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Interconnectedness of Health and Economy in Post-COVID-19: A Systems Thinking Approach to Synergies, Trade-Offs, and Policy Responses in Nepal

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ABSTRACT

Background: This study addresses the economic challenges posed by the Coronavirus Disease 2019 (COVID-19) pandemic, with a specific focus on Nepal. Employing a Systems Thinking approach, the study develops a comprehensive model that integrates macroeconomic interventions, exploring the trade-offs and synergies among various economic sectors. The interconnectedness of health, economic, and policy domains highlights the need for a holistic understanding of the pandemic's effects.

Methods: An exploratory research design was used. The model introduces three primary subsystems—import, local demand, and local production—illustrating their interdependence. The causal loop diagram depicts the implications of fiscal and monetary policies on the economy, emphasizing the synergy and trade-offs resulting from policy interventions.

Results: Findings reveal the significant economic impact of the pandemic on Nepal, leading to its negative growth rate in FY 2020/21, the first time Nepal has experienced this in the last two decades. The results show that both intended and unintended consequences are observed following the adoption of fiscal and monetary policy that aimed at minimizing the spread of virus suggesting a complex nature of relationship among the policy variables. The fiscal policy induced negative consequences on the increasing loan, slow revenue growth, while positive feedbacks are observed on increased investment opportunities, and boosting of local economy. The monetary measures yielded unintended consequences on the rising land prices, surge in share market.

Conclusions: The study concludes by emphasizing the crucial role of informed policymaking in navigating the complex landscape, offering insights for creating a resilient and sustainable post-pandemic future.

Keywords: Causal loop diagram; COVID-19; economic sectors; systems thinking approach.

INTRODUCTION

The Coronavirus Disease 2019 (COVID-19) pandemic caused widespread human suffering and economic turmoil on a global scale with far-reaching socio-economic implications.[1] While diseases and economic crises are global, their impacts are ultimately felt at the local level. The worldwide real GDP had a significant fall of 4.3 percent, suggesting that the ramifications of COVID-19 extend beyond the health system.[2] The Government of Nepal (GoN) imposed a nationwide lockdown on March 24, 2020, in reaction to the COVID-19 outbreak, primarily to prevent the spread of the virus.[3] Consequently, Nepal faced challenging decisions concerning the trade-offs between safeguarding lives and sustaining livelihoods.[4] A clear trade-off can be observed between containment measures and its economic cost. We employed a novel Systems Thinking Approach to understand and address these challenges given the multiplicity and complexity of the nature of the problems and inter-relations across the economic and health sectors in Nepal.

METHODS

The existing literature predominantly focuses on the economic modeling approach to assess the impact of COVID-19 on a particular sector or sub-sectors of the

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economy.[5-7] On the other hand, a broader depiction of the complex relationships across the economic sectors and subsectors, economic policies' role, and possible positive and negative consequences arising out of COVID-19 is still limited in Nepal and elsewhere.

Hence, to cover this gap where there is lack of comprehensive and effective response to the ongoing economic crisis, the study introduces a systems thinking approach which is more than just linear thinking and simple cause-and-effect analysis. It is an interdisciplinary approach that views problems as interconnected parts of a larger whole. This study seeks to create a comprehensive model that considers the systemic effects of COVID-19-induced economic shocks, considering macroeconomic interventions and their interplay, along with the associated trade-offs and synergies affecting the overall economic activity. The goal is to provide policymakers with empirically grounded insights for informed decision-making to restore economic stability.

An exploratory research design and VENSIM software were used to construct casual loop diagrams and interpret results. We aim to develop a casual loop diagram for the Nepalese economy following the systems thinking approach. The systems thinking framework for establishing interconnectedness and relationship comprises three primary subsystems: import, local demand, and local production. The connection between these modules is illustrated in Figure 1.

