



REVIEW ARTICLE

Economic Impact of Government Interventions during the COVID-19 Pandemic in Iran: A Systematic Review and Content Analysis

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ABSTRACT

Background: Iran is one of the hardest hit countries by COVID-19 and has witnessed a high incidence and prevalence of mortality and morbidity cases. This study generally aims to highlight the main economic aspects of government responses to the COVID-19 outbreak in Iran.

Methods: In order to benefit from a comprehensive tool to evaluate direct and indirect costs of approvals, a preliminary systematic review was conducted. Qualitative content analysis and simplified method of activity-based costing (ABC) were used in order to calculate the aggregate cost of a given set of activities. The direct and indirect costs of approvals based on the aggregated costs of categorized activities were analyzed. All costs were converted into US dollars using the monthly mean exchange rate.

Results: Totally, 164 publications were included in the systematic review. Designed tool was approved by expert opinions (met CVI>0.79 and CVR≥0.6) and seven aspects of economic consequences of COVID-19 interventions were assessed. The overall tangible and calculable costs were estimated about 25,755,700,000 US\$. Direct support and compensation for losses of industries and companies accounted for the largest costs (41%) related to COVID-19 interventions (10,587,000,000 US\$).

Conclusion: Establishing economic security for industries, rapid and simultaneous measures of prevention, treatment and vaccination, and increasing household income can significantly reduce the costs of controlling similar diseases in the future.

Keywords: Cost Analysis, Economic Consequences, COVID-19, National Coronavirus Headquarters, Iran

Introduction

The COVID-19 outbreak was declared a pandemic by the World Health Organization (WHO) on March 11, 2020, and became the principal leading cause of morbidity and mortality in most of nations and has profoundly affected health systems worldwide (1, 2). The WHO updated reports show that COVID-19 led to more than 775 million cases of infection and more than 7 million deaths around the world by July 2024 (3).

The COVID-19 disease was not only a global epidemic and a public health problem, but also

unprecedentedly affected the global economy and financial markets in every region of the world. Governments scrambled with emergency actions including social distancing measures, public awareness programs, testing, quarantining policies, and income support packages (4, 5).

Iran is one of the hardest hit countries by COVID-19 and has witnessed a high incidence and prevalence of mortality and morbidity cases. Establishing the national steering committee,

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leveraging the primary health care capacity, supporting the workforce, strengthening preparedness, partnerships with international agencies, vaccines development, and improving access to medicines, vaccines, and health products were only examples of Iran governmental actions in dealing with COVID-19 disease (6).

Strict government actions, encompassing stringent social distancing measures, aggressive testing and quarantining policy and generous income support programs, might reduce the rate of new infections. However, these actions generated additional uncertainty regarding their costs and effectiveness (7).

This study generally aims to highlight the main economic aspects of government responses to the COVID-19 outbreak in Iran. In this regard, the study focused on designing a comprehensive tool to evaluate the economic consequences, identifying the content of Iran National Headquarters for Coronavirus Control legislation, monitoring the trend of changes in macroeconomic indicators, and estimating the direct and indirect economic cost of COVID-19 policy responses.

Material and methods

Study design: In order to analyze the economic aspects of government responses to COVID-19 outbreak, this study applied the simplified method of activity-based costing (8). It let us to calculate the aggregate cost of a given set of activities. First, the content of Iran National Headquarters for Coronavirus Control legislations and approvals was scrutinized to identify the activities with probable economic consequences. Then, the direct and indirect costs of approvals were estimated based on the aggregated costs of categorized activities. In order to benefit from a comprehensive tool to evaluate direct and indirect costs commonly used indicators were extracted and selected through a preliminary systematic review. To this end, articles and reports published by databases and reputable organizations were reviewed.

