Labuan Bulletin of International Business & Finance

Volume 19 Issue 1 eISSN 2600- 7894

I'LL BE BACK – ARE SHOCKS TO COVID-19 TOTAL CONFIRMED CASES PERMANENT OR TRANSITORY?

Chiu Yue Wan[1], Tuck Cheong Tang[1*]

[1]*Department of Economics, Faculty of Economics & Administration, Universiti Malaya, Malaysia*
**Corresponding author's email: tangtuckcheong@um.edu.my*

ABSTRACT

The objective of this study is to examine the possible next wave(s) of Covid-19 for 209 countries. The data are total confirmed cases of Covid-19 for the periods spanning between 31 December 2019 and 5 October 2020. The results of unit root tests with a breakpoint suggest 34% (71 countries) of the countries worldwide are transitory (stationary). That is, the shocks such as lockdown have inappropriate effects on the cases of Covid-19. Their next wave of Covid-19 is determining. A 44% (91 countries) of the total has their total confirmed cases of Covid-19 permanent (a unit root), indicating that the next wave is unlikely after the shocks. Other countries are inconclusive. Different continents deliver different findings. This study is relevant to policymakers in both fiscal and monetary policies, as well as international business and finance.

***JEL classification**: C22; I19.*
***Keywords**: Breakpoint, Covid-19, permanent, transitory, unit root tests.*

Received: November 23, 2020
Revised: March 19, 2021
Accepted: March 23, 2021

1. INTRODUCTION

"*The wave is not the water. The water merely told us about the wave moving by.*"
by Buckminster Fuller (1895-1983)

The outbreak of Coronavirus (now known as Covid-19) in Wuhan of Hubei region, China has spread to numerous countries in an essentially short period, and the World Health Organization (WHO) has declared it as a public health emergency on 11 February, 2020. The WHO has announced that Covid-19 classified as a pandemic a month later. Immediate responses, especially the lockdowns (or "shocks", more technically used here) implemented by many countries (or cities), are relatively appropriate in "flattening the curve" in their first wave. However, as reported on 17 November 2020, the US has entered its third wave while India and Brazil seem to still be on one big wave. Several countries in Europe are experiencing their second and third waves. Another example, Iran

has been considered the worst in the region, and the country is experiencing a second wave.[1]

As inspirited by Smyth et al. (2009)'s study entitled "*I've been to Bali too' (and I will be going back): are terrorist shocks to Bali's tourist arrivals permanent or transitory?*", this study aims to examine whether the total confirmed cases of Covid-19 is transitory (stationary) or permanent (has a unit root) for a total of 209 *countries*.[2] Smyth et al. (2009) apply the unit root tests to test the null hypothesis that tourist arrivals to Bali contain a unit root, which is following a shock (terrorist attack) tourist arrivals will not return to their stable growth path. It implies that the effects of the shock will be permanent. If the null hypothesis is rejected, a stationary property suggests that following the shock, tourist arrivals will return to their long-run growth path, and the impact of the shock on varied tourist numbers will only be transitory (Smyth et al., 2009, p. 1368). Among other similar studies are Lean and Smyth (2009), Smyth et al. (2009), Tang and Wong (2009), and Yucel (2020).

Following their fashion, this study postulates the null hypothesis that the total confirmed cases of Covid-19 have a unit root or permanent in the current setup. It reflects that the shocks (such as lockdowns and other responses to Covid-19 outbreaks[3]) have a permanent effect on the cases of Covid-19, or so-called "flattening the curve" as they will not return to their stable growth path. The likelihood of the next wave is least likely. Meanwhile, a rejection of this hypothesis suggests stationary or transitory total cases of Covid-19. It eventually shows that they will return to their long-run patch indicating the possibility of the next wave(s) that the shocks have no desirable impact on the cases of Covid-19. This study symbolises this hypothesis as *"I'll be back"*, a catchphrase associated with Arnold Schwarzenegger from the science fiction film, The Terminator in 1984.

A recent study by Bahmani-Oskooee et al. (2021) has tested the stochastic properties of the daily accumulated number of confirmed cases of Covid-19 between 01/01/2020 and 14/05/2020 in the 20 countries using fourier quantile unit root test. They find that the negative shocks have long-lasting effects in all countries, except for China, while positive shocks have permanent effects in some countries. However, this study looks at a different perspective of unit root tests, as noted early.

Broadly speaking, the concept of stationarity in time series by the mean of unit root tests has been widely applied in empirical studies because of its relevant implications for economic modelling and theoretical applications. A seminal work by Nelson and Plosser (1982) shows plenty of arguments concerning the dynamic properties of macroeconomic and financial time series. They test the stationarity of U.S. long historical macroeconomic time series, i.e., real GNP, nominal GNP, real per capita GNP, industrial production, employment, unemployment rate, GNP deflator, consumer prices, wages, real wages, money stock, velocity, bond yield, and common stock prices. More recent works

[1] See, "Infographic: What a third COVID-19 wave could look like", retrieved from https://www.aljazeera.com/news/2020/11/17/infographic-what-a-third-covid-19-wave-looks-like

[2] They include countries, territories and areas based on the data avaibale in "Our world in data – Coronavirus (Covid-19) cases" as listed in **Appendix B**. For example, Western Sahara is a disputed territory on the northwest coast and in the Maghreb region of North and West Africa. In general, there are 195 countries in the world today, which comprises 193 countries that are member states of the United Nations, and 2 countries that are non-member observer states, namely the Holy See and the State of Palestine**.**

[3] It excludes Covid-19 vaccine 'shock' as it has not been released for public during the research sample period, 31 December 2019 - 5 October 2020. China has approved the emergency use of CanSino Covid-19 vaccine for the military personnel on 25 June 2020, while Russia's Sputnik V for healthcare workers on 11 August 2020.

revisiting their data are Pascalau (2010) and Charles and Darne (2011). For example, the latter finds the rejection of the unit root null hypothesis for five of the fourteen Nelson–Plosser macroeconomic time series, namely real GNP, real per capita GNP, industrial production, employment, and unemployment.[4]

The findings of unit root tests offered by this study contribute a predicative on the next wave(s) of the Covid-19 outbreak for 209 countries. The next wave is most likely to occur if the total cases of Covid-19 are transitory (or stationary). Perhaps, some countries are inconclusive. Their findings have feasible economic implications, in particular on international business and finance. The IMF (International Monetary Fund) has collected and reported in *Policy Tracker- Key Policy Responses* for the countries responses to Covid-19 including their fiscal, monetary and macro-financial, exchange rate, and balance of payments (BoP)[5]. Vuchkova et al. (2018) noted that the combination of confinement and protectionist measures, including export bans, import tariffs, and border closures implemented to curb Covid-19, has affected multinational enterprises (MNEs) by increasing their trade costs and amplifying the costs of communicating tacit knowledge. OECD (March, 2020) outlines that businesses are *monetarily* tensioned for debt repayments, taxes, and significant operational expenses, thus reducing costs and employment. Higher defaults on business (and household debt) would erode the asset quality of banks and other lending institutions. Many central bankers of OECD countries, in fact, have considered further monetary policy to ensure well-functioning markets. Clearly, according to OECD, external private finance inflows to developing economies could drop by USD 700 billion (60%) in 2020 compared to 2019 levels, exceeding the immediate impact of the 2008 Global Financial Crisis. It increases its vulnerability to future pandemics, including climate change and other global public bads (OECD, 24 June 2020).

Following sections include a brief documentation of the data used, and the testing method applied, i.e. Augmented Dickey-Fuller (ADF) unit root test with breakpoint (Dickey & Fuller, 1979). Section three reports and discusses the empirical findings of ADF unit root test with a structural break according to their respective continents, that is either their total confirmed cases of Covid-19 are either transitory or permanent. The last section refreshes this study.

2. DATA AND UNIT ROOT TESTS

The variable used in this study is the total confirmed cases of Covid-19. The data are available from the "*Our World in Data*" provided by the University of Oxford and the Global Change Data Lab along with the European Centre for Disease Prevention and Control (ECDC).[6] This study covers a total of 209 countries. Their time series plots of the country's total confirmed cases of Covid-19 are depicted in **Appendix A**. This study has further categorized them into their respective continent via Africa (55 countries), Asia (46 countries), Europe (51 countries) North America (36 countries), Oceania (8 countries), and South America (13 countries), see the first column of **Appendix B**. The data are on

[4] Other studies have looked at a particular macroeconomic time series, including real GDP (Stock & Watson, 1986; Smyth & Inder, 2004; Cushman, 2016; Canarella, Gupta, Miller, & Omay, 2019), inflation (Liu, Chang, Su, & Lobont, 2017), unemployment (Cevik & Dibooglu, 2013), and the components of Balance of Payments (BoP) such as current account balance (Apergis, Katrakilidis, & Tabakis, 2000; Greenidge, Holder, & Moore, 2009; Kuo, 2016), financial account balance (Ng & Tang, 2019), and net errors and omissions (Liung & Tang, 2019).

[5] See, "Policy responses to Covid-19", retrieved from https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19#B

[6] See, "Our world in data – Coronavirus (Covid-19) cases", retrieved from https://ourworldindata.org/covid-cases

a daily basis ranging between 31 December 2019 and 5 October 2020. Mostly for the 209 countries observed, the total confirmed cases of Covid-19 exhibit an increasing trend associated with a structural break(s).

Table 1: Top 10 countries of total confirmed cases of Covid-19, per day (in millions).

Country (period)	Total	Mean	Median	Maximum	Standard Deviation
United States (21/1/2020 - 5/10/2020)	637m	2.275m	1.498m	7.418m	2.413m
Brazil (26/2/2020 - 5/10/2020)	354m	1.266m	0.248m	4.915m	1.626m
India (30/1/2020 - 5/10/2020)	308m	1.103m	0.101m	6.624m	1.788m
Russia (1/2/2020 - 5/10/2020)	115m	0.409m	0.286m	1.215m	0.420m
Peru (7/3/2020 - 5/10/2020)	63.0m	0.297m	0.253m	0.828m	0.269m
Spain (1/2/2020 - 4/10/2020)	61.4m	0.220m	0.232m	0.790m	0.200m
Mexico (29/2/2020 - 5/10/2020)	56.0m	0.206m	0.061m	0.762m	0.252m
South Africa (6/3/2020 - 5/10/2020)	53.3m	0.252m	0.095m	0.681m	0.271m
United Kingdom (1/2/2020 - 5/10/2020)	50.9m	0.182m	0.229m	0.503m	0.148m
Colombia (7/3/2020 - 5/10/2020)	47.8m	0.229m	0.071m	0.855m	0.280m

Table 2: Bottom 10 countries of total confirmed cases of Covid-19, per day.