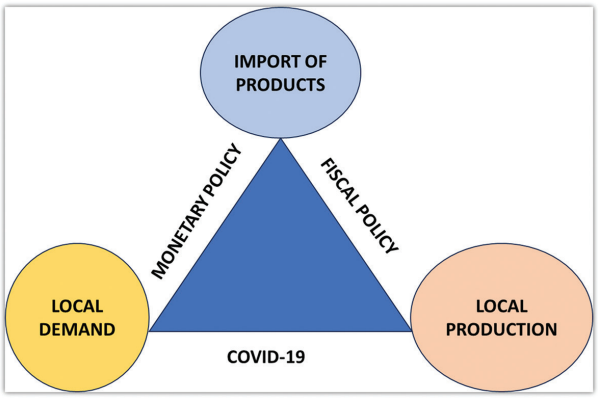

Figure 1. Connection between import of products, local production, and local demand.

Source: Authors

Figure 1 depicts the influence of the global market through import/export activities on local demand. Local production is influenced by local demand, primarily through expanding production capacity. When local production capacity grows, an increase in demand beyond the produced output necessitates more imports. Conversely, if local output surpasses local demand, it opens avenues for increased exports. [8] This study examines the impact of the COVID-19 pandemic and macroeconomic policy interventions (fiscal and monetary policies) within these three modules.

Data sources: This article is primarily based on the report produced by the Central Department of Economics (CEDECON), Tribhuvan University. [9] The data for this study comes from both review of policy documents and stakeholders' interaction. As discussion with key stakeholders remains crux of the systems thinking approach, an interaction with key officials and policy makers was conducted on a workshop on September 03, 2022 at CEDECON, Tribhuvan University. Notably, 15 Officials and policy makers from National Planning Commission, Ministry of Finance and Nepal Rastra Bank (NRB) participated in the workshop that help to scope, illustrate and validate the causal loop diagram as outlined in subsequent discussions below

RESULTS

In the systems thinking framework, we organize the connections between macroeconomic variables into feedback loops and represent them through simulations involving stocks and flows. However, it's important to note that the impacts may not be entirely quantifiable; rather, the aim is to illustrate the trends and behaviors of the variables under investigation over time. Figures 2 and 3 demonstrate the implication of fiscal and monetary policies on the possible effects on the economy. Implementing macroeconomic policies creates both synergy (+) and trade-offs (-) and affects real and monetary variables. In figure 2 introduction of tax cuts through fiscal policy created synergy effects on investor's psychology as a result investment and production increases.

NRB's intervention through expansionary monetary policy during COVID-19 as shown in Figure 3 started with a decrease in interest rates and created a feedback loop. The falling interest rate goes by two channels to affect economic activity and foreign exchange reserves. To begin with, the surge in credit due to lower interest rates increases import, investment in shares, and land purchases which hike the prices in the economy as a result production become costly and local production decreases and economic activities falls as a result

interest rate rises in the economy once again. In addition, the increase in imports deteriorates foreign reserve directly or indirectly, i.e., rise in demand. Furthermore, the price rise also contracts local demand and local production simultaneously as a result exports falls and foreign currency reserve declines.