Data extraction: The databases of PubMed, Scopus, Web of Science, ProQuest, Cochrane

Library, Science Direct and the publications of the World Health Organization (WHO), International Monetary Fund (IMF), World Bank, Organization for Economic Co-operation & Development (OECD) and European Central Bank (ECB) were examined. Moreover, the publications of all official working groups dealing with COVID-19 in Iran were reviewed. The databases were explored using a search strategy as follows:

COVID-19 (MeSH terms) OR SARS-CoV-2 (MeSH terms) OR Communicable Disease Control (MeSH terms) OR Coronavirus Infections (MeSH terms) OR Pandemics / economics (MeSH terms) OR Pneumonia, Viral / economics (MeSH terms) OR COVID-19 Vaccines (MeSH terms) AND Socioeconomic Factors (MeSH terms) OR Economics (MeSH terms) OR Taxes (MeSH terms) OR Income (MeSH terms) OR Models, Econometric* (MeSH terms) OR Cost of Illness (MeSH terms) AND Quarantine (MeSH terms) OR Social Isolation (MeSH terms) OR Government (MeSH terms) OR Government Regulation (MeSH terms) OR Health Policy / economics (MeSH terms) OR Financing, Government (MeSH terms)*

Inclusion and exclusion criteria: All studies and reports providing of a complete analysis on economic aspects of COVID-19 published from the beginning of the pandemic to the end of 2023 were included in this review. The studies and reports with unreliable data, records with limited study populations and non-generalizable results or lack of any cost analysis methods were excluded from this research.

Analysis: The study analyzed any type of multipurpose government budget credibility, direct costs of activities and approvals, financial resources considered for prevention, control and treatment, morbidity and mortality costs, and trends of included macroeconomic indicators through a qualitative content analysis and a simple activity-based costing analysis. The designed data gathering tool and indicator's categorization were approved by 20 health care experts (met CVI>0.79 and CVR≥0.6) and seven aspects of economic consequences of COVID-19 interventions were assessed.

Results

Description of identified records: Overall, 2526 records were retrieved. Duplicated records (457) and publications with irrelevant titles/abstracts (1674) were removed, leaving 395 records eligible for full-text review. About 29 publications were added to the included record after the references

check process. Finally, 435 records were assessed for eligibility. Another 271 records were further excluded after reviewing the full text of the retrieved articles with reasons. Finally, 164 publications were included in this systematic review. The study selection procedure is presented in PRISMA flow diagram (9) [Figure 1].