Country (period)	Total	Mean	Median	Maximum	Standard Deviation
Anguilla (27/3/2020 - 5/10/2020)	572	2.964	3	3	0.187
Vatican (7/3/2020 - 5/10/2020)	2170	10.585	12	12	2.940
Montserrat (21/3/2020 - 5/10/2020)	2201	11.116	11	13	2.573
Falkland Islands (4/4/2020 - 5/10/2020)	2285	12.351	13	13	2.251
Greenland (20/3/2020 - 5/10/2020)	2461	12.305	13	14	2.267
Saint Kitts and Nevis (26/3/2020 - 5/10/2020)	2980	15.361	15	19	2.914
Bonaire Sint Eustatius and Saba (2/4/2020 - 5/10/2020)	3031	16.209	7	124	23.935
Dominica (23/3/2020 - 5/10/2020)	3530	17.919	18	31	4.088
British Virgin Islands (27/3/2020 - 5/10/2020)	3611	18.710	8	71	22.927
Laos (25/3/2020 - 5/10/2020)	3717	19.062	19	23	3.643

Tables 1 and 2 reports the summary statistics of the top 10 and bottom 10 countries of total confirmed cases of Covid-19, respectively.[7] As of 5 October 2020, the United States has recorded its world's largest total of 637 million confirmed cases of Covid-19 with an average (median) of 1.5 million cases per day. It is followed by Brazil, India, Russia, Peru, Spain, Mexico, South Africa, the United Kingdom, and Colombia. The United States is 'tagged' by the highest risk of Covid-19 as indicated by the data variability (standard deviation). Table 2 shows that Anguilla is the world's least total confirmed cases of Covid-19, that is 572 cases since 27 March 2020. On average, the country has only 3 cases reported per day. Other countries fall into this category, bottom 10 are Vatican, Montserrat, Falkland Islands, Greenland, Saint Kitts and Nevis, Bonaire Sint Eustatius and Saba, Dominica, British Virgin Islands, and Laos. Anguilla has the lowest risk of total confirmed cases of Covid-19 with the estimated standard deviation of

[7] The summary statistics for the remaining countries are available upon request from the corresponding author.

0.2, while Bonaire Sint Eustatius and Saba, and British Virgin Islands are in large variations, i.e., 23.9 and 22.9, respectively.

This study employs the ADF (Augmented Dickey-Fuller) unit root test (Dickey & Fuller, 1979) with a breakpoint in order to test the stationarity of the underlying time series, i.e., either transitory or permanent. More precisely, a time series is suggested to be stationary, or integrated with order zero, $I(0)$, if the null hypothesis of a unit root can be rejected at least at 10% significant level. It implies that the total confirmed cases of Covid-19 observed in the respective country is transitory. If the null hypothesis cannot be rejected (at 10% significant level), the underlying time series is said to have a unit root, or integrated with order one, $I(1)$, that is permanent. Other conventional methods such as the PP (Phillips & Perron, 1988), and the KPSS (Kwiatkowski, Phillips, Schmidt, & Shin, 1992) tests, is not being considered by this study since the tests do not account for structural break as it is obviously observed in the time series plots as illustrated in **Appendix A**. According to Perron (1989), conventional unit root tests including those noted PP and KPSS, are biased toward a false unit root null when the data are trend stationary with a structural break.

More technically, the ADF method with a breakpoint proceeds with two different models, namely innovational outlier (IO) and additive outlier (AO), see Perron (1989) for details. In brief, the innovational outlier (IO) model assumes that the break occurs gradually, with the breaks following the same dynamic path as the innovations, while the additive outlier (AO) model assumes the breaks occur immediately. Under the IO assumption, the null hypothesis is tested by $y_t = y_{t-1} + \beta + \psi(L)(\theta D_t(T_b) + \gamma DU_t(T_b) + \in_t)$, where β is a drift parameter $\in_t$ are i.i.d. (independent and identically distributed) innovations, and $\psi(L)$ is a lag polynomial representing the dynamics of the stationary and invertible ARMA error process. The break variables enter the model with the same dynamics as the $\in_t$ innovations. For the AO model, the null hypothesis follows $y_t = y_{t-1} + \beta + \theta D_t(T_b) + \gamma DU_t(T_b) + \psi(L)\in_t$, in which the full impact of the break variables occurs immediately.[8] It is to note that different models (IO and IA) may offer different findings. Indeed, neither data nor economic theory has nothing to say about this concern. In this study, for simplicity, a conclusive finding of either transitory or permanent a country's total confirmed cases of Covid-19 can be delivered if both IO and AO models consistently supported it.

3. EMPIRICAL FINDINGS

This section is about the empirical findings of the ADF unit root tests with a breakpoint. The computed test statistics and other relevant statistics of the 209 countries are tabulated based on their respective continents as presented in **Appendix B**. The null hypothesis of a unit root is rejected if the computed *p*-value (probability value, as bolded) of the respective test is less than 0.10, or to say at least at 10% level of significance. That is, a time series of total confirmed cases of Covid-19 is stationary, or to say, it is transitory.

For convenience, Table 3 summarizes the findings of unit root tests viz. transitory and permanent (with its percentages) by IO and AO models, and by continent. Of the 209 countries, the IO model rejects the null hypothesis of a unit root for half (104 countries) of the examined countries, but only 39% (82 countries) for AO model that, 71 countries or 34% of 209 countries are stationary of their total confirmed cases of Covid-19. The countries are listed in Table 3. It indicates that following the shock such as lockdown, the

[8] See, *Unit root tests with a breakpoint, the Eviews User's Guide*, retrieved from http://www.eviews.com/help/helpintro.html#page/content%2Fadvtimeser-Unit_Root_Tests_with_a_Breakpoint.html%23ww188080

total cases of Covid-19 will return to their long-run growth path; that is, the impact of the shock on Covid-19 cases will only be transitory – *I'll [Covid-19] be back!* However, 91 out of 209 countries, or equivalently 44%, fail to reject their null hypothesis of a unit root for both IO and AO models, indicating that the cases of Covid-19 contain a unit root. That is, the effects of the shock (lockdown, for instance) will be permanent, as the cases of Covid-19 will not return to their stable growth path.

By crossing different continents, it is interesting to observe that Africa, Asia, Europe, and South America have their percentages (as the countries in the continent) of permanent the total confirmed cases of Covid-19 as evidenced by both IO and AO models, are higher than of transitory. It implies that the lockdown or other measures (shocks) to combat the spread of Covid-19 are feasible and appropriately implemented by the countries in their continents. For example, the Africa continent has 56% or 31 of its 55 countries with permanent (have a unit root) finding, while 27% (15 countries) are transitory of their total confirmed cases of Covid-19. Nevertheless, the opposite observation holds for the continents of North America and Oceania in which the total confirmed cases of Covid-19, in percentages of their total countries, are more for transitory than of permanent. North America continent with 36 countries, for example, only 8 or 22% of the countries are with permanent finding, while 47% is transitory.

Let look at the countries ranked top 10 and bottom 10 as highlighted in the early section, Tables 1 and 2. Of the top 10 countries with their total confirmed cases of Covid-19, only Brazil is permanent. Other countries, namely United States, Russia, Peru, Mexico, South Africa, and Colombia are transitory, the data property observed of the cases of Covid-19. It signals that the shocks such as lockdown, implemented by the countries, in fact infeasible. The remaining countries (India, Spain, and United Kingdom) remain inconclusive since both IO and AO models suggest different findings. Of the bottom 10 countries, most of them are transitory (Anguilla, Dominica, Falkland Islands, Greenland, Laos, Montserrat, Saint Kitts and Nevis, and Vatican), but British Virgin Islands, and Bonaire Sint Eustatius and Saba have inconclusive finding. Although these countries have the least alarming situation of the outbreak of Covid-19 in terms of the total confirmed cases, but the impact of the shock(s) on Covid-19 cases will only be transitory (or temporary).

4. CONCLUSION

This study offers an essential prediction on the likelihood of upcoming wave(s) of Covid-19 for 209 countries by applying the unit root tests with a breakpoint. The time series data of total confirmed cases of Covid-19 cover daily observations ranging between 31 December 2019 and 5 October 2020. It is predictive that 71 countries (34%) will face the next wave of Covid-9 outbreak given their results of transitory (i.e., stationary) – a shock such as a lockdown has a temporary effect to "flatten the curve" - *"I'll be back"*. Fortunately, the total confirmed cases of Covid-19 are permanent (i.e., has a unit root) for 91 countries (44%), in which it is less likely the next wave(s) to come once a shock occurs. This observation is varying from continent to continent. Africa, Asia, Europe, and South America have more countries with permanent findings than transitory of the total confirmed cases of Covid-19. North America, and Oceania are in a reversed position.

Table 3: Findings of the unit root tests by continents.