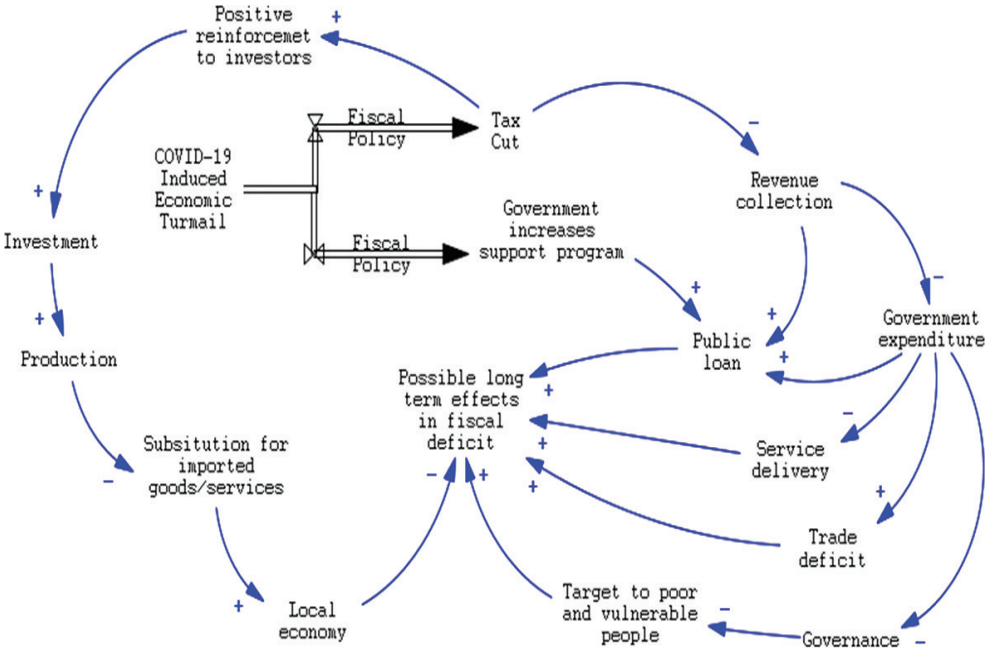

Figure2. Fiscal policy framework.

Source: Authors

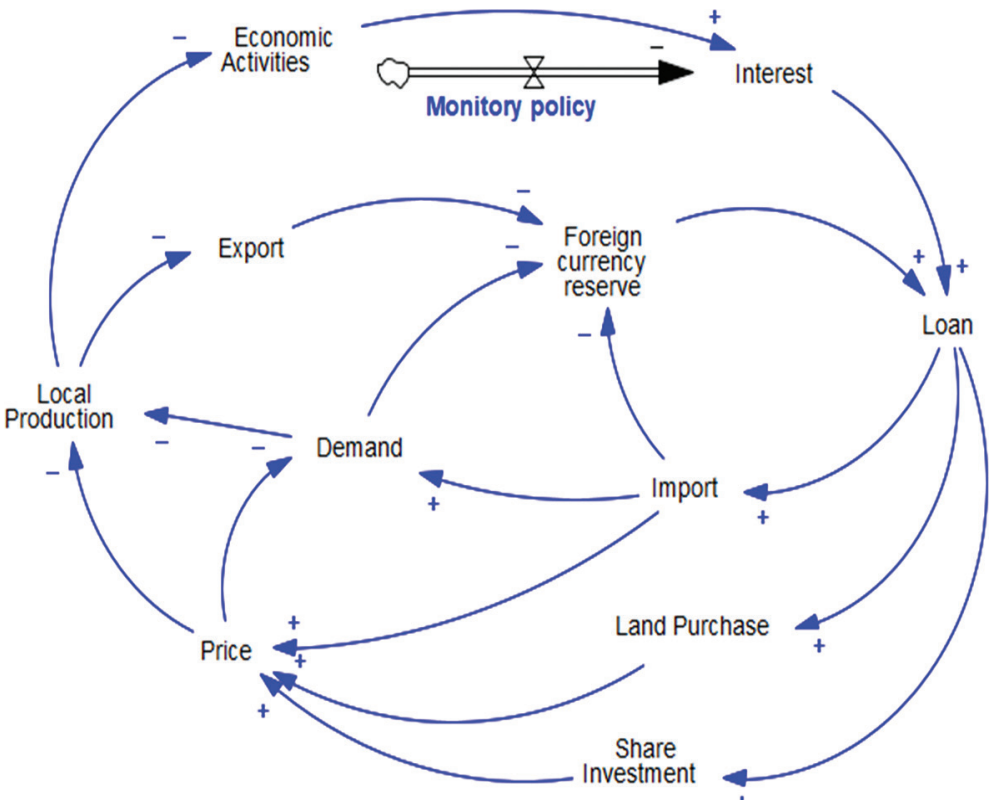

Figure 3. Monetary policy framework.

