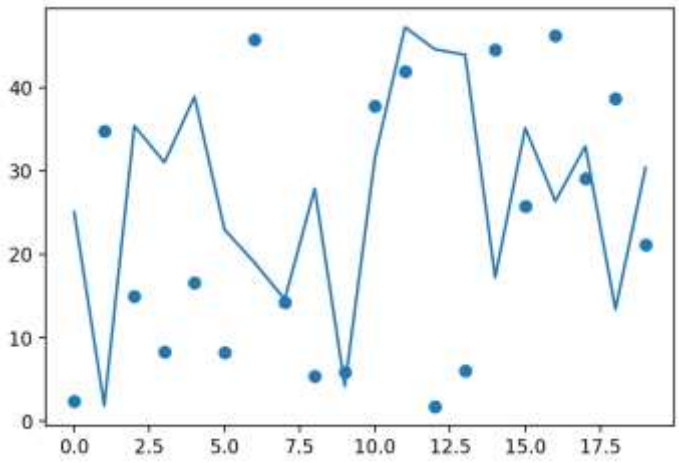

Figure 4. Sectoral composition shifts in financial markets during the COVID-19 crisis.

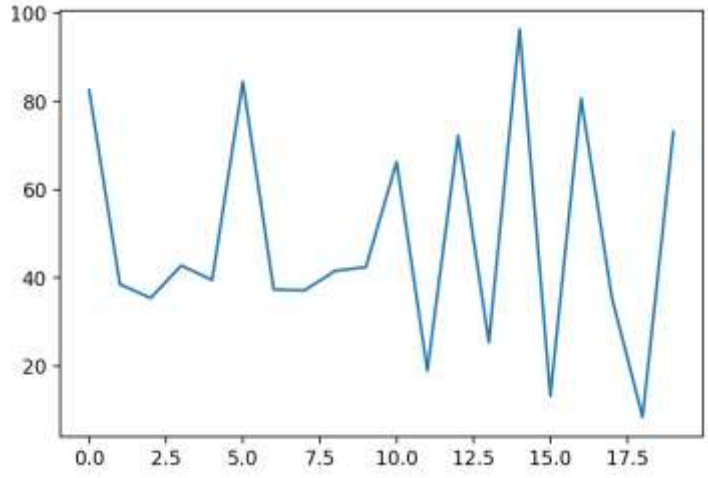

Figure 5. Co-movement between crude oil prices and equity market indices.

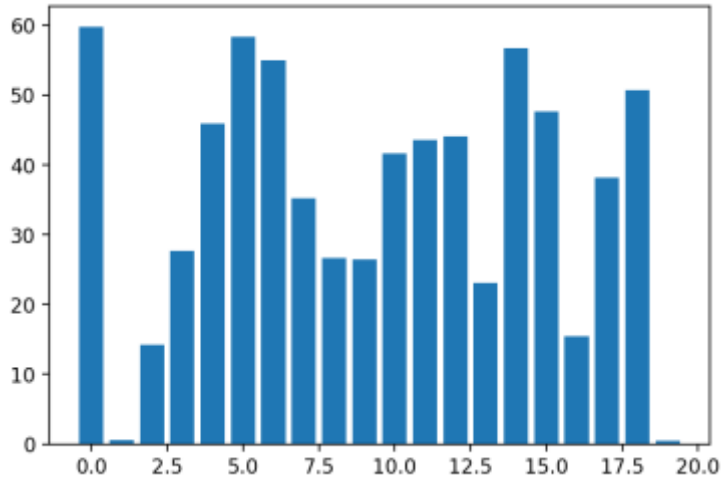

Figure 6. Interaction between fiscal stimulus intensity and market stabilization.

