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# **COVID-19 AND ARMENIA 2020**

## **MEASURING FORGONE OUTPUT**

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DEVELOPMENT RESEARCH NOTE**

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# COVID-19 AND ARMENIA 2020

## MEASURING FORGONE OUTPUT

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### Key Findings

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- The note estimates (hindcast and forecast) missed production in Armenia in 2020 to be larger than during the Great Recession but smaller than during the collapse of the Soviet Union.
- The supply shocks are the largest during the lockdown months of the second quarter but will continue to the third and fourth quarters of 2020.
- Decreased remittance inflows from Russia will cause lower aggregate demand with the largest shock in the third quarter of 2020.

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# COVID-19 and Armenia 2020

## Measuring Forgone Output

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### Introduction

Once Paul Samuelson famously mocked the predicting ability of the market saying that the ‘indices predicted nine out of the last five recessions.’ Indeed, false alarms are an embarrassment for those involved in forecasting, but this is one of those rare cases that we – the authors of this piece – would love to be proven wrong.

Recently, Paul Krugman claimed that 2020 has brought an unprecedented – by cause and depth – economic crisis but was still suggesting looking for answers in history. Gevorkyan (2020) suggested that a COVID-induced recession will resemble the post-communist recession as the global value chains were disrupted - and both supply and demand for the products may be on halt.

While Astrov *et al.* (2020) predict the economies of CEE to be back to expected in the second half of 2020, the Armenian reality will be much different. The reasons are various, including the prolonged severe spread of the virus and the ever-existing risk of getting the second wave shocks due to remittance dependence.

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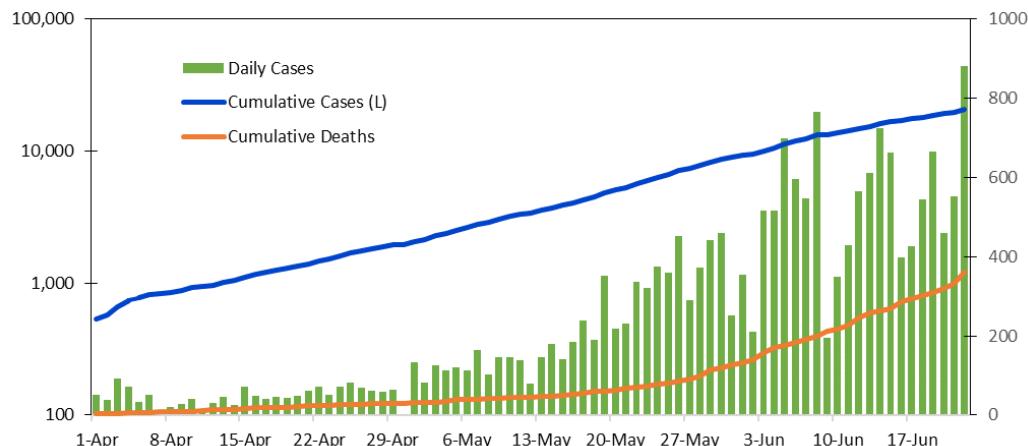
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According to our most-probable scenario, the magnitude of the COVID-induced decline in the Armenian economy will likely surpass the record of the Great Recession at least from the duration point of view, only moments shy of repeating the debacle of the early 90s.

This crisis is unique because its duration, severity and depth depend heavily on epidemiological data and assumptions. In this document we attempt to quantify the short-term impact of the COVID-induced shocks on the output. In doing so, we are not aiming to forecast GDP change, but rather estimate the loss compared to what would have otherwise been.

Our approach to the quantification of the short-term impact of the pandemic on the Armenian economy is rather straightforward and is practically borrowed, one could say, from a proverbial *Econ 101* textbook: we will analyse the COVID-19 shocks from the demand and the supply sides.

*Figure 1: Epidemiological situation in Armenia as of June 22<sup>nd</sup>*



Source: WHO, Moody's Analytics

First, we will (gu)estimate the magnitude of supply shocks arising from, among other things, the lockdown, restriction of movement and travel, economic activity, etc. For this we base our calculations on results from a unique survey carried out by the American University of Armenia in late-May 2020. Here, we assume that the shocks are proportional to the number of fired people, people on forced unpaid leave, and those

experiencing decreased salaries in each sector, augmenting this data with sectorial and time specifics.

Second, we will calibrate the demand shocks using a well-established proxy: the private transfers from Russia, the economic centre of gravity for the region. Here, the underlying assumption is that virtually all private transfers feed directly into final consumption.

The practical beauty of our approach is that it does not rely on any actual forecast or quantitative estimate of economic performance prior to COVID-19 shock. Rather, our quantitative results show an overall loss of output relative to what it could have been were there no pandemic. Thus, a practitioner can apply both the methodology and the resulting magnitudes to any projection of output level. At the same time, what follows is a simple and tractable sequence of estimations that can serve as a solid starting point should someone desire to enrich the setup and use updated real-world data.