	Transitory (i.e. has no unit root) (Reject H_0 of a unit root)			**Permanent** (i.e. has a unit root) (Fail to reject H_0 of a unit root)[#]		
	Innovational Outlier, IO	Additive Outlier, AO	**Observation of Transitory**	Innovational Outlier, IO	Additive Outlier, AO	**Observation of Permanent**
ALL (209)	50% (104/209)	39% (82/209)	**34% (71/209)**	50% (105/209)	61% (127/209)	**44% (91/209)**
Africa (55)	44% (24/55)	27% (15/55)	**27% (15/55)**	56% (31/55)	73% (40/55)	**56% (31/55)**
	Algeria, Chad, Comoros, Djibouti, Egypt, Equatorial Guinea, Eritrea, Guinea, Guinea-Bissau, Kenya, Madagascar, Mali, Mauritius, Namibia, Niger, Nigeria, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, South Sudan, Tanzania, & Western Sahara	Algeria, Comoros, Egypt, Eritrea, Guinea, Kenya, Madagascar, Mauritius, Namibia, Niger, Nigeria, Senegal, Somalia, South Africa, & Tanzania	Algeria, Comoros, Egypt, Eritrea, Guinea, Kenya, Madagascar, Mauritius, Namibia, Niger, Nigeria, Senegal, Somalia, South Africa, &Tanzania	Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Congo, Cote d'Ivoire, Democratic Republic of Congo, Ethiopia, Gabon, Gambia, Ghana, Lesotho, Liberia, Libya, Malawi, Mauritania, Morocco, Mozambique, Rwanda, Sao Tome and Principe, Sudan, Swaziland, Togo, Tunisia, Uganda, Zambia, & Zimbabwe	Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Congo, Cote d'Ivoire, Democratic Republic of Congo, Djibouti, Equatorial Guinea, Ethiopia, Gabon, Gambia, Ghana, Guinea-Bissau, Lesotho, Liberia, Libya, Malawi, Mali, Mauritania, Morocco, Mozambique, Rwanda, Sao Tome and Principe, Seychelles, Sierra Leone, South Sudan, Sudan, Swaziland, Togo, Tunisia, Uganda, Western Sahara, Zambia, & Zimbabwe	Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Congo, Cote d'Ivoire, Democratic Republic of Congo, Ethiopia, Gabon, Gambia, Ghana, Lesotho, Liberia, Libya, Malawi, Mauritania, Morocco, Mozambique, Rwanda, Sao Tome and Principe, Sudan, Swaziland, Togo, Tunisia, Uganda, Zambia, & Zimbabwe

Asia (46)	50% (23/46)	41% (19/46)	**30% (14/46)**	50% (23/46)	57% (26/46)	**39% (18/46)**
	Afghanistan, Armenia, Azerbaijan, Bahrain, Bangladesh, Brunei, China, Iran, Kuwait, Kyrgyzstan, Laos, Malaysia, Mongolia, Myanmar, Oman, Pakistan, Qatar, Taiwan, Tajikistan, Thailand, Timor, Turkey, & Vietnam	Armenia, Azerbaijan, Bangladesh, Brunei, China, Georgia, India, Israel, Jordan, Kuwait, Laos, Malaysia, Myanmar, Oman, Syria, Tajikistan, Thailand, Timor, & Turkey	Armenia, Azerbaijan, Bangladesh, Brunei, China, Kuwait, Laos, Malaysia, Myanmar, Oman, Tajikistan, Thailand, Timor, & Turkey	Bhutan, Cambodia, Georgia, India, Indonesia, Iraq, Israel, Japan, Jordan, Kazakhstan, Lebanon, Maldives, Nepal, Palestine, Philippines, Saudi Arabia, Singapore, South Korea, Sri Lanka, Syria, United Arab Emirates, Uzbekistan, & Yemen	Afghanistan, Bahrain, Bhutan, Cambodia, Indonesia, Iran, Iraq, Japan, Kazakhstan, Kyrgyzstan, Lebanon, Maldives, Mongolia, Nepal, Pakistan, Palestine, Philippines, Qatar, Saudi Arabia, Singapore, South Korea, Taiwan, United Arab Emirates, Uzbekistan, Vietnam, & Yemen	Bhutan, Cambodia, Indonesia, Iraq, Japan, Kazakhstan, Lebanon, Maldives, Nepal, Palestine, Philippines, Saudi Arabia, Singapore, South Korea, United Arab Emirates, Uzbekistan, & Yemen
Europe (51)	39% (20/51)	47% (24/51)	**33% (17/51)**	61% (31/51)	53% (27/51)	**47% (24/51)**
	Andorra, Belarus, Bosnia and Herzegovina, Finland, France, Germany, Gibraltar, Guernsey, Hungary, Iceland, Ireland, Isle of Man, Jersey, Liechtenstein, Norway, Russia, San Marino, Serbia, Switzerland, & Vatican	Belarus, Belgium, Bosnia and Herzegovina, Finland, France, Germany, Gibraltar, Guernsey, Hungary, Iceland, Ireland, Isle of Man, Italy, Jersey, Liechtenstein, Luxembourg, Macedonia, Montenegro, Norway, Russia, Spain, Switzerland, United Kingdom, & Vatican	Belarus, Bosnia and Herzegovina, Finland, France, Germany, Gibraltar, Guernsey, Hungary, Iceland, Ireland, Isle of Man, Jersey, Liechtenstein, Norway, Russia, Switzerland, & Vatican	Albania, Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Faeroe Islands, Greece, Italy, Kosovo, Latvia, Lithuania, Luxembourg, Macedonia, Malta, Moldova, Monaco, Montenegro, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Ukraine, & United Kingdom	Albania, Andorra, Austria, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Faeroe Islands, Greece, Kosovo, Latvia, Lithuania, Malta, Moldova, Monaco, Netherlands, Poland, Portugal, Romania, San Marino, Serbia, Slovakia, Slovenia, Sweden, & Ukraine	Albania, Austria, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Faeroe Islands, Greece, Kosovo, Latvia, Lithuania, Malta, Moldova, Monaco, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Sweden, & Ukraine

North America (36)	72% (26/36)	53% (19/36)	**47% (17/36)**	28% (10/36)	47% (17/36)	**22% (8/36)**
	Anguilla, Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Canada, Cayman Islands, Curacao, Dominica, Dominican Republic, Greenland, Grenada, Haiti, Honduras, Jamaica, Mexico, Montserrat, Panama, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, Turks and Caicos Islands, & United States	Anguilla, Aruba, Belize, Bonaire Sint Eustatius and Saba, British Virgin Islands, Canada, Cayman Islands, Dominica, Greenland, Grenada, Haiti, Jamaica, Mexico, Montserrat, Saint Kitts and Nevis, Saint Lucia, Trinidad and Tobago, Turks and Caicos Islands, & United States	Anguilla, Aruba, Belize, Canada, Cayman Islands, Dominica, Greenland, Grenada, Haiti, Jamaica, Mexico, Montserrat, Saint Kitts and Nevis, Saint Lucia, Trinidad and Tobago, Turks and Caicos Islands, & United States	Bonaire Sint Eustatius and Saba, British Virgin Islands, Costa Rica, Cuba, El Salvador, Guatemala, Nicaragua, Puerto Rico, Sint Maarten (Dutch part), & United States Virgin Islands	Antigua and Barbuda, Bahamas, Barbados, Bermuda, Costa Rica, Cuba, Curacao, Dominican Republic, El Salvador, Guatemala, Honduras, Nicaragua, Panama, Puerto Rico, Saint Vincent and the Grenadines, Sint Maarten (Dutch part), & United States Virgin Islands	Costa Rica, Cuba, El Salvador, Guatemala, Nicaragua, Puerto Rico, Sint Maarten (Dutch part), & United States Virgin Islands
Oceania (8)	62.5% (5/8)	50% (4/8)	**50% (4/8)**	37.5% (3/8)	50% (4/8)	**37.5% (3/8)**
	Australia, Guam, New Caledonia, New Zealand, & Papua New Guinea	Australia, New Caledonia, New Zealand, & Papua New Guinea	Australia, New Caledonia, New Zealand, & Papua New Guinea	Fiji, French Polynesia, & Northern Mariana Islands	Fiji, French Polynesia, Guam, & Northern Mariana Islands	Fiji, French Polynesia, & Northern Mariana Islands
South America (13)	46% (6/13)	38% (5/13)	**31% (4/13)**	54% (7/13)	62% (8/13)	**46% (6/13)**
	Bolivia, Colombia, Falkland Islands, Paraguay, Peru, &Venezuela	Bolivia, Colombia, Falkland Islands, Peru, & Suriname	Bolivia, Colombia, Falkland Islands, & Peru	Argentina, Brazil, Chile, Ecuador, Guyana, Suriname, & Uruguay	Argentina, Brazil, Chile, Ecuador, Guyana, Paraguay, Uruguay, & Venezuela	Argentina, Brazil, Chile, Ecuador, Guyana, & Uruguay

Note: # based on *p*-value less than 0.10.

Let look here, the case of a small open economy, Malaysia. The total cases of Covid-19 for the country are found to be transitory from the data between 25 January and 5 October 2020, signalling the next possible wave of Covid-19. The country has successfully flattened the Covid-19 graph and reducing the spread of cases in the community in an official statement reported on 25 June 2020. Nevertheless, the third wave of Covid-19 has been announced on 9 October 2020 a few days from our data. This casual observation is in line with the finding reported. Similar implications may be true for China and United States, both having their total cases of Covid-19 transitory.

This study has important and relevant implications, especially in international business and finance, in predicting the next wave of Covid-19 outbreaks. For those countries have their transitory of total confirmed cases of Covid-19, although their outbreaks are well controlled, but more proactive and longer-term strategies need to be implemented in order to respond to the next wave(s), especially to diminish the impacts on sectors related to international business and finance. Various policies have been taken country-wise in response to Covid-19, especially the economic-based policies to support mainly automatic insurance mechanisms and the existing social safety net. The measures of fiscal policy (tax and spending), monetary policy (loans and guarantees, monetary instruments, and foreign exchange operations)[9] to migrate international business and finance to the lowest risk such as economic volatility, bankruptcy, etc. It is costly for the policies to be implemented, while its effectiveness remains unclear on international business and finance. If a country's total cases of Covid-19 are found to be permanent, that is, the next wave is least likely, a sound economic stimulus package is necessary to facilitate business recovery and further spurring economic growth by enhancing the sustainability of both international and domestic business and finance. It is observable globally that government increases their expenditure extraordinarily high during the Covid-19 pandemic to accelerate economic recovery. For example, an appropriate arrangement *travel bubble can be implemented between* among the countries, which the new wave of Covid-19 is least likely 'to be back' (or green zone *countries) to* revive the tourism-related businesses, which is essential for smooth economic recovery.

As the Covid-19 pandemic unfolds, countries with a transitory finding of total cases of Covid-19 are important to monitor more closely the unfavourable economic implications of their Covid-19 responses, such as the economic costs of further lockdown their border with travel bans, movement control order, and more. It requires additional policy responses by the government. The international business and finance sector have to rethink and reconfigure their business models for a new-normal world with lockdown (and cross-border) restrictions. International businesses ought to manage their risk systematically with the upcoming wave of Covid-19, if possible. Financial sectors may assess their availability of working capital, including liquidity, to pursue a slow and steady recovery. Either finding, it is observed that gold prices have risen spurred by the Covid-19 pandemic, while cryptocurrency has increased its 'value' (prices), in particular, Bitcoin with an invention of so-called 'cryptoassets' or 'cryptowealth' in the financial market. More, but insufficiently to be discussed the most economic implications lengthy here, and they are eventually country-specific in nature.