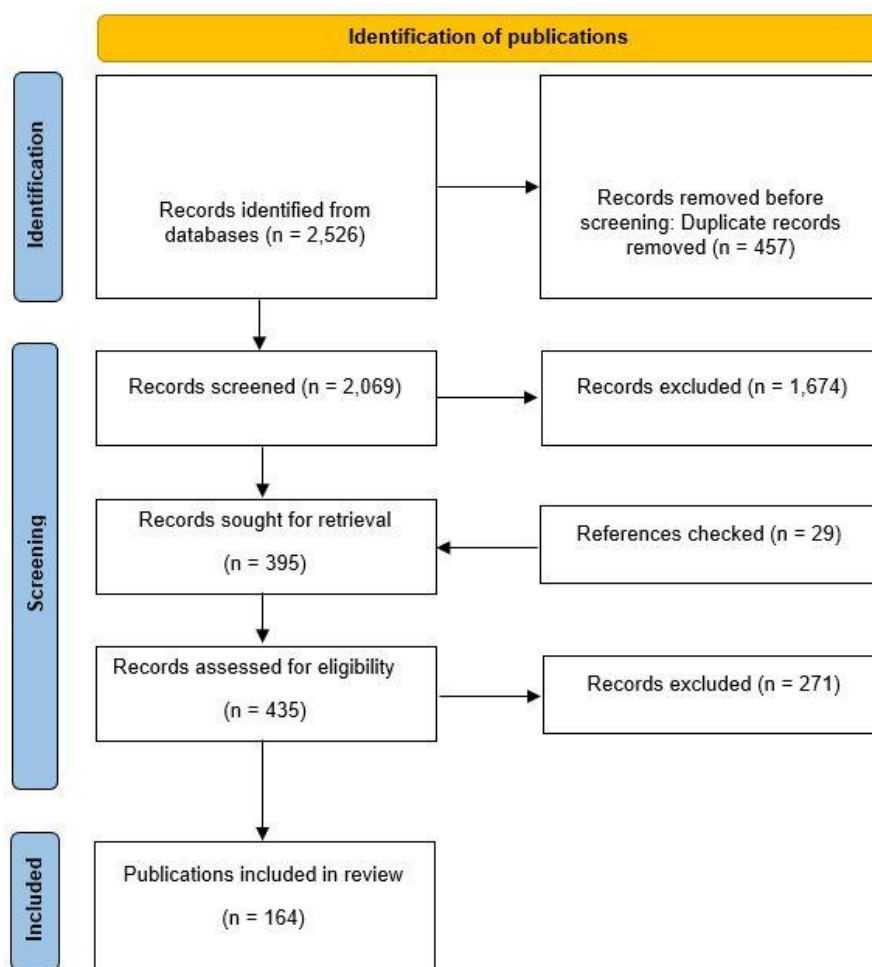


Figure 1. PRISMA flowchart

The designed tool for assessing the consequences: The final designed tool for analysis and assessing the economic consequences of COVID-19 approvals based on criteria extracted from

preliminary systematic review was approved by 20 experts' opinions (met $CVI > 0.79$ and $CVR \geq 0.6$) presented in Table 1.

Table 1. Prepared framework to collect data and information

NO	Indicators
The costs of direct or indirect payments due to approvals	
I 1	Budgets, investments, and special financial resources allocated for COVID-19
I 2	The cost of awareness programs, prevention and treatment, procurement of health supplies and equipment, special insurance tariffs, drugs, tests, tracking, screening
I 3	Financing, advance payments, purchase, import, investment, production, development and access to COVID-19 vaccines
The cost of support packages for individuals and households, businesses, markets, industries	
I 4	Direct payments, support packages, grants, facilities, loans and contract renewals to support individuals and households
I 5	Direct support and compensation for losses of industries and companies, businesses, transportation and passengers, tourism, financial markets, stock market, labor market, commercial insurance
Direct or indirect consequential costs of approvals	
I 6	Direct medical costs, direct non-medical costs, disability, absenteeism, lost productivity and premature death due to COVID-19
I 7	The lost value due to closures, quarantines, restrictions, social distancing, reduction of working hours, border control policy, transportation and cancellation of events on national economic indicators

Cost and consequences analysis: The details of data and cost analysis based on the designed tool, related data and information extraction from publications, content of approvals, legislations, official reports, articles, reports of Statistical Centre of Iran, Ministry of Health and Medical Education, Central Bank of Iran, and websites are presented in Table 2. Overall, tangible and

calculable costs were estimated about 25,755,700,000 US\$. All costs were converted into US dollars using per year mean exchange rate.

Figure 2 presents an overview of the share of each of the cost headings from overall aggregated tangible costs.

Table 2. The details of data and cost analysis

NO	Indicators	Costs (US\$)	Ref.
I 1	Budgets, investments and special financial resources allocated for COVID-19	4,530,400,000	Approvals content
I 2	The cost of awareness programs, prevention and treatment, procurement of health supplies and equipment, special insurance tariffs, drugs, tests, tracking, screening	323,300,000	Approvals content
I 3	Financing, advance payments, purchase, import, investment, production, development and access to COVID-19 vaccines	2,183,000,000	Approvals content
I 4	Direct payments, support packages, grants, facilities, loans and contract renewals to support individuals and households	4,712,000,000	Approvals content
I 5	Direct support and compensation for losses of industries and companies, businesses, transportation and passengers, tourism, financial markets, stock market, labor market, commercial insurance	10,587,000,000	Approvals content
I 6	Direct medical costs, direct non-medical costs, disability, absenteeism, lost productivity and premature death due to COVID-19	3,420,000,000	Ghaffari (10)
I 7	The lost value due to closures, quarantines, restrictions, social distancing, reduction of working hours, border control policy, transportation and cancellation of events on national economic indicators	*Table 3	Statistical Centre of Iran, Central Bank of Iran