### **Supply Shocks**

Table 1 below shows our assumptions about the size of the shocks relative to the same period under ‘normal’ conditions. For instance, the arts and entertainment sector has lost 75% of value added in April compared to what it could have generated were there no infection; note that we assume increased use of water due to heightened sanitary requirements. The calibration itself is based on a combination of our expert judgement and a phone-survey dataset that was collected in late-May of 2020 by the Center for Business Research and Development at AUA. Over 1300 working-age respondents from various regions of Armenia - both rural and urban - answered a set of questions (covering various questions on experience, behaviour, attitudes and such like) using their own smart devices, in return for entry into a lottery that may potentially award them over 5% of an average monthly salary.

*Table 1: Industry-level deviations, %from concurrent counterfactual*

	Mar	Apr	May	Jun	Jul - Sept	Oct - Dec
Arts; entertainment and recreation	19	75	46	41	37	35
Accommodation and food service activities	17	75	65	40	38	38
Transportation and storage	4	55	45	34	16	14
Wholesale and retail trade; repair of motor vehicles	18	44	31	20	12	9
Manufacturing	17	42	30	20	12	9
Real estate activities	50	75	60	35	17	11
Electricity; gas; steam and air-conditioning supply	0	5	5	5	5	5
Construction	38	87	47	0	0	0
Education	8	22	18	12	8	6
Financial and insurance activities	5	16	6	6	6	6
Public administration and defence; social security	0	3	3	2	0	0
Professional; scientific and technical activities	12	31	25	17	10	8
Other service activities	13	40	33	24	18	15
Water supply; sewerage; waste management	-5	-25	-15	-15	-15	-15
Agriculture; forestry and fishing	13	33	28	18	10	7
Administrative and support service activities	17	46	46	30	18	14
Activities of households as employers	6	18	7	7	7	7
Information and communication	4	16	14	11	9	8
Mining and quarrying	6	13	12	7	4	2
Human health and social work activities	8	28	23	18	12	4

Source: AUA

*Table 2: Industry-level impacts on GDP, %from concurrent counterfactual*

	Mar	Apr	May	Jun	Jul - Sept	Oct - Dec
Arts; entertainment and recreation	1.05	4.13	2.53	2.26	2.02	1.93
Accommodation and food service activities	0.31	1.35	1.17	0.72	0.69	0.68
Transportation and storage	0.14	1.87	1.53	1.16	0.56	0.48
Wholesale and retail trade; repair of motor vehicles	2.25	5.50	3.88	2.50	1.54	1.17
Manufacturing	2.07	5.12	3.66	2.44	1.46	1.14
Real estate activities	4.70	7.05	5.64	3.29	1.63	1.03
Electricity; gas; steam and air-conditioning supply	0.00	0.23	0.23	0.23	0.23	0.23
Construction	3.19	7.31	3.95	0.00	0.00	0.00
Education	0.25	0.68	0.56	0.37	0.25	0.19
Financial and insurance activities	0.28	0.90	0.34	0.34	0.34	0.34
Public administration and defence; social security	0.00	0.16	0.16	0.10	0.01	0.00
Professional; scientific and technical activities	0.16	0.40	0.33	0.22	0.13	0.11
Other service activities	0.12	0.36	0.30	0.22	0.16	0.14
Water supply; sewerage; waste management	-0.03	-0.13	-0.08	-0.08	-0.08	-0.08
Agriculture; forestry and fishing	2.20	5.58	4.73	3.04	1.69	1.24
Administrative and support service activities	0.17	0.46	0.46	0.30	0.18	0.14
Activities of households as employers	0.01	0.02	0.01	0.01	0.01	0.01
Information and communication	0.15	0.61	0.53	0.42	0.33	0.30
Mining and quarrying	0.19	0.42	0.38	0.22	0.12	0.06
Human health and social work activities	0.38	1.34	1.10	0.86	0.59	0.21
<b>Total</b>	<b>17.58</b>	<b>43.35</b>	<b>31.40</b>	<b>18.62</b>	<b>11.85</b>	<b>9.31</b>

Source: AUA, CBA

We then use the industry's long-run normalized average shares in GDP to calculate the individual impact effects. In doing so we utilise the empirical observation that main components of GDP tend to have relatively stable shares in output; the data is sourced from the CBA website.

Table 2 shows the time-varying effects on GDP of each economic sector. These can then be summed up to arrive at an estimate of the gross impact. Specifically, in April there's a 43.4% decline in gross value added relative to the 'normal' level of activity. Due to the gradual removal of restrictions by the government, the impact is less severe in the two months to June, marking the average Q2 impact at 31.2%.

