

The Potential Threats of covid-19 on world GDP and its Trade:

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Abstract:The coronavirus extremely slowdown the human activities on the earth by lockdown around the world to avoid the spread of this deadly virus and cause immense loss to the global GDP and its volume of trade.According to one estimates,the world will witness around 3% to 10%fall in their GDP and the volume of global trade expected to fall 5-15%around the globe.The biggest negative shock is recorded in the output of domestic services affected by the pandemic,as well as in traded tourist services.This paper depicts the global GDP decline and its volume of trade viz global pandemic and amplified global pandemic.

Keywords:Covid-19 pandemic,amplified global pandemic,CGE modeling and lockdown.

Introduction:

As the coronavirus emerged in china and spread globally, authorities have acted to limit its spread. Experience with similar diseases reveals that while the human costs are significant, the bulk of the economic costs are due to the preventive behaviour of individuals and the transmission control policies of governments. Many countries took action to limit the spread through social isolation policies, such as shutting educational institutions, limiting work and restricting the mobility of people. The preventive actions have had an immediate and significant impact on all economies, and through trade and tourism, on partner economies.

Economic models can be used to model the consequences of pandemics. It focuses on four channels- i) the direct impact of a reduction in employment, ii) the increase in costs of international transaction, iii) the sharp drop in travel; and iv) the decline in demand for services that require proximity between people

Global pandemic and an amplified global pandemic:-

We consider two scenarios; a global pandemic and an amplified global pandemic. In the case of the global pandemic, it is assumed that countries bear only one – half of the impact of the full china shock. In the case of the amplified global pandemic, the shocks are uniform across all countries. A baseline global pandemic scenario sees GDP of the world fall by 2% below the baseline, of developing countries by 2.5 percent, and of industrial countries by 1.8 percent. The declines are nearly twice as large in an amplified pandemic scenario in which containment is assumed to take longer. This study illustrate the transmission channels and heterogenous impact covid-19 on output and trade in different scenarios. The results presented here should be regarded as scenario analyses, not as projections. The given shocks are illustrative and based on previous episodes of global epidemics or on preliminary data.

Global computable general equilibrium Model Envisage:

The quantitative findings are based on simulations using a version of the Envisage model calibrated to GTAP version IOA. Envisage is a relatively standard computable general equilibrium (CGE) model. The model has been configured for a shortterm closure with the following assumptions.

- 1) Production elasticities have been reduced to near zero, so there is little substitution possibilities across inputs in production.
- 2) In order to capture the typically durable relationship within global value chain, trade elasticities for goods have been reduced from their standard values to represent the short-run inability to replace imported components and final goods with products from other countries. The elasticity between domestic and imported goods has been set to 0.4. The elasticity of substitution across import sources has been set to 0.8.
- 3) Labour supply is exogenous, while wages adjust to equate demand and supply of labour. The return to capital is fixed, while supply of capital is endogenous.

Transmission channels:-

The shocks have been divided into four sets, but all are assumed to occur simultaneously. ie the final shock encompasses all shocks. The duration of the shocks is currently unknown, though, based on prior events, it is likely to last from 8-12 weeks and most likely unsynchronised across countries.

The first shock is a drop in employment by 3% below the baseline. With lower availability of labour, we would expect wages, ceteris paribus, to rise, while return to capital is unchanged under our assumptions. Lower labour means lower demand for capital, as firms need a combination of labour and capital to produce goods and services.

Under utilization of capacity takes place due to factory closures as well as social distancing forcing workers to stay at home. Due to higher rates of contagion, immediate unemployment consequences of covid-related business closures and negative demand shock, we conservatively assume the underutilization of the labour force to be 3% on average over the whole year across all sectors of the economy.

The second shock raises the international trade costs of imports and exports by 25%. The shock is applied across all goods and services. Trade costs arise when goods cross borders. The assumed increase in transport and transaction costs in foreign trade is driven by additional inspections, reduced hours of operation, road closures, border closures, increase in transport costs, etc.