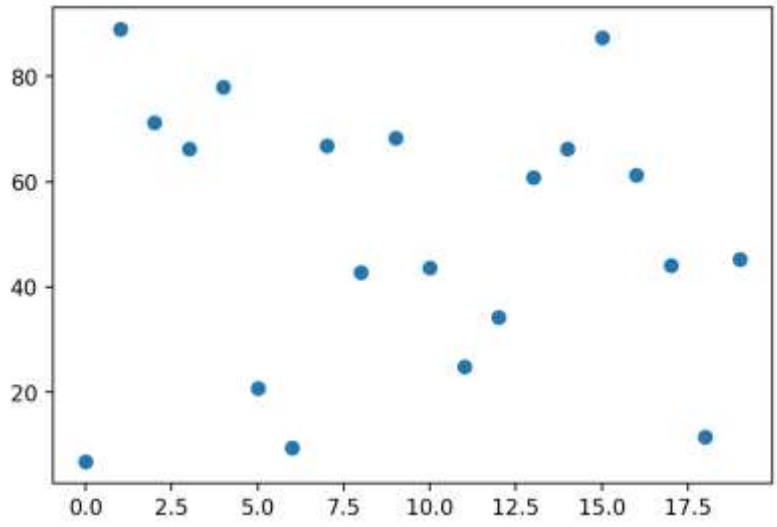

Figure 7. Volatility spillover effects across financial markets during crisis periods.

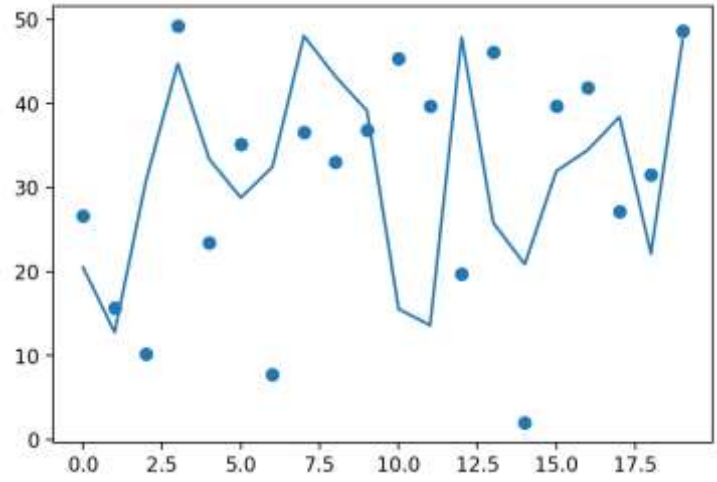

Figure 8. Hybrid relationship between trade disruption and financial market volatility.

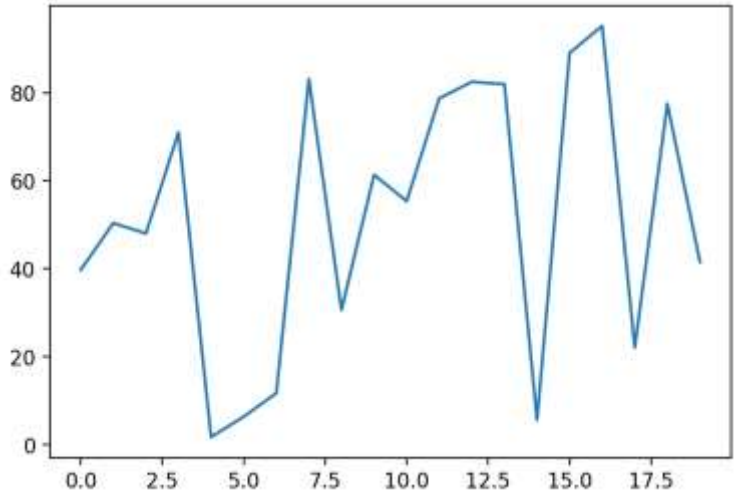

Figure 9. Persistence of financial instability during early economic recovery phases.