#### **Demand Shock Calibration**

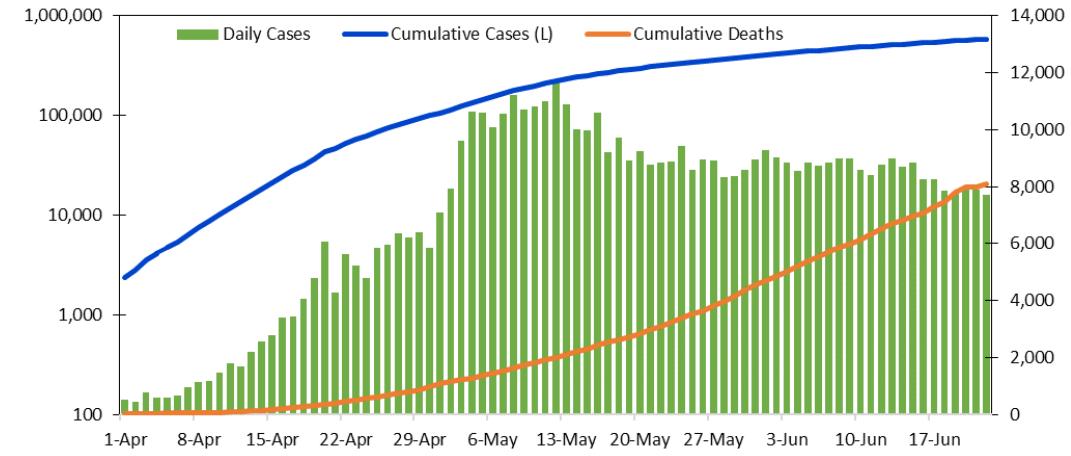
Any consideration of the economic outlook of Armenia is incomplete without considering the developments in the economic gravity centre of the region, the Russian Federation. While the lift-off of the infection started somewhat later compared to major European peers, nevertheless the country has been battered by the infection peaking in the first half of May. Since then, the daily incidence has been somewhat stabilized with a very cautious dynamic towards decrease. And yet the situation is far from being resolved. Therefore, we see 2020 as a lost year for the Russian economy (see Figure 3).

One of the main links between the Armenian and the world - mostly, Russian - economy are the private transfers, or remittances. The size of the net remittance inflow into Armenia went down from slightly short of 20% to about 12% of the GDP in the last half a dozen years; however, it is still a large part of the income (and thus consumption) for the poorer households.

The remittance shock to Armenia will be larger than expected from the COVID-induced recession because of the additional lower oil prices that results in lower non-tradable goods demand in Russia that needs fewer migrants and thus leads to lower remittances (World Bank, 2020).

Further, the disruption of movement between countries may majorly contribute to lower remittances (Kalantaryan & McMahon, 2020). Though plenty of anecdotal evidence exists claiming that a large share of the usual *gastarbeiter* population remained in Armenia and is employed in agriculture and thus large agricultural production can be expected, there is no systematic evidence yet to support the hypothesis.

*Figure 2: Epidemiological situation in Russia as of June 22<sup>nd</sup>*



Source: WHO, Moody's Analytics

Our approach to calibration of inter-quarter demand shocks is summarised in the following steps.

**First**, we establish the empirical regularity that the dynamics of private transfers to Armenia follow very closely the nominal GDP growth in Russia (see Figure 3), and then we use this relationship to fit a simple linear model to explain remittance flows using contemporaneous GDP growth as the driver.

**Second**, we use the estimated model<sup>3</sup> and Moody's Analytics February and June vintage forecasts for the Russian GDP growth to predict correspondingly a) the counterfactual and b) the most likely remittance flows. The percentage deviation between the two measures will give us the demand-side analogue of supply shocks as presented in Table 1. The results are shown in Figure 4.

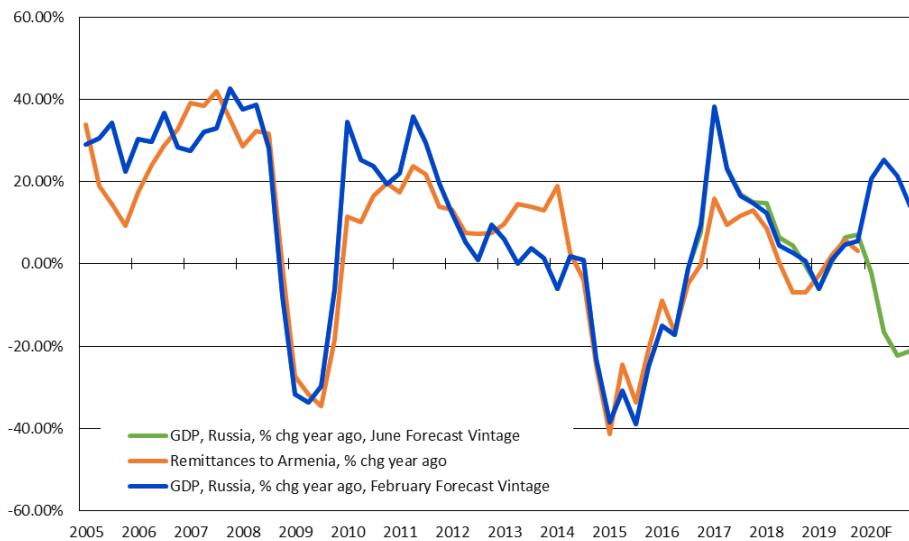
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<sup>3</sup> R-squared of 84.6%, p-value < 0.0001.