Finally, yet importantly, a few concerns have to take note of in this study. More technically, the computed statistics are based on the daily data end on 5 October 2020 due to an urgent need for this work by policymakers and businesses. Perhaps, updated data and more observations may offer better findings. Secondly, the empirical results are constrained by one test, ADF with a breakpoint. Other testing methods are available for comparison

[9] Refer to footnote 4.

purse, such as the unit root tests with multiple breakpoints; imposing nonlinearity assumption; and so on. Immediate consideration for the next piece of work on this topic is to use a new method, i.e., the multivariate autoregressive distributed lag framework for unit root testing, which is still under development, by the respective researchers.

ACKNOWLEDGMENT

This study is the first author's Graduation Exercise (EIA3005) for academic session 2020/2021 entitled "*Do total confirmed cases of Covid-19 have a unit root*?" for partial fulfilment of the requirement for the Bachelor's Degree in Economics at the Faculty of Economics and Administration, Universiti Malaya. This work is part of the *Fundamental Research Grant Scheme* (FRGS) grant, FRGS/1/2020/SS0/USM/02/25

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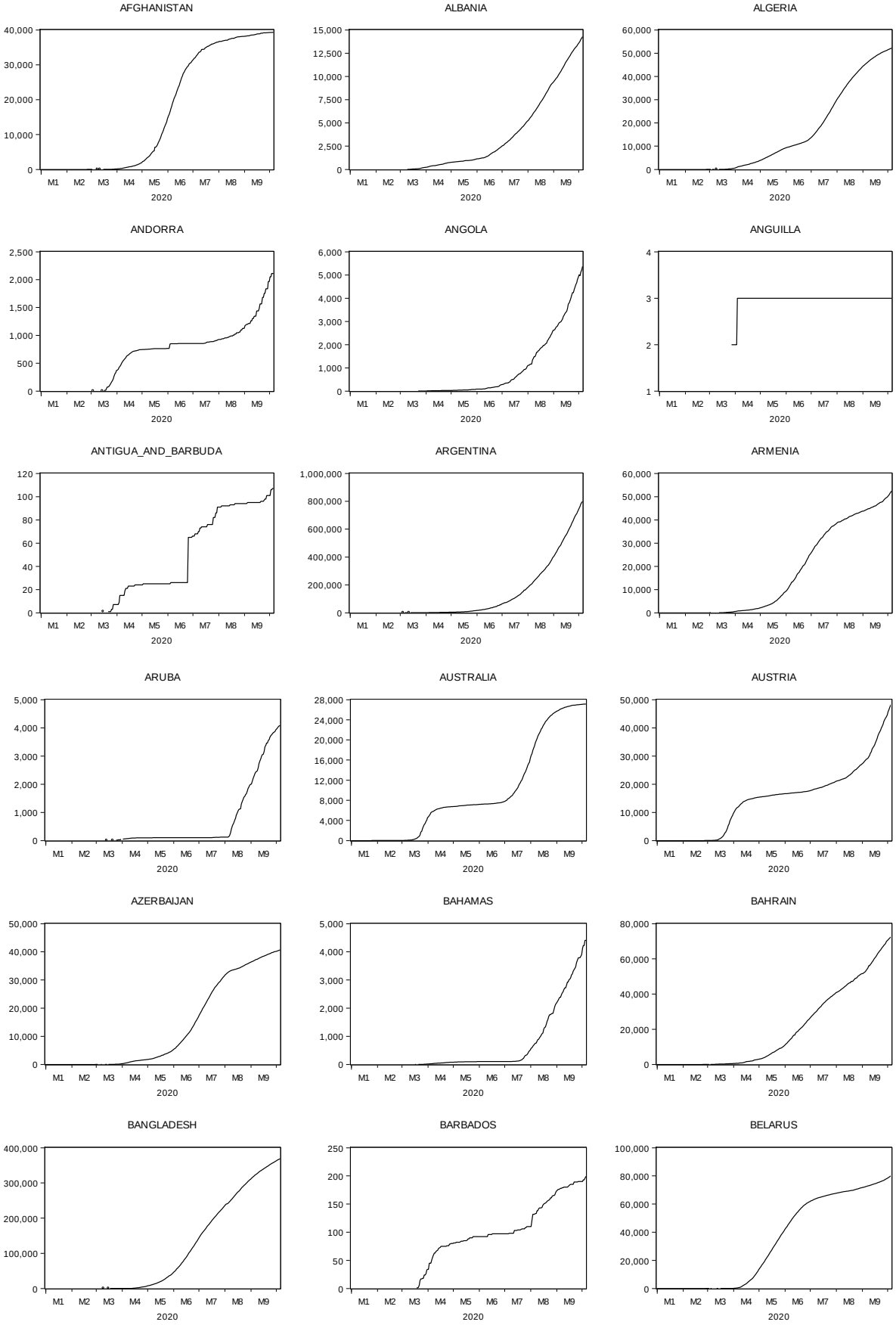
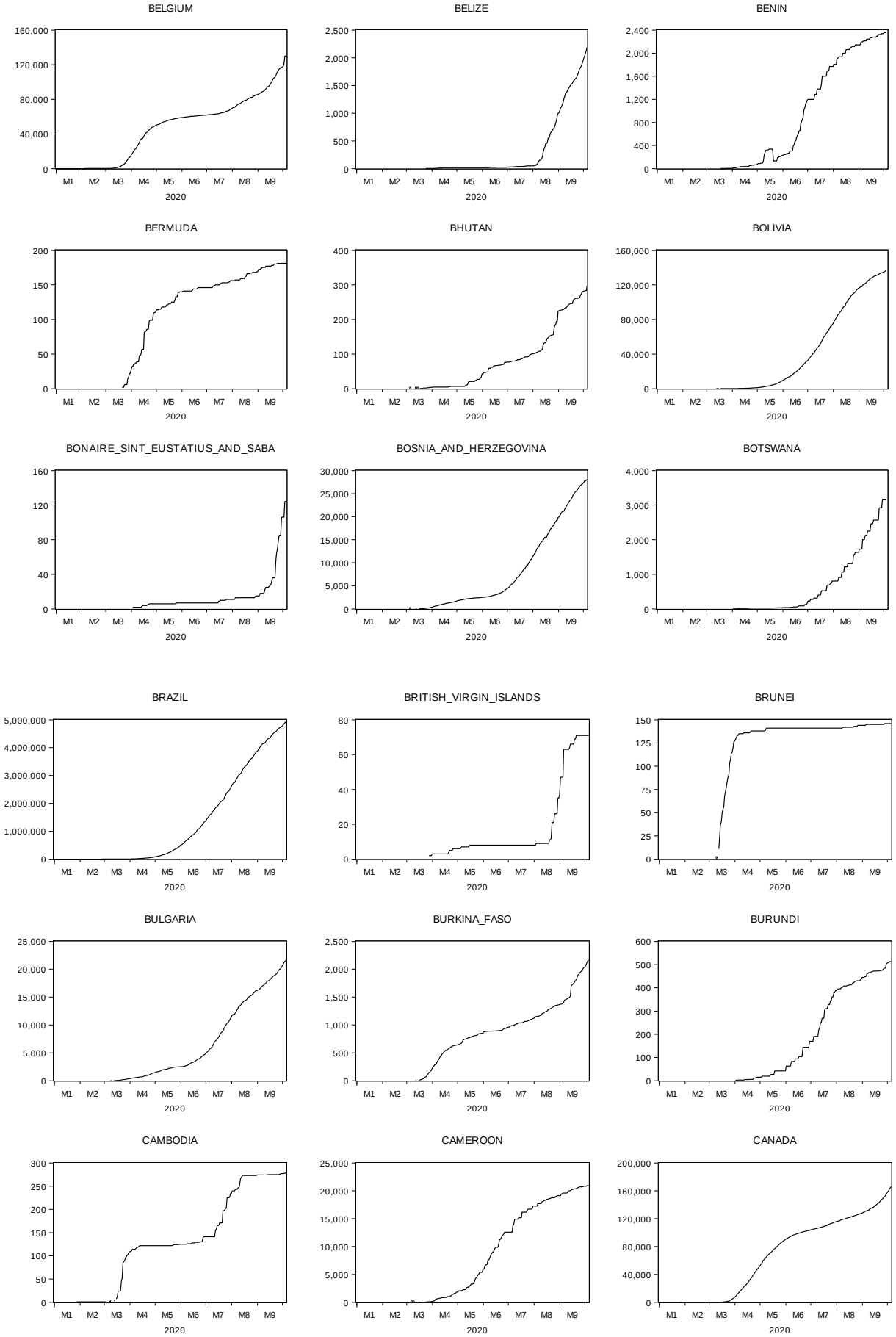
Appendix A: Time series plots of total confirmed cases of Covid-19.