The third shock entails a sharp drop in international tourism. This is captured via a 50% consumption tax on international tourism- related services, such as transport, accommodation etc. This generates typically small revenue for the relevant countries that is rebated back to households with a lumpsum. The export tax is applied to both outbound and inbound services that include; accommodation, food and service activities, water, air and other transport, and recreational and other services. The effects of covid-19 in the tourism, hospitality and recreation sectors have been unprecedented. In the accommodation and lodging sectors, quarterly revenues are down 75% . Travel agents saw a slowdown in bookings of 50% in march 2020. Airlines world wide are expected to lose \$ 113 billion in revenues for 2020.

The fourth shock represents a demand switch by households who purchase fewer services requiring close human interaction, such as mass transport, domestic tourism, restaurants and recreational activities, while redirecting demand towards consumption of goods and other services. Demand for the targeted services assumed to drop by 15% . This results in a reallocation of household demand across sectors, while total expenditures are still driven by previous shocks and relative prices of goods in the consumption. How the corona virus hit the different sectors and affects the economy is presented in figure 1.

It is difficult to estimate the impact of social distancing and overall decline of economic activity on those selected sectors, but anecdotal evidence suggest that it is likely to be significant. Depending on the length of the business closures, the annual impact could vary drastically. The decline of 15% at an annual level seems like a middle of the road estimate.

Scenarios:-

We start by considering the effects of covid-19 on world supply capacity, trade costs, international tourism and demand switching as discussed above. Then, we study the consequences of similar shocks under the “ amplified global pandemic” scenario

“Global Pandemic” scenario:

The shocks are implemented to the full degrees in china, but other countries experience amounting to only half the shocks described below.

- i) underutilization of labour by 3% across all sectors in the global economy results in declining capital usage.
- ii) Trade costs of global imports and exports increase by 25% applied across all goods and services.
- iii) Sharp drop in international tourism (captured via a 50% tax on inbound and outbound tourist related services such as transport, accommodation,etc).
- iv) Reallocation of demand away from sectors requiring human interaction.

“ Amplified global pandemic scenario”

In the amplified global pandemic scenario, there is a bigger reduction in annual output due to a deeper and more prolonged pandemic. The same shocks are assumed in all countries, effectively doubling the shocks for all countries and keeping the china shock unchanged.

Macro economic impacts:-

The global pandemic scenario assumes that the pandemic hits china the hardest, but also hurts other countries. The global pandemic is expected to reduce chinese GDP by 3.7% (all percentage changes are reported in relation to the baseline). The impact on china becomes progressively more negative as impacts of the shocks accumulate. First, the supply shock reduces GDP through reduction in employment (and capital) leading to lower production and exports, as well as lower imports due to lower income of households and shrinking production.

With higher trade costs, the price of a unit of imports and exports increases and the competitiveness of chinese production declines due to higher costs of exporting and higher costs of inputs, final goods prices also increase. The rising trade costs represent a productivity loss, since additional inputs are needed to bring goods to their consumers, instead of being available for consumption and investment. Further, inbound and outbound tourism decreases significantly, resulting in further decline of Chinese GDP and exports.

Global GDP is expected to decline by 2.1% while developing countries GDP is expected to decline by 2.5% and high – income countries by 1.9%. The biggest GDP losses, under the global pandemic scenario are expected in East Asia and Pacific (EAP) countries due to their relatively deep integration through trade and direct impact on tourism, e.g. cambodia (3.2%), Singapore (2.1%), Hong Kong SAR, china (2.3%), Thailand (3%), Vietnam (2.7%) , and Malaysia (2.1%).