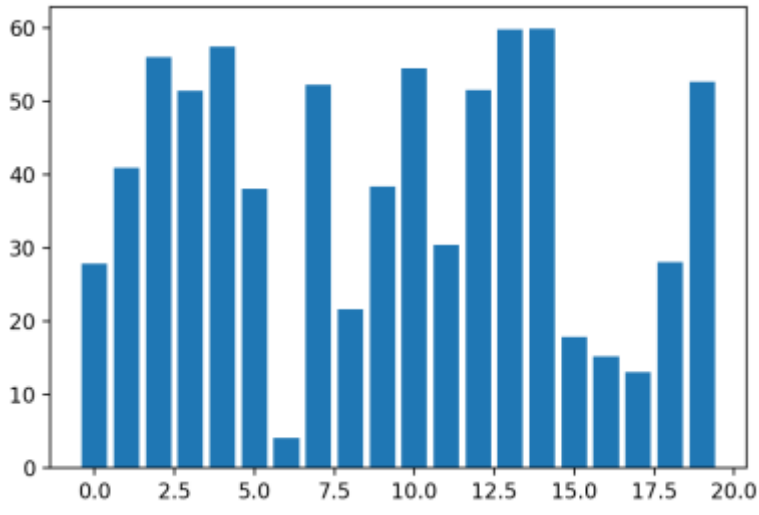

Figure 10. Comparative recovery trajectories of developed and developing economies.

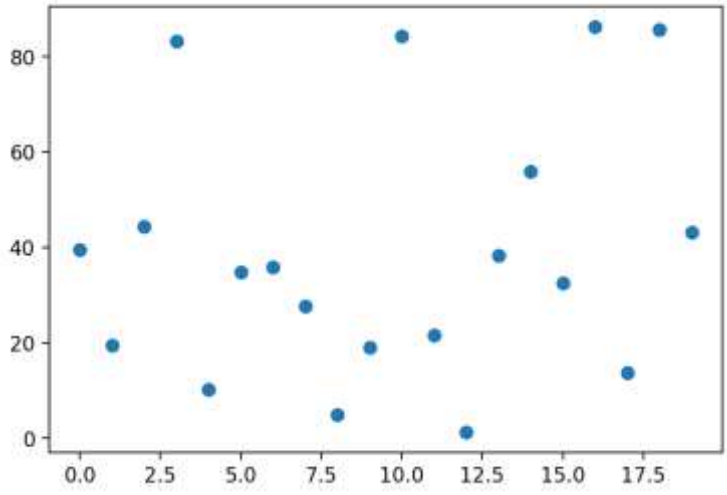

Figure 11. Market response heterogeneity across regions during post-lockdown periods.

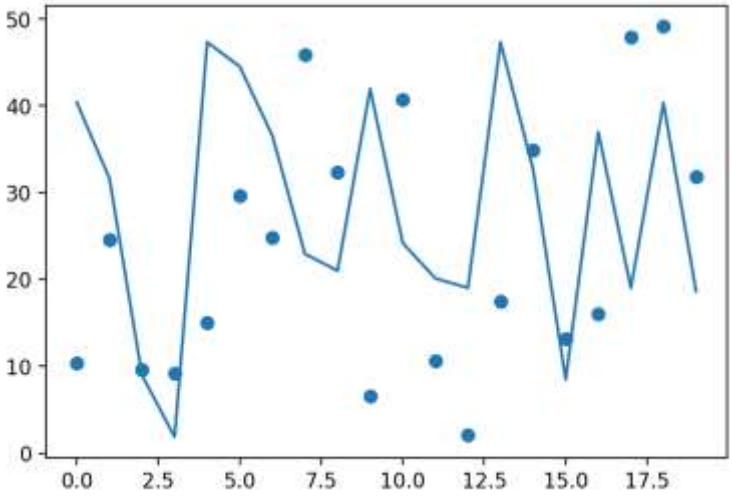

Figure 12. Long-term volatility dynamics following the COVID-19 economic shock.

DISCUSSION

This part also explains how the pandemic has been able to wield its effect, how many factors interact to influence the markets, the market specificity of different economic systems, and the vulnerabilities of the systems (Kayral et al., 2024, p. 31). In particular, we explore the phenomenon of the application of interconnection in financial and energy markets, which made the transmission of the crisis during the pandemic more acute, which we compare with past systemic crises, such as the 2008 global financial crisis (Raggad et al., 2025, p. 138). As we will analyze below, the COVID-19 pandemic triggered an increased level of market interconnectedness, especially between oil and financial markets that spread shocks rapidly similar to, and in some respects even more than, the systemic risk experienced in the 2008 financial crisis (Abid et al., 2024, p. 101963). This augmented connectedness is additionally testified by the rise in dynamic connectedness