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BENIN
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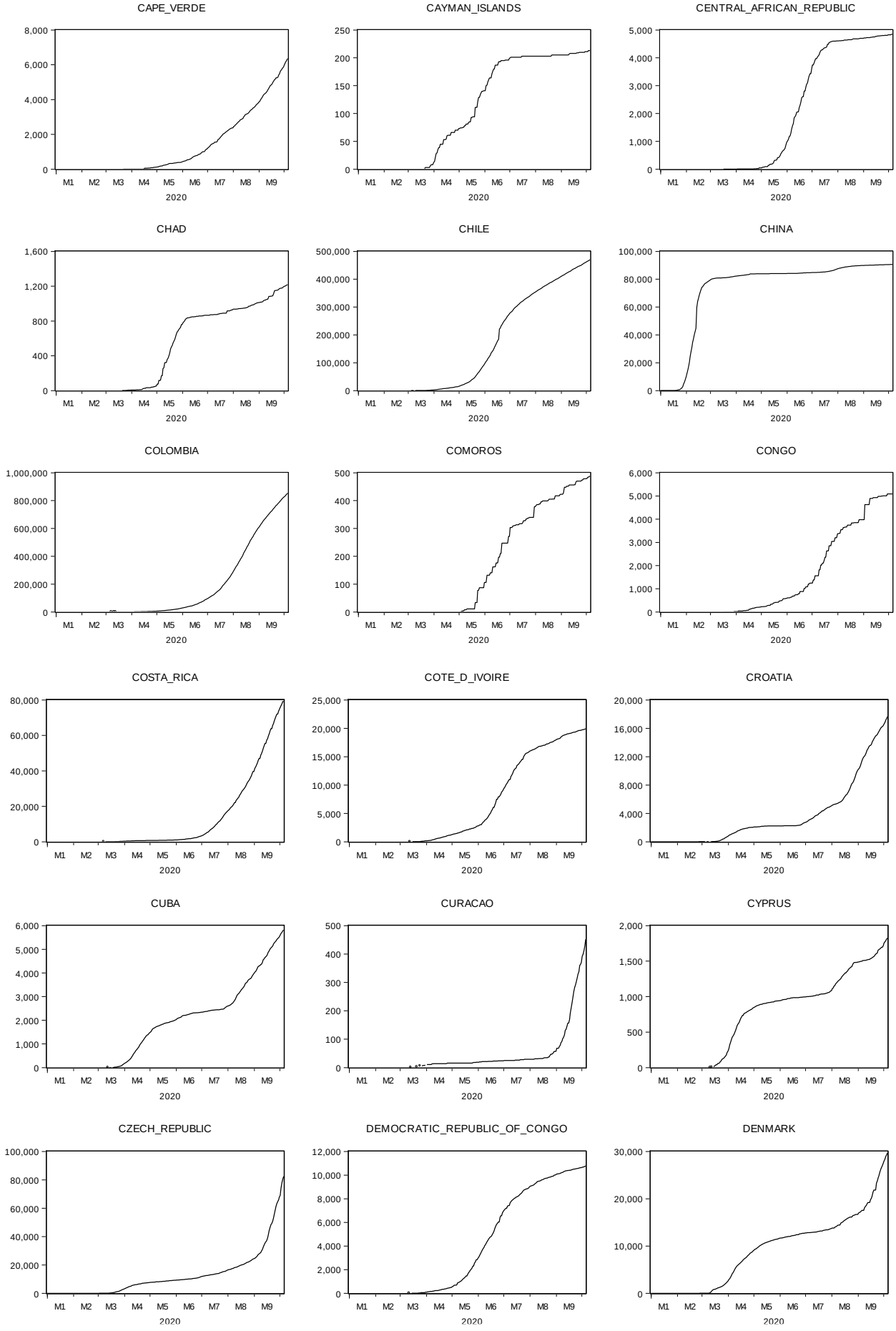
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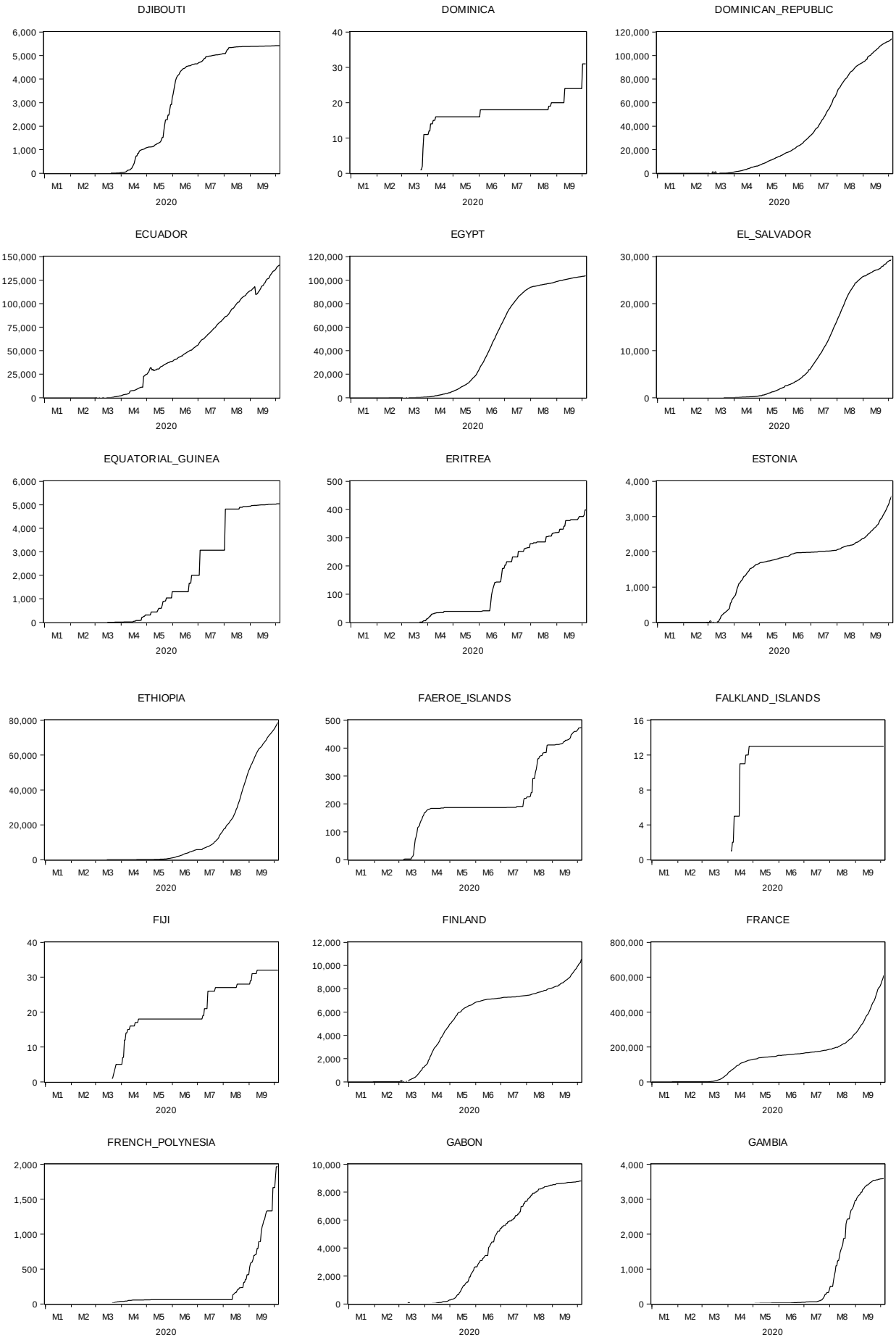
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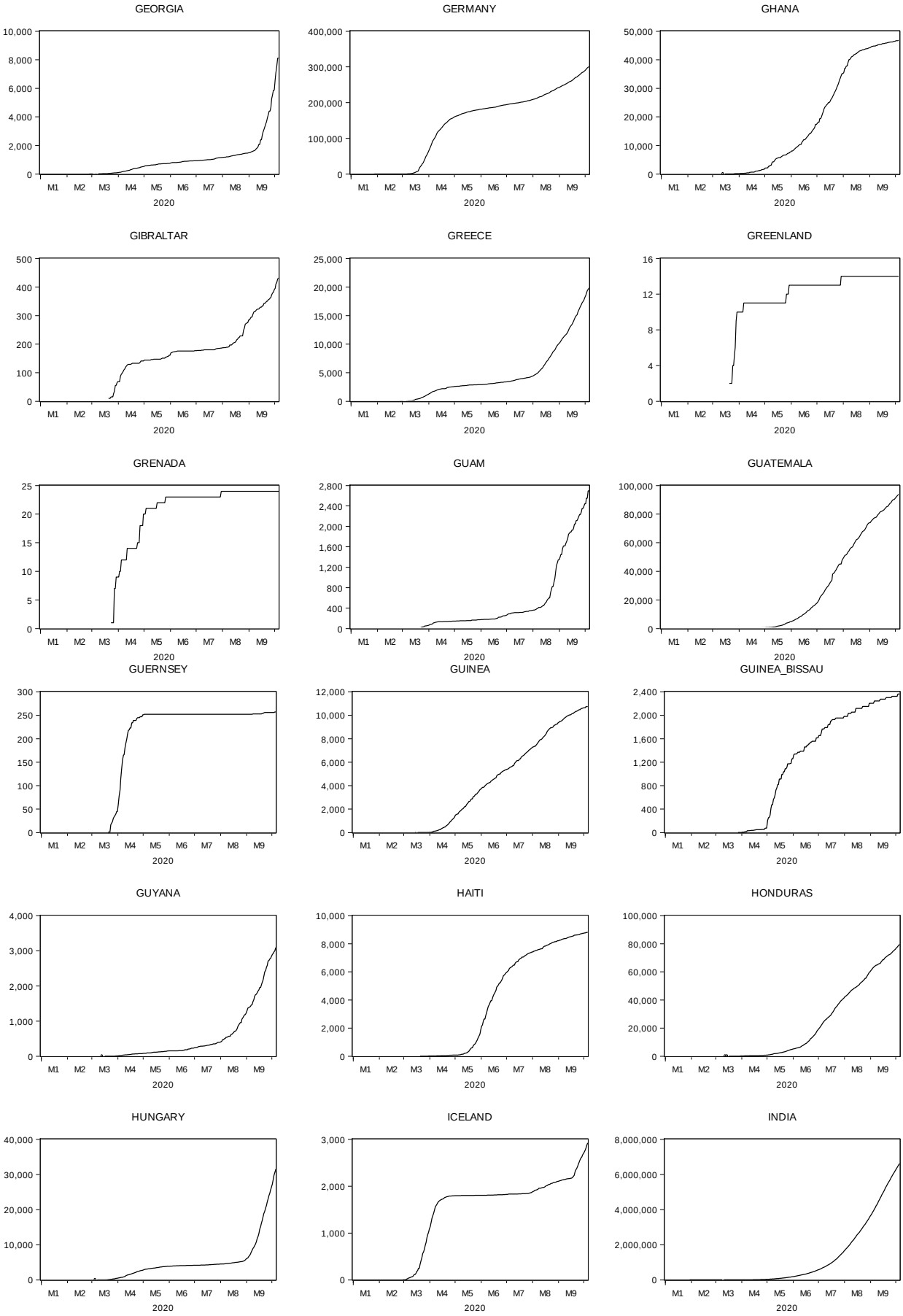
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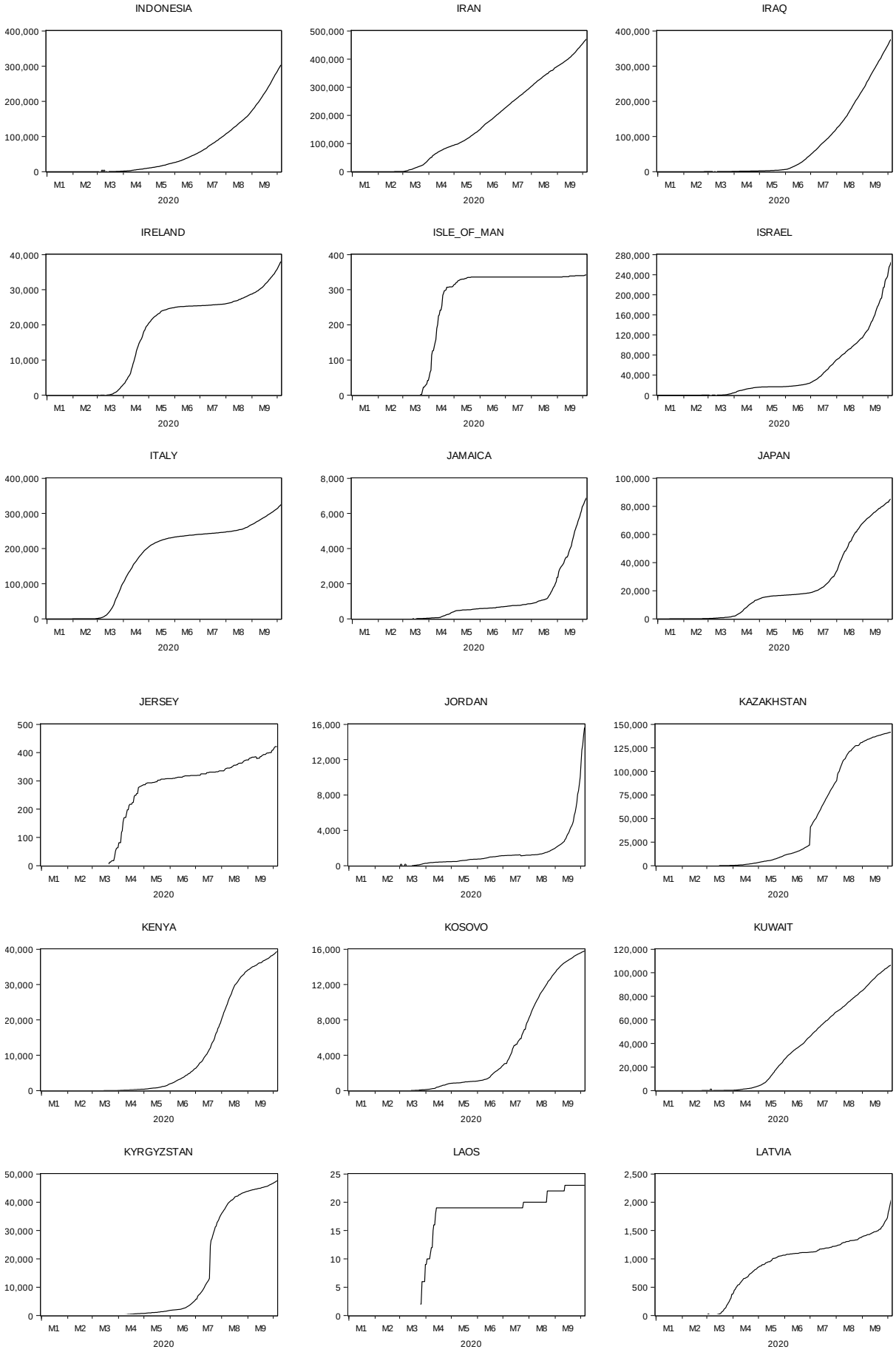