Exports at the global level are expected to decrease by 2.5%, china, considered to be the “world’s factory”, suffers a decline in production across all sectors and goods, due to an underutilization of labour and capital , and , together with an increase of its trade costs, increases the import costs for the rest of the world, which translates into a decline in global exports. China sees a contraction in exports of 3.7%. Some countries in the East Asia and Pacific region are the most affected in terms of export declines, with Hong

Kong SAR, china, suffering the biggest losses (5.2%), followed by the Lao people's Democratic Republic (3.6%), Cambodia (3.9%) and Singapore (4.4%).(see Table – 2)

Under amplified global pandemic scenarios, global GDP loss reaches 3.9%, while chinses GDP declines by 4.3%. Cambodia and Thailand are expected to record GDP losses of over 6%, while Singapore; Hong Kong SAR, china, Taiwan, the Republic of korea; Malaysia and the Philippines see losses of over 4.5%. High – income countries could see significant losses of GDP, with the estimated loss in the European union over 3.4%, Japan -4.6%, the USA -3.4% and canada -3.2% . Countries in sub-saharan Africa (SSA) and the Middle East and North Africa (MENA) are the least affected, and under the global and amplified global pandemic scenarios, the estimated loss of GDP is estimated to be around 3%. (see Table -1)

Under the amplified global pandemic scenario, global exports decline 4.6%. Several countries that experience larger than global average losses of exports are in the EAP region, such as Hong Kong SAR, china (9.8%), Cambodia (7.4%), Singapore (8.5%), Lao PDR (7.3%), Thailand (6.8%), but also the Russian Federation and the Philippines see losses up of 6.4%, while Canada, Europe, and the USA see declines of around 4.5% with the amplified global spread of the virus, all countries see their total exports decline, but the least integrated regions through trade and tourism, such as MENA, SSA, and Latin America and the Caribbean, are the least affected.

Trade impacts:

In our illustrative simulations of the shocks are identical across countries, and the deep recession under the amplified global pandemic scenario results in negative impacts on exports across all sectors and most destination. Under the amplified global pandemic scenario, USA exports are expected to decline by almost \$85 billion. The most impacted are exports of services, especially tourism and services requiring face-to-face interaction. The biggest declines are expected in exports to Europe and EAP, driven by recession and lower demand in those regions, the main destinations for USA exports in services.

In the case of china, the biggest decline of exports is registered in manufacturing goods, and in Chinese exports directed to the USA, Europe and EAP countries. There is a small increase in exports to ECA and MENA countries. Whereas in Thailand, the biggest impacts are on exports of manufacturing goods and services, with very little impact on agricultural goods or natural resources.

Sectoral output impacts:

The first shock is affecting all sectors in a similar fashion, by limiting the availability of labour and capital, though labour- intensive sectors are likely to be hit harder. The increase in the tourism tax results in a decline of tourism, but all other industries that supply inputs needed to generate tourism services will be impacted by a negative demand shock as well. Finally social distancing results in lower demand for selected sectors, but some substitution towards goods and remaining services sectors. Overall the sectoral impact of the amplified global pandemic scenario (Table 3) leads to a steeper decline in services as compared to agriculture and manufacturing. The biggest negative shock is recorded in the output of domestic services affected by the pandemic, as well as in traded tourist services. At the global level, output of services affected by the pandemic could decline by 9.3%, tourism services could decline by 8.8%, with a decline in agricultural and manufacturing output of about 3%.

Under the amplified global pandemic scenario, Thailand, for example is expected to record an aggregate output loss of 5.3%, the largest drop among the developing countries. All sectors would see a decline of output, but the biggest percentage drops are recorded in transport services, recreational activities, and

accommodation (between 10% and 20%). However, the sectors that suffer the most in absolute terms include trade and selected agricultural (crops) and manufacturing goods (chemicals, electronics, refined oil). These are the real impacts on the volume of output.