**Third**, and finally, we use the ratio of remittances in GDP for the Armenian economy to quantify the impact of the deviations as shown in Figure 4: we use a value of 11%. Thus, we obtain the demand-side equivalent of Table 2.

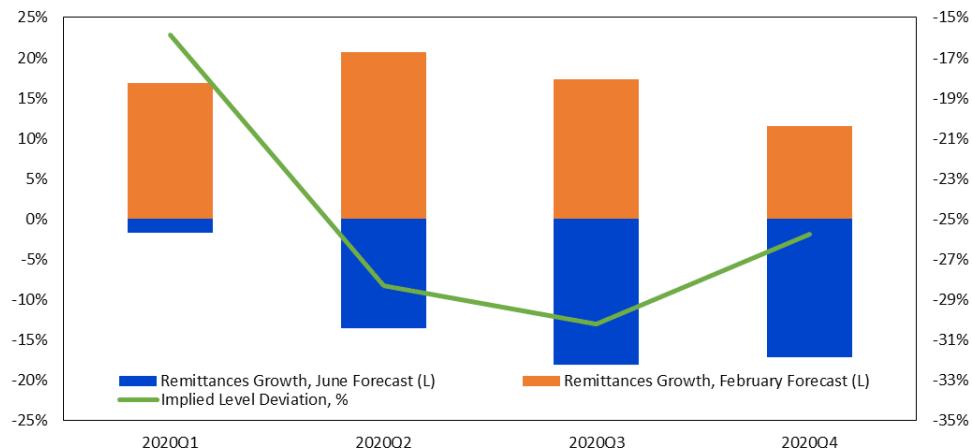
We do appreciate the data-driven limitations of this approach in that not all of domestic demand is driven by remittances. Hence, any and all outcomes of the analysis should only be viewed as a lower bound on potential impact.

*Figure 3: Private transfers to Armenia largely driven by Russian economy*



Source: CBA, ROSSTAT, Moody's Analytics

*Figure 4: Private transfers to Armenia largely driven by Russian economy*



Source: CBA, ROSSTAT, Moody's Analytics

### **Aggregation**

Having obtained quarterly impacts on GDP from both supply and demand sides, we can proceed to aggregate those in an additive fashion. As can be seen from Table 3, currently the supply side is the driving force behind the expected economic decline. Note that the magnitude of demand shocks is at a lower bound and may likely go up with further refinements.

*Table 3: COVID19-induced demand and supply shocks to the Armenian economy in 2020<sup>4</sup>*

	2020Q1	2020Q2	2020Q3	2020Q4
Demand side	-1.76	-3.14	-3.35	-2.86
Supply side	-5.86	-31.20	-11.85	-9.31
Aggregate shocks	-7.62	-34.34	-15.20	-12.17

Source: Moody's Analytics, AUA

### **An Afterword**

In our view, the risks to the impact quantified in this paper are skewed towards the downside, especially with regards to the second half of 2020. A number of factors threaten a more severe outcome:

- » There is a chance that a significant part of the estimated demand shock in Q2 may in reality transfer to Q3 and Q4 in the form of unrealized pent-up demand. In practice, this means that the loss of income in Q2 was countered by physical inability to spend (e.g., due to lockdowns); however, this also means failure to generate savings for future use.
- » The still-rising incidence of daily cases poses a serious healthcare risk both regionally and globally and can trigger isolationist policies, even though temporal, towards the

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<sup>4</sup> March supply shock is assumed to be representative of Q1.

- country. This will further exacerbate the issue with remittances by complicating the return of Armenian seasonal workers to traditional markets in Russia and elsewhere.
- » The Armenian economy is prone to absorbing external shocks with a noticeable delay: The Great Recession and the aftermath of the Russian crisis in 1998-1999 are appropriate examples. This means that what we currently view as largely a supply shock, has the potential to transform into a full-blown demand-driven recession going into 2021.
  - » Finally, political uncertainty caused by the recent developments may halt project implementation and foreign investment.

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