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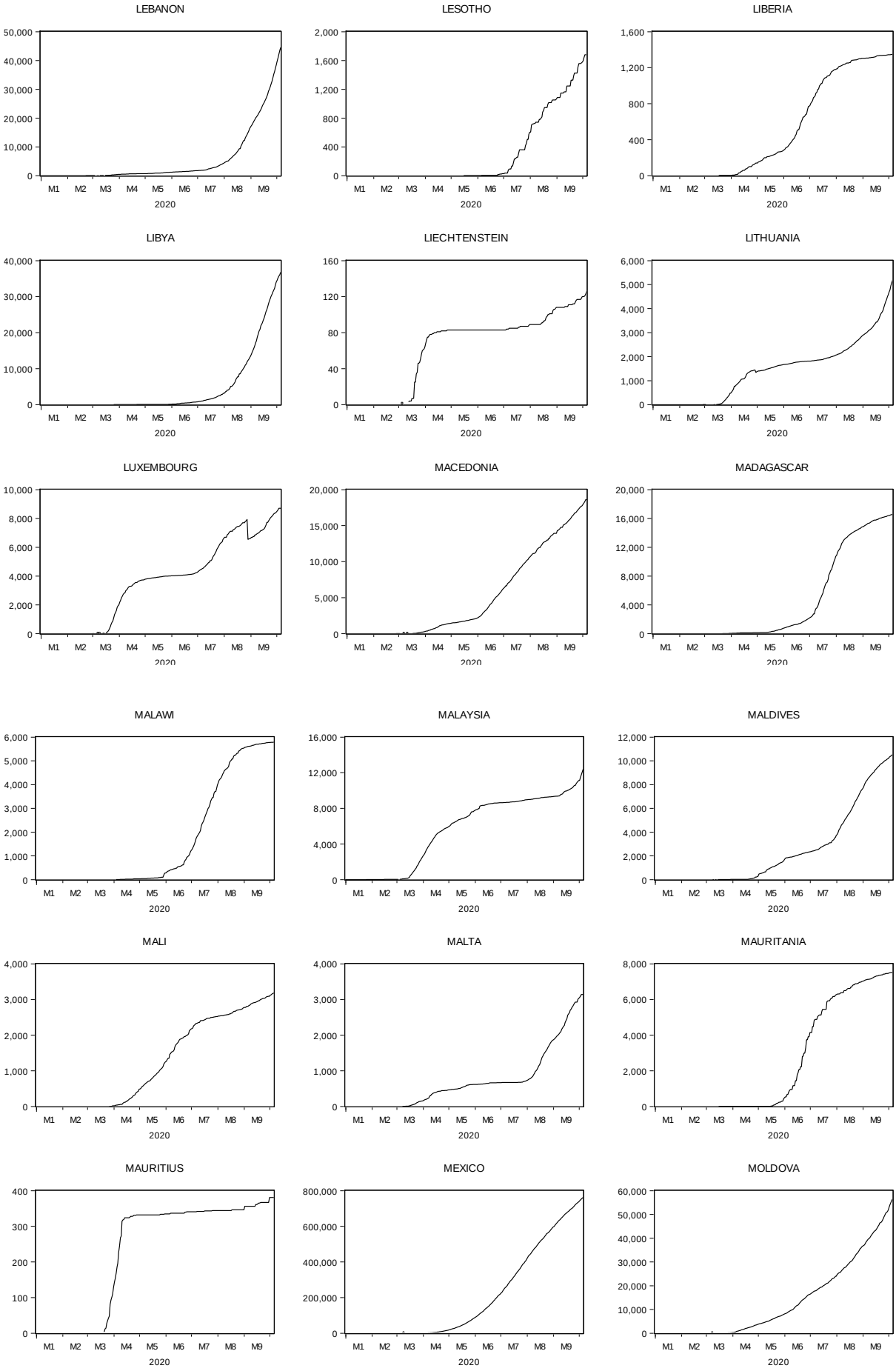
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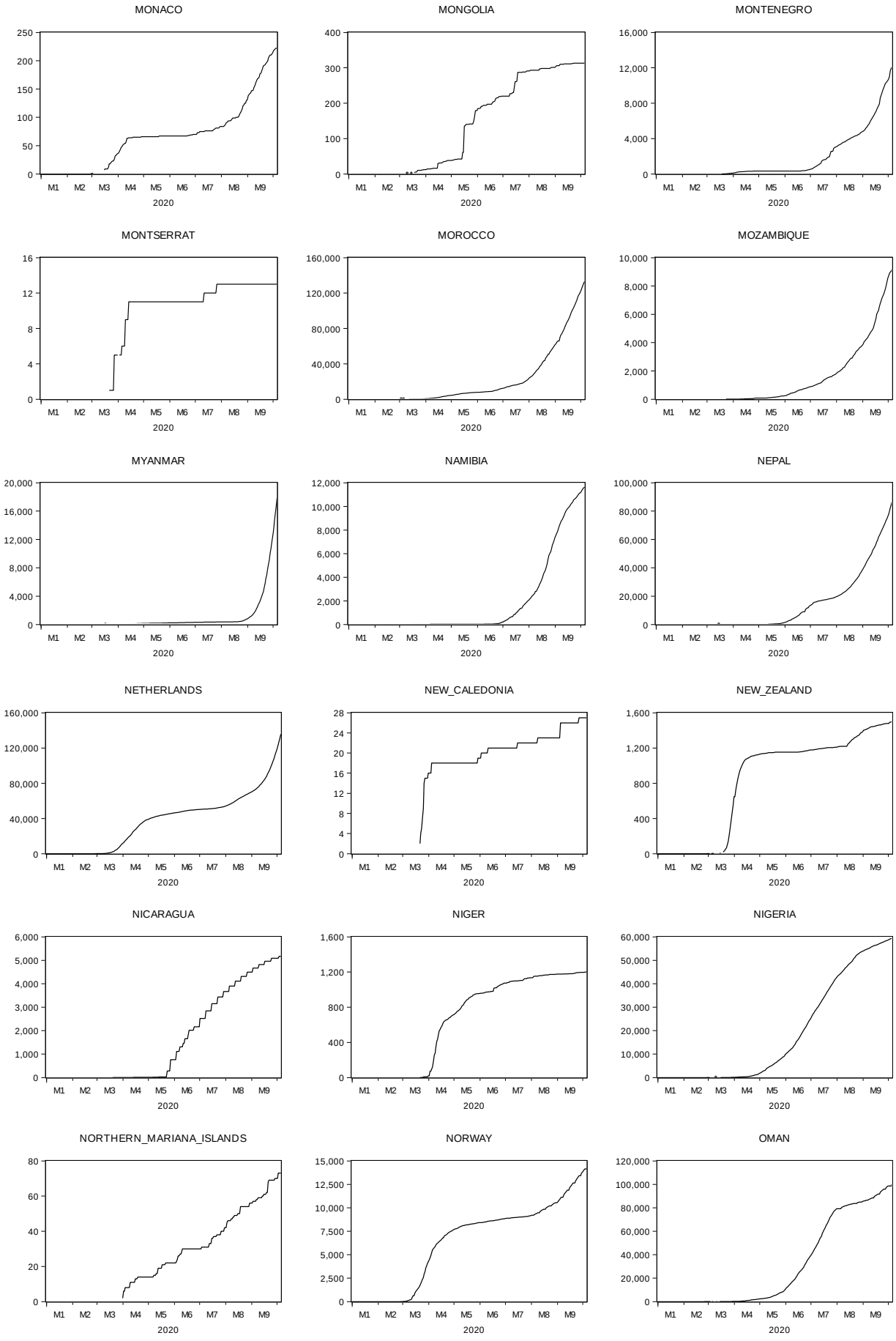
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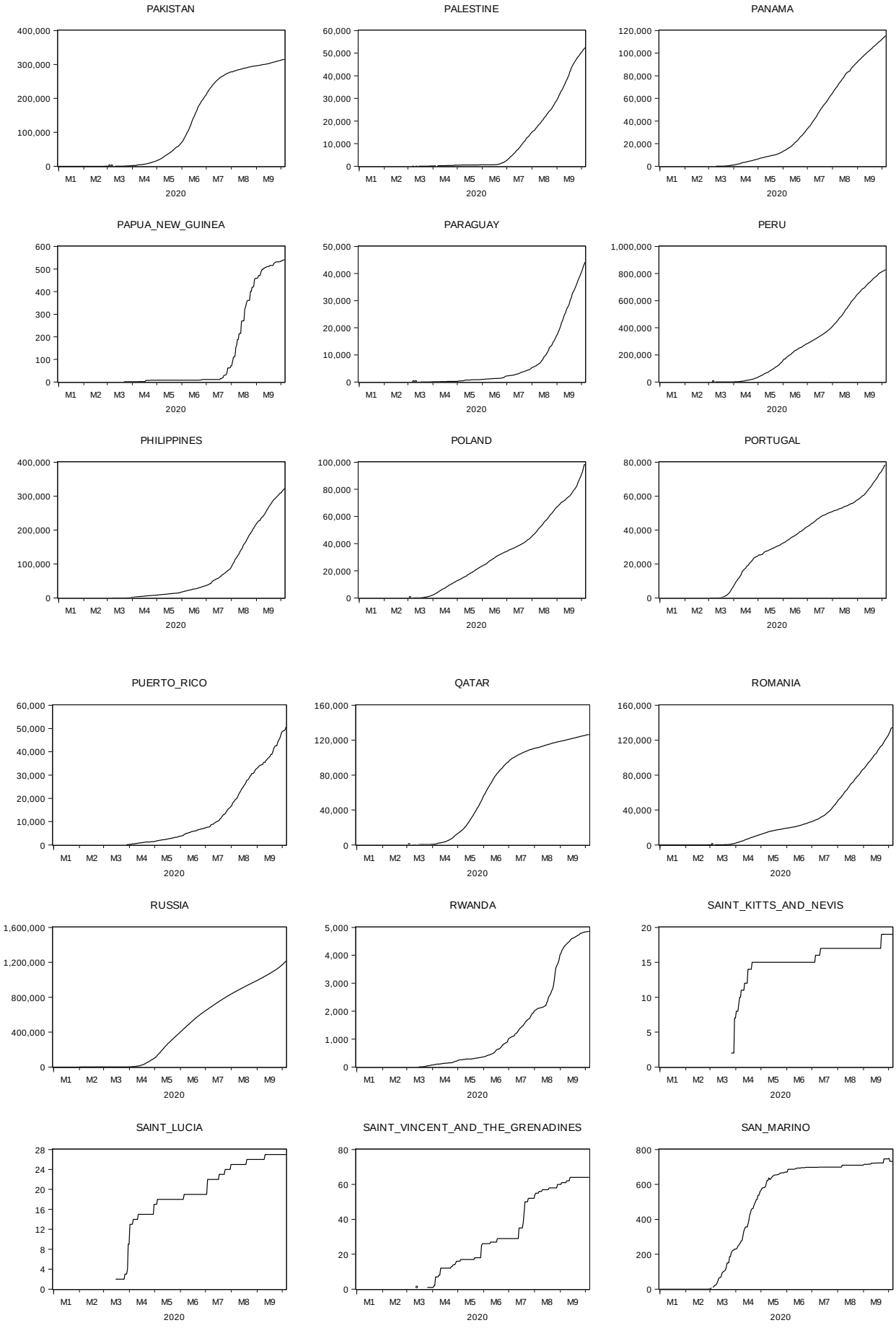
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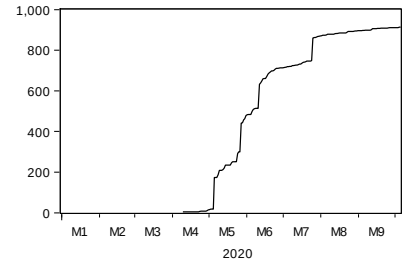