The primary focus is necessarily on containment, treating the ill and helping communities cope with the epidemic. Our illustrative scenario indicate that the potential loss of income in affected countries could be significant, with global GDP declining by up to 3.9% and developing countries hit the hardest (4% on average but some over 6.5%). Governments will need to offer significant support to affected businesses and households. A global crisis requires a global response and there is a need for global collaboration not just on health, but also on trade, finance and macro economic policies. Fortunately, global institutions are beginning to catalyze and co-ordinate global efforts, as well as to provide technical and financial support to countries coping with the health and economic consequences of the outbreak.

Conclusion: Never before in the history of mankind such a kind of virus breakouts and brought immense damage to the men and materials around the globe. Its impacts on GDP and volume of trade are different in different countries. A global crisis requires a global response and there is a need for global collaboration not just on health, but also on manufacturing, trade, finance and macroeconomic policies and make the world economies resilient in its path.

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Figure 1. Implications of the COVID-19 as implemented in the Envisage model.

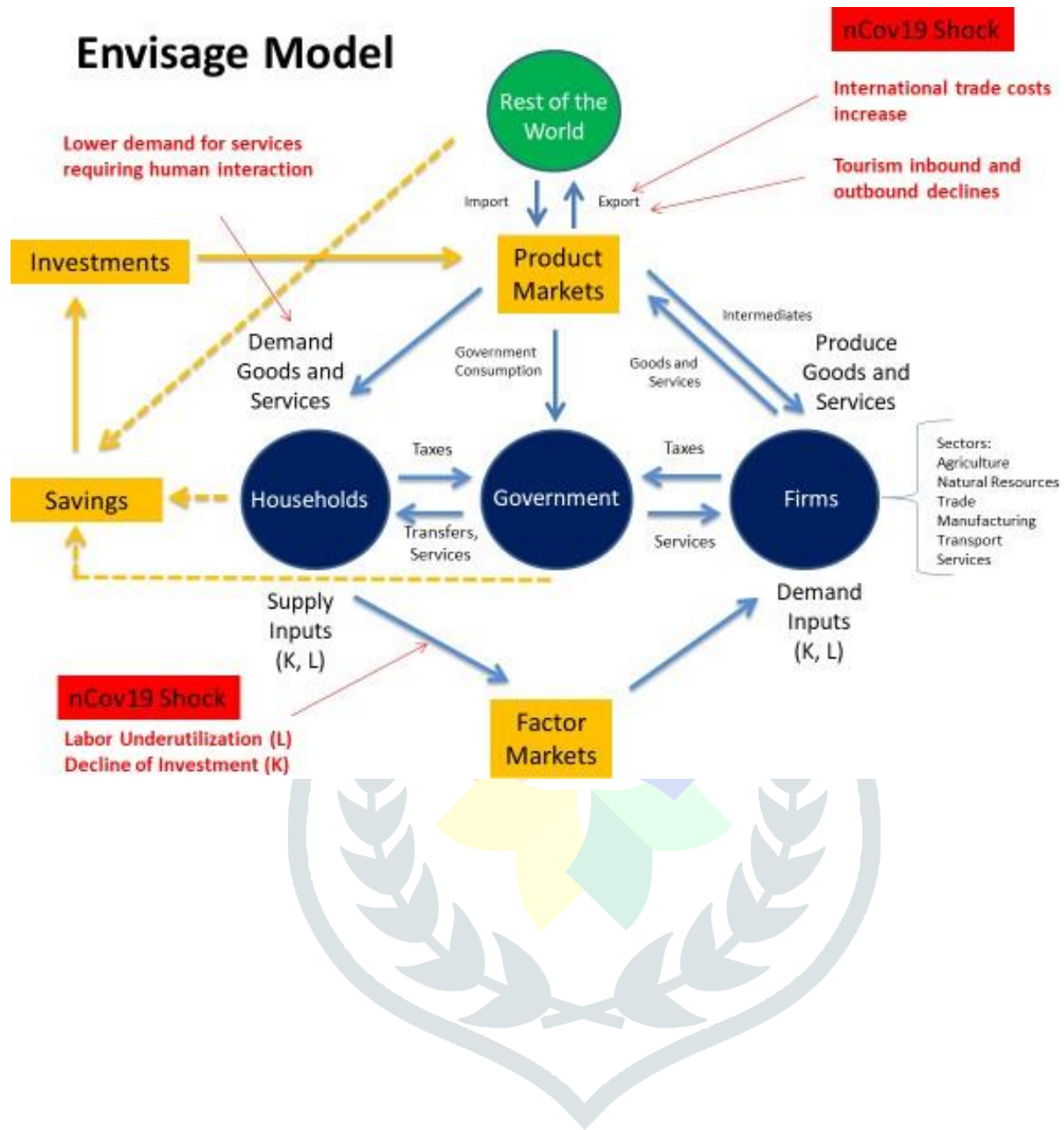


Table 1: GDP implications of various scenarios - cumulative impacts (% deviations from the benchmark)

	Global pandemic	Amplified global pandemic
China	-3.69	-4.31
Developing EAP excluding China	-2.38	-4.76
Cambodia	-3.21	-6.57
Lao PDR	-2.15	-4.05
Malaysia	-2.09	-4.23