Source: Authors

DISCUSSIONS

The socio-economic consequences led by the pandemic at the household level provide insights into how COVID-19 affects saving, per-capita consumption, and the advantages of government interventions. [5] Many studies support a consistent downward trend in per capita GDP during the COVID-19 pandemic. [6,7] In the Nepalese context, a few studies have aimed to understand implications of the COVID-19 on the economy. A study using SIR-Macro model analysis showed that lockdown measures resulted in a loss of consumption and working hours by 20 %. [10] Although these analyses offer valuable insights, they often neglect the broader implications, especially those arising from the interconnectedness of various systems or sectors. Recently, there has been growing interest in applying a systems thinking approach to comprehend the intricate intersectoral dynamics triggered by COVID-19. This approach recognizes the complexity, trade-offs, and synergies among these sectors, offering a more holistic and dynamic understanding of the crisis and promoting informed, adaptive decision-making, allowing for better policy design for both immediate and long-term impacts.

Some studies utilized the systems thinking approach to underscore the necessity for a broader understanding of the issue's complexity, cautioning that actions stemming from limited comprehension could lead to adverse health and economic consequences. [11-13]

In response to the COVID-19 crisis, the GoN implemented a comprehensive set of fiscal policies and monetary policies measures. These policies were broadly expansionary, aiming to boost the economic activities in Nepal.

The fiscal measures mainly intended to streamline the expenditure to finance the health needs and a set of tax cuts or deferring on income and providing subsidies or cuts on the utility bills. The fiscal policy responses included expanding health services, upgrading health infrastructure, and developing healthcare personnel to safeguard citizens from various health risks, such as Coronavirus. Additionally, the aim was to enhance the quality and accessibility of healthcare services. The budget also focused on revitalizing affected businesses in sectors like agriculture, industry, tourism, and construction. This involved restoring disrupted production and supply chains through measures to prevent and control Coronavirus infections. [14]

While aiming to boost economic activities, various intended and unintended effects emerged, as highlighted in the causal loop diagram shown in Figure 2. For example, the expansionary fiscal policy, combined with slow revenue growth, led the GoN to depend on loans to finance its expenses. Conversely, this resulted in a widening trade deficit and decreased service delivery. The negative impacts were also noticeable in service delivery, governance, and specific programs to assist low-income groups. Conversely, positive feedback was observed regarding increased investment opportunities, import substitution, and invigoration of the local economy. The loop diagram thus illustrates various aspects of the economy that were not initially targeted or anticipated to have an impact.

On the monetary front, the central bank has taken proactive measures to inject liquidity into the financial system. Key actions include reducing the Cash Reserve Ratio from 4% to 3% and lowering the interest rate on the standard liquidity facility rate from 6% to 5%. The requirement for a 2% countercyclical capital buffer has been waived. [15] Reporting norms have been eased, and no penalties for non-compliance with regulatory and supervisory requirements are imposed. The refinance fund has been enlarged, and repayments for loans and working capital have been postponed. Sectors impacted by the crisis receive additional working capital loans tailored to their needs, with more flexible repayment schedules. Interest rates have been decreased up to 2 percentage points for the interest due between mid-April and mid-July 2021. Furthermore, interest rates on loans for affected sectors have been cut. These monetary policies are crucial tools in lessening the economic repercussions of the pandemic. [15]

Our findings, on the other hand, suggest that some unintended consequences arose due to these policy responses. An increase in land prices, an unbridled rise in the share index, and an unexpected growth in imports were some of the adverse outcomes. These factors led to adopting a tight monetary policy stance in subsequent years following historically low foreign currency reserves.

CONCLUSIONS

The COVID-19 pandemic has magnified the importance of understanding and managing the synergies and trade-offs among economic activities. Striking a balance between public health and economic stability is an ongoing challenge that requires thoughtful and informed policymaking. Recognizing that synergies can be harnessed to generate positive outcomes and trade-offs must be managed to mitigate negative consequences

is essential. Policymakers must aim for solutions that minimize the costs while maximizing the benefits of various economic activities during the pandemic. By navigating this complex landscape effectively, nations can chart a path to a more resilient and sustainable post-pandemic future.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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