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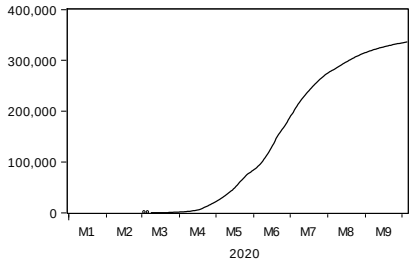

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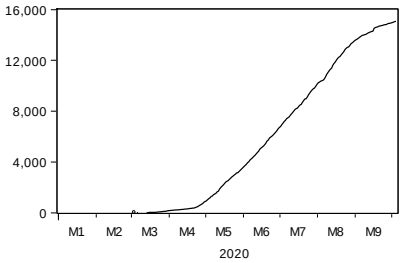

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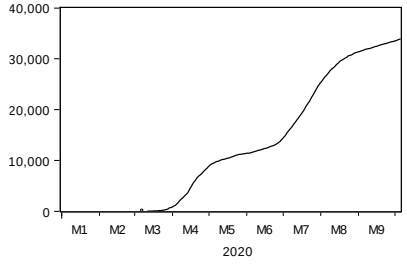

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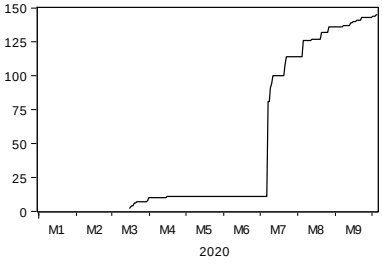

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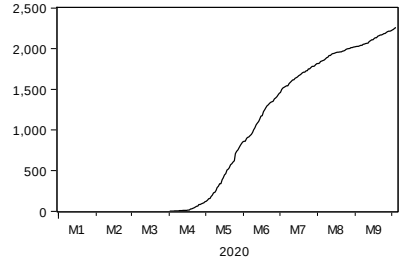

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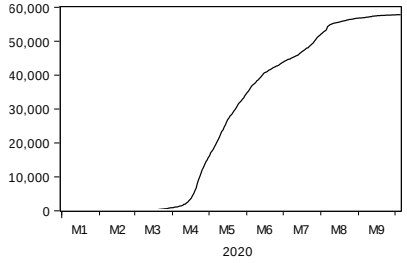

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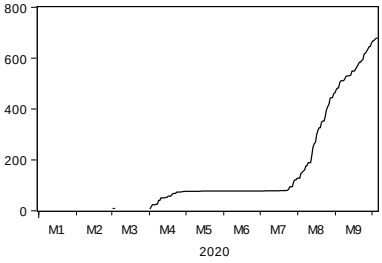

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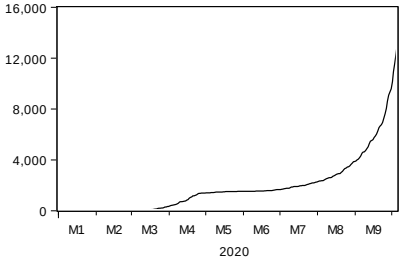

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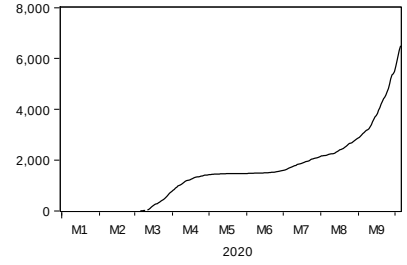

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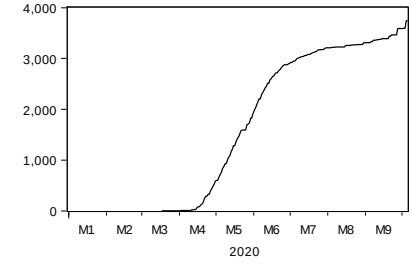

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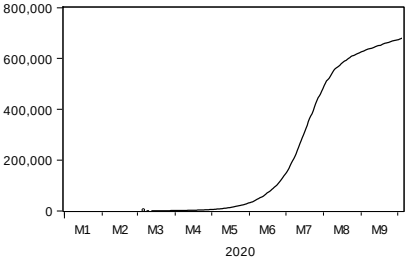

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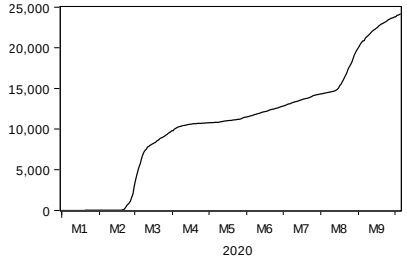

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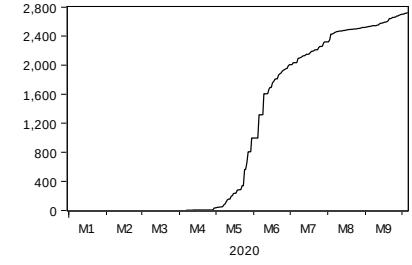

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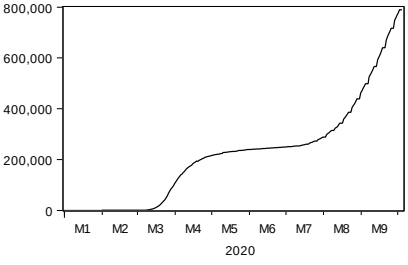

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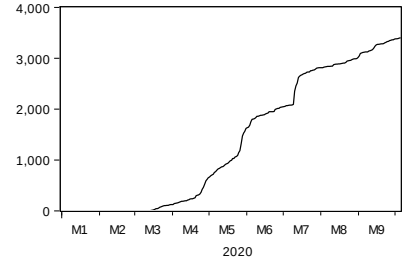

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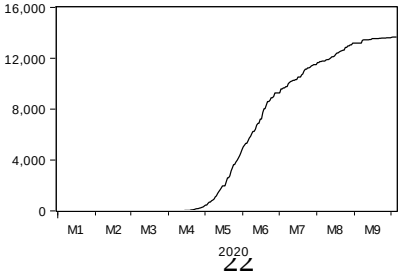