Thailand	-3.03	-6.21
Vietnam	-2.65	-4.49
Philippines	-2.46	-4.80
Indonesia	-1.74	-3.51
Hong Kong SAR, China	-2.31	-4.82
Korea, Rep.	-2.44	-4.89
Singapore	-2.08	-4.45
Taiwan, China	-2.81	-5.67
Canada	-1.57	-3.18
Europe	-1.85	-3.85
Japan	-2.23	-4.57
United States	-1.67	-3.40
Middle East & North Africa	-1.38	-2.95
Sub-Saharan Africa	-1.44	-2.95
Brazil	-1.71	-3.42
Rest of Latin America & Caribbean	-1.85	-3.73
Russian Federation	-1.94	-3.99
Rest of Europe & Central Asia	-2.21	-4.60
India	-2.41	-4.93
Rest of South Asia	-2.31	-4.68
Oceania	-1.70	-3.37
Developing countries	-2.49	-4.00
High-income countries	-1.84	-3.77
World Total	-2.09	-3.86

Source: Envisage simulations

Table 2: Real exports implications of various scenarios - cumulative impacts
(% deviations from the benchmark)

	Global pandemic	Amplified global pandemic
China	-3.73	-3.08
Developing EAP excluding China	-1.75	-4.07
Cambodia	-3.89	-7.40
Lao PDR	-3.57	-7.29
Malaysia	-2.45	-5.28
Thailand	-3.40	-6.81
Vietnam	-1.00	-2.82
Philippines	-2.94	-6.35
Indonesia	-1.38	-3.21
Hong Kong SAR, China	-5.18	-9.80
Korea, Rep.	-1.90	-3.95
Singapore	-4.39	-8.48
Taiwan, China	1.14	1.07
Canada	-2.30	-4.73
Europe	-2.48	-4.86
Japan	-1.04	-2.33
United States	-2.37	-4.60
Middle East & North Africa	-2.22	-4.87
Sub-Saharan Africa	-1.87	-4.29
Brazil	-2.03	-4.27
Rest of Latin America & Caribbean	-2.21	-4.76
Russian Federation	-3.49	-7.44
Rest of Europe & Central Asia	-2.89	-5.72
India	-1.68	-3.45
Rest of South Asia	-1.99	-4.12
Oceania	-2.32	-4.98
Developing countries	-2.80	-4.54
High-income countries	-2.30	-4.59
World Total	-2.50	-4.57

Source: Envisage simulations

Table 3. Output implications of amplified global pandemic – cumulative impacts

(% deviations from the benchmark)