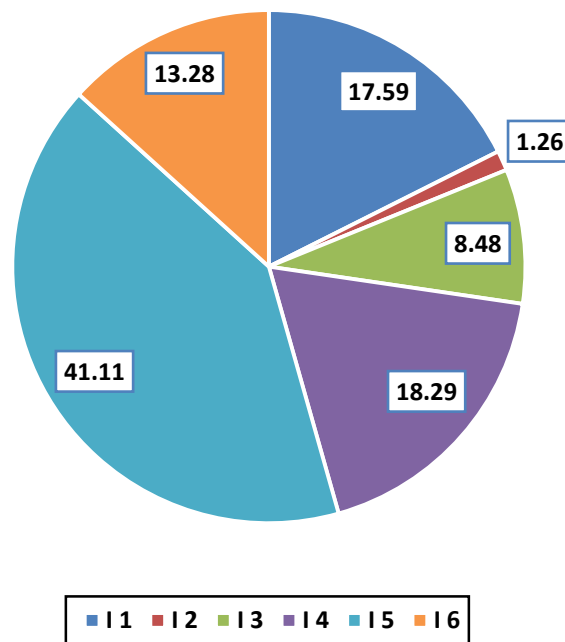


Figure 2. Share of each of the cost headings from overall aggregated tangible costs (percentage)

Macroeconomic consequences: A comparison between countries performance, the selected macroeconomic indicators (GDP per capita, inflation rate, unemployment rate, export growth rate) of countries with almost similar population,

infection, or death rate with Iran (United States, Germany, Australia, Argentina, Indonesia, South Africa) due to the COVID-19 disease, are presented in Table 3.

Table 3. Macroeconomics indicators trend for countries *

Indicators	Countries	2017	2018	2019	2020	2021	2022	2023
GDP per capita	United States	60,322	63,201	65,548	64,317	71,055	77,246	81,695
	Germany	44,652	47,939	46,805	46,749	51,426	48,718	52,745
	Australia	53,954	57,273	55,049	51,868	60,697	65,077	64,711
	Argentina	14,613	11,795	9,963	8,500	10,650	13,650	13,730
	Iran	5,758	3,850	3,276	2,746	4,084	4,668	4,502
	Indonesia	3,839	3,902	4,151	3,895	4,334	4,787	4,940
	South Africa	6,734	7,067	6,702	5,753	7,073	6,766	6,253
Inflation rate	United States	2.1	1.9	2.3	1.4	7.0	6.5	3.4
	Germany	1.51	1.73	1.45	0.14	3.07	6.87	5.90
	Australia	1.95	1.91	1.61	0.85	2.86	6.59	4.1
	Argentina	26	42	49.2	40.1	53.8	69.5	133.8
	Iran	8	18	39.9	30.6	43.4	43.5	44.6
	Indonesia	3.8	3.2	3	1.9	1.6	4.2	3.7
	South Africa	5.2	4.5	4.1	3.2	4.6	7	6.1
Unemployment rate	United States	4.4	3.9	3.7	8.1	5.3	3.6	3.6
	Germany	3.7	3.4	3.1	3.9	3.6	3.1	3
	Australia	5.6	5.3	5.2	6.5	5.1	3.7	3.7
	Argentina	8.3	9.2	9.8	11.5	8.7	6.8	6.2
	Iran	12.2	12.2	10.7	9.7	9.3	9.1	9.1
	Indonesia	3.8	4.4	3.6	4.3	3.8	3.5	3.4
	South Africa	24	24.2	25.5	24.3	28.8	28.8	28