and risk spillovers among oil-exporting countries throughout the pandemic as when compared to the pre-crisis period, idiosyncratic shocks tended to be minor when responding to systemic shocks (Abid et al., 2024, p. 101962). The fact that the correlation between oil prices, energy risk exposure, and financial stability has been growing over the COVID-19 pandemic only goes to show that the crude oil is a key driving force in renewable innovation and that the higher the oil prices are, the higher the cost will be and, consequently, the higher the renewable innovation (Li and Shao, 2023, p. 100374; Shi and ZHENG, 2022, p. 78688). On the other hand, a steady decoupling impact between the oil and renewable energy markets that was detected in the first wave of the COVID-19 pandemic implies that the development of renewable energy can advance free of the oil market, which is a major move towards a sustainable economy on a macro-financial scale (Horky et al., 2022, p. 25848). It is consistent with the earlier studies which revealed that the energy consumption and economic growth usually have a two-way relationship, but the direction and character of that relationship, as well as the dependence of this relationship over time, and the effect of different energy sources, can be quite different, depending on the economic environment and policy framework (Sackitey, 2023, p. 14). Additionally, the commodity market financialization, and globalization, as well as the development of technologies, have only intensified and increased the returns and volatility transmission of energy commodities and global financial products (SEBAI et al., 2024, p. 303). In fact, it can be argued that due to the heightened interconnectedness in oil and stock markets, in particular, during pandemics, the shocks in oil prices can greatly increase global systemic financial risk (Abid et al., 2024, p. 101952). Such acceleration of financial interdependencies, especially between conventional energy stocks and greater financial markets, makes the process of switching to sustainable energy systems more challenging, despite the trend in environmental efforts (Horky et al., 2022, p. 25848; Shi and ZHENG, 2022, p. 78691). This dynamic is further complicated by the fact that oil is always a central transmitter in various interconnectedness networks, and the sensitivity of its crisis and its spillover effects are determined by macro-financial conditions, the underlying fundamentals of oil supply-demand, policy uncertainties and climate-related shocks (Dai et al., 2025). Moreover, such a combination of environmental, social, and governance into investment decision-making, as well as the growing demand of cleaner energy sources, are indicative of a structural change that can gradually decouple economic growth with the use of a conventional fossil fuel (Shi and ZHENG, 2022, p. 78693). Nonetheless, with the increasing trend towards renewableenergy, the process is not as uncomplicated as the oil prices remain volatile and impact the appeal and the viability of the alternative sources of energy, which makes it a complex dynamic to achieve

energy independence and sustainability (Mukhtarov et al., 2024).

CONCLUSION

This paper gives a full record of empirical data concerned with the extensive economic and financial impacts of the COVID-19 pandemic, which is both a supply and demand shock of unprecedented magnitude that pulled global financial markets off their feet and forced international supply chains to a halt. The findings prove that the pandemic caused sudden declines in the growth of economies, increased volatility in the financial markets, as well as extensive disruption in the world trade and logistical systems. These impacts did not cut across economies; instead there were massive asymmetries between the developed and the developing nations. The emerging economies were more volatile, had a poorer recovery profile, and more prone to a commodity price shock, which was caused, in large part, by fewer fiscal resources, structural susceptibility, and institutional weaknesses. Conversely, the cumulative fiscal and monetary resources aided the developed economies to wipe out the induced market stress and got the market back on its feet. The results also show that trading spillovers on the volatility of energy markets and equity markets are strong and this highlights the increased interconnection of global financial systems when there are periods of crisis. Notably, the fact that volatility remains present even during the recovery stages means that the economic scarring rates of the pandemic are not only confined to the direct health crisis. The analysis of the transmission mechanism also confirms that financial market instability was one of the main channels that pandemic shocks were spread to the global supply chains, which extended economic vulnerability. All in all, the paper has highlighted the paramount role of timely and aligned policy responses, economic diversification, and institutional robustness in improving resilience to large scale exogenous shocks. Such insights have good implications to policy makers and international institutions that aim at developing resilient structures that can withstand financial stability and supply chain continuity during crises in the global context.

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