	Agriculture	Natural resources	Manufacturing	Services	Domestic services affected by pandemic	Trade and tourist services	Total
China	-3.12	-1.08	-3.61	-3.67	-4.85	-4.64	-3.54
Developing EAP excluding China	-2.70	-1.04	-3.21	-5.40	-9.45	-11.28	-4.12
Cambodia	-2.87	-3.98	-2.69	-9.66	-14.96	-19.00	-5.11
Lao PDR	-2.41	-3.89	-2.60	-5.85	-12.18	-15.02	-3.57
Malaysia	-4.19	-0.79	-4.11	-4.34	-7.30	-9.73	-4.03
Thailand	-3.06	-2.91	-4.43	-6.84	-11.53	-14.64	-5.29
Vietnam	-3.06	-0.72	-3.34	-3.93	-8.52	-8.99	-3.37
Philippines	-2.51	-2.65	-3.93	-5.16	-11.10	-13.30	-4.44
Indonesia	-2.70	-0.61	-3.03	-3.67	-7.65	-8.84	-3.15
Hong Kong SAR, China	-1.29	-3.24	-1.33	-6.06	-8.46	-9.23	-5.35
Korea, Rep.	-3.91	-4.25	-3.68	-4.53	-6.87	-6.15	-4.10
Singapore	-2.61	-3.47	-4.32	-4.01	-7.18	-6.28	-4.11
Taiwan, China	-1.04	-7.75	-1.80	-6.84	-7.82	-7.17	-4.15
Canada	-4.30	-1.10	-3.25	-3.02	-8.95	-9.16	-2.96
Europe	-3.00	-1.02	-2.89	-4.02	-9.04	-9.06	-3.65
Japan	-4.71	-2.85	-2.77	-4.62	-8.75	-8.35	-3.98
United States	-3.60	-0.21	-2.45	-3.80	-9.99	-11.27	-3.38
Middle East & North Africa	-2.76	-1.65	-2.67	-3.02	-9.11	-10.03	-2.65
Sub-Saharan Africa	-2.51	-1.72	-2.95	-3.02	-6.35	-8.13	-2.79
Brazil	-3.40	-1.20	-2.86	-3.14	-8.55	-9.28	-2.99
Rest of Latin America & Caribbean	-2.64	-1.21	-2.94	-4.05	-10.51	-11.87	-3.49
Russian Federation	-3.00	-2.19	-3.73	-3.86	-8.72	-9.62	-3.58
Rest of Europe & Central Asia	-2.20	-0.59	-3.53	-5.07	-10.20	-11.36	-4.20
India	-3.36	-0.84	-3.98	-4.35	-8.23	-8.76	-4.03
Rest of South Asia	-2.62	-2.64	-3.25	-5.23	-8.04	-9.28	-4.14
Oceania	-3.93	-1.89	-3.10	-3.20	-8.21	-8.07	-3.11
Developing countries	-2.90	-1.42	-3.47	-3.87	-7.98	-8.63	-3.51
High-income countries	-3.49	-0.95	-2.78	-4.00	-9.20	-9.60	-3.59
World Total	-3.04	-1.29	-3.13	-3.95	-8.77	-9.26	-3.56

Note: Agriculture – Crops, Livestock; Manufacturing - Meat products (incl. fisheries), Other food, Textiles, Wearing apparel, Leather products, Wood and paper products, Refined oil, Chemical products (incl. rubber and plastics), Non-metallic minerals, Metals, Computer, electronic and optical products, Machinery and equipment nec, Motor vehicles and parts, Transport equipment nec, Other manufacturing; Services – Electricity, Construction, Trade incl. warehousing, Accommodation, food and service activities, Water transport, Air transport, Other transport, Communications, Recreational and other services, Other services; Natural resources - Natural resource products, Fossil fuel extraction; Domestic services affected by pandemic - Trade, Accommodation, food and service activities, Water transport, Air transport, Other transport, Recreational and other services; Traded tourist services - Accommodation, food and service activities, Water transport, Air transport, Other transport, Recreational and other services.

Source: Envisage simulations