Export growth rate	United States	4.1	2.9	0.5	-13.1	6.3	7	NA
	Germany	4.9	2.2	2.3	-9.3	9.7	3.3	-2.2
	Australia	5.5	4.1	3.9	-1.7	-8.6	-0.5	6.5
	Argentina	2.6	0.6	9.8	-17.4	8.5	5.8	-6.7
	Iran	0.5	-0.4	-20.6	-12.8	5.2	8.2	15.4
	Indonesia	8.9	6.5	-0.5	-8.4	18	16.2	1.3
	South Africa	-0.3	2.7	-3.3	-12	9.1	7.4	3.5
Governmental budget deficit (% of GDP)	United States	-4.42	-6.09	-6.66	-14.86	-12.06	NA	NA
	Germany	+1.3	+1.9	+1.5	-4.3	-3.6	-2.5	-2.5
	Australia	-1.9	-0.5	0	-4.3	-6.4	-1.4	+0.9
	Argentina	-6.1	-5	-3.8	-8.5	-3.1	-2.4	-2.95
	Iran	-1.6	-1.6	-4.5	-5.8	-4.2	-4.1	-5.5
	Indonesia	-2.51	-1.76	-2.2	-6.5	-4.65	-2.35	-.65
	South Africa	-4.4	-4.7	-6.9	-10	-5.7	-4.2	-4.9

*World Bank data series, OECD, Trading Economics, (2017-2023).

Discussion

This study developed a comprehensive and approved tool for evaluation of economic consequences of COVID-19 pandemic interventions applied by governments. Due to the diversity in the methods of measuring the economic consequences of the COVID-19, by using this tool, the results of different research can be comparable and it would be able to assess this type of economic effects in the same pandemics in the future.

Furthermore, we estimated the direct and indirect costs of strategies for COVID-19 control in Iran based on this structured and accepted tool. The overall tangible and calculable costs estimated about 25,755,700,000 US\$. This aggregated cost more than Iran GDP in 2020 (\$239.74B). The direct financial supports and compensations for losses of industries and companies accounted for the most costs related to COVID-19 in about 10,587,000,000 US\$ (41%). The second almost cost incurred by the country is the direct medical costs, direct non-medical costs, disability, absenteeism, lost productivity and premature death due to COVID-19 for about 4,712,000,000 US\$ (18%).

The study also investigated the changes in the trend of some selected macroeconomic indicators such as GDP per capita, inflation rate, unemployment rate, export growth rate and governmental budget deficit (% of GDP) before

and after the prevalence of the COVID-19 in Iran and some countries with same population, infection rate, and mortality rate.

It seems that the first impressive economic indicator in countries is the GDP per capita (Table 3) and the lowest value of this indicator was observed in 2020 for all investigated countries. The second most impressive index in terms of time was the export growth rate indicator. Among the investigated countries, the negative consequences of the COVID-19 prevalence on this indicator have been observed earlier in Iran, which seems logical, since Iran was leadership in becoming the center of the outbreak of this disease in early of 2019 after China. The macroeconomic indicator that has been affected the latest in terms of time is the inflation rate.

Based on Table 3, it seems that developed countries have been more successful than developing countries in short time restoring the economic situation to the state before the outbreak of the COVID-19. In contrast, the developing countries that have been plagued by structural economic problems even before the COVID-19 outbreak have fared poorly in this regard. To our knowledge, this study was the first attempt comprehensively examined the aggregated economic consequences of government COVID-19 policies in Iran by various indicators. However, limited access to additional reliable data and lack of benefit from longitudinal and prospective

research methods can be considered as the current study limitations.

Conclusion

Undoubtedly, the costs of controlling the COVID-19 disease were incredible in not only Iran but also all over the world. However, it seems that developed countries have been more successful than developing countries in short time restoring the economic situation to the state before the outbreak of COVID-19. Establishing economic security for industries, rapid and simultaneous measures of prevention, treatment and vaccination, and increasing household income can significantly reduce the costs of controlling similar diseases in the future. Moreover, comparison of prevention, control and treatment of COVID-19 outbreak from clinical and economical aspects in the form of cost-effectiveness studies can be useful for managing similar diseases in future.

Ethical Consideration

Ethical issues encompassing plagiarism, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc., have been completely observed by the authors.

Acknowledgements

The authors would like to thank the Health Deputy of Iranian National Organization for Passive Defense.

Conflict of Interests

The authors had no conflict of interest to declare.

Authors' Contributions

AM.L, SM.HSh, and S.H designed the research; S.H and M.M conducted the research; AM.L and S.H wrote the paper. AM.L had primary responsibility for the final content. All authors read and approved the final manuscript.

Funding

Not Applicable.

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