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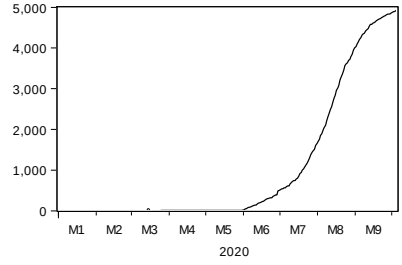
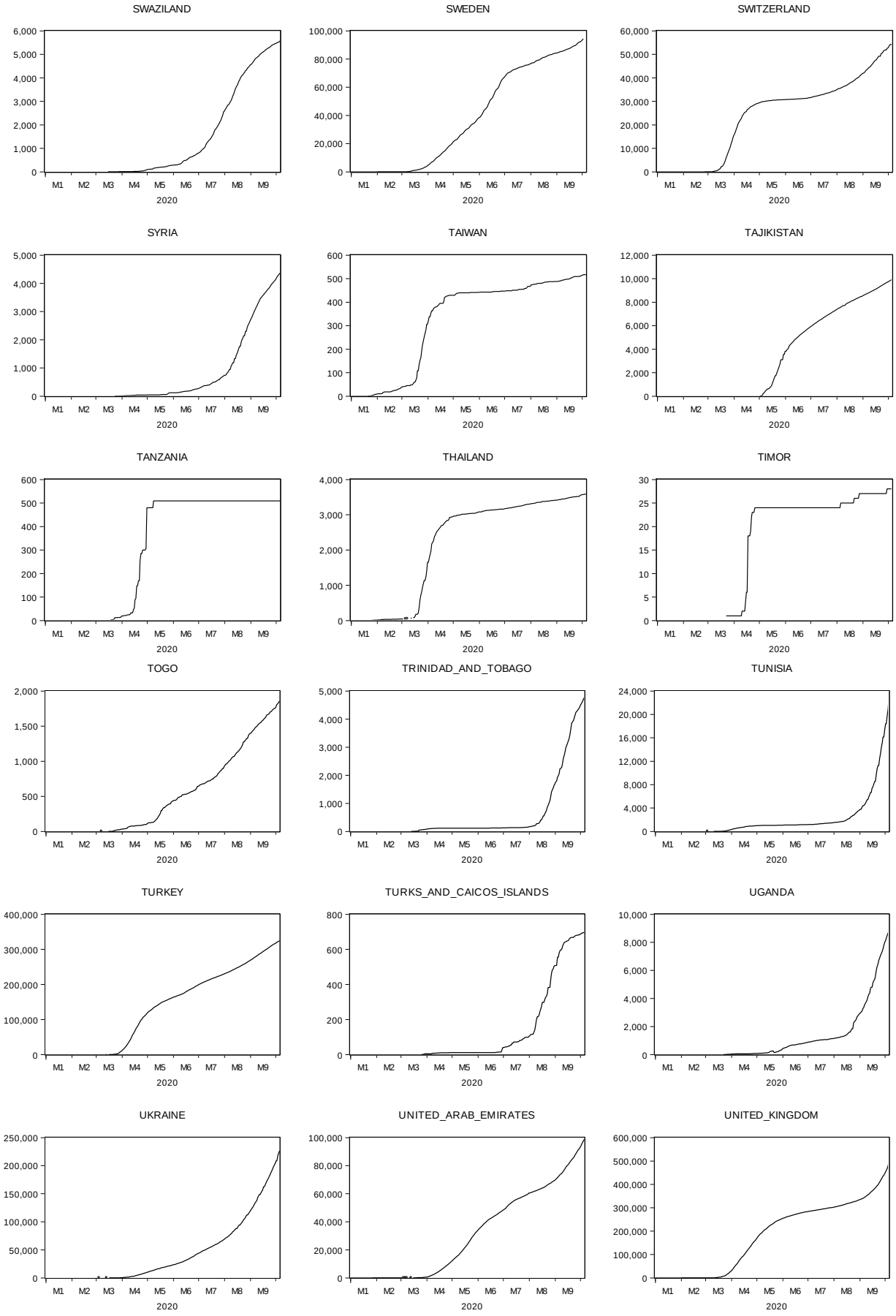
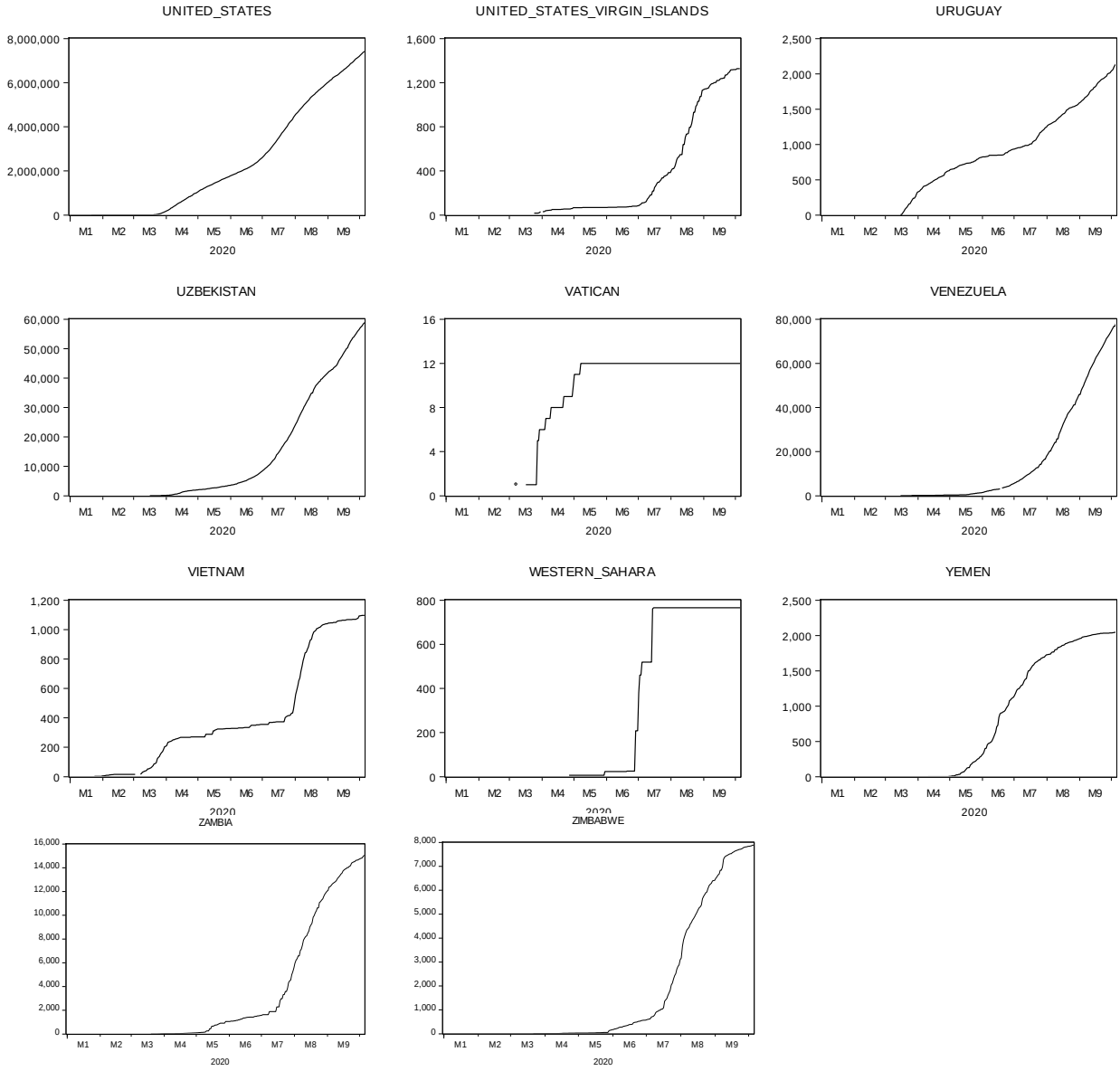



SWAZILAND
SWEDEN
SWITZERLAND
SYRIA
TAIWAN
TAJIKISTAN
TANZANIA
THAILAND
TIMOR
TOGO
TRINIDAD_AND_TOBAGO
TUNISIA
TURKEY
TURKS_AND_CAICOS_ISLANDS
UGANDA
UKRAINE
UNITED_ARAB_EMIRATES
UNITED_KINGDOM
M1 M2 M3 M4 M5 M6 M7 M8 M9
2020


UNITED_STATES
8,000,000
6,000,000
4,000,000
2,000,000
0
M1 M2 M3 M4 M5 M6 M7 M8 M9
2020
UNITED_STATES_VIRGIN_ISLANDS
1,600
1,200
800
400
0
M1 M2 M3 M4 M5 M6 M7 M8 M9
2020
URUGUAY
2,500
2,000
1,500
1,000
500
0
M1 M2 M3 M4 M5 M6 M7 M8 M9
2020
UZBEKISTAN
60,000
50,000
40,000
30,000
20,000
10,000
0
M1 M2 M3 M4 M5 M6 M7 M8 M9
2020
VATICAN
16
12
8
4
0
M1 M2 M3 M4 M5 M6 M7 M8 M9
2020
VENEZUELA
80,000
60,000
40,000
20,000
0
M1 M2 M3 M4 M5 M6 M7 M8 M9
2020
VIETNAM
1,200
1,000
800
600
400
200
0
M1 M2 M3 M4 M5 M6 M7 M8 M9
2020
WESTERN_SAHARA
800
600
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200
0
M1 M2 M3 M4 M5 M6 M7 M8 M9
2020
YEMEN
2,500
2,000
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M1 M2 M3 M4 M5 M6 M7 M8 M9
2020
ZAMBIA
16,000
14,000
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2020
ZIMBABWE
8,000
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0
M1 M2 M3 M4 M5 M6 M7 M8 M9
2020

Appendix B: Computed statistics of unit root test with breakpoint by continents.

Africa	Innovational Outlier, IO	*p*-value	Finding	Additive Outlier, AO	*p*-value	Finding
1. Algeria (26/2/2020 - 5/10/2020)	-5.846 [2] (6/5/2020)	< **0.01**	Transitory	-5.615 [2] (5/22/2020)	**0.015**	Transitory
2. Angola (22/3/2020 - 5/10/2020)	1.004 [0] (6/29/2020)	> 0.99	Permanent	-2.755 [8] (8/6/2020)	0.986	Permanent
3. Benin (17/3/2020 - 5/10/2020)	-2.986 [0] (6/12/2020)	0.964	Permanent	-2.957 [0] (6/12/2020)	0.967	Permanent
4. Botswana (1/4/2020 - 5/10/2020)	-0.873 [9] (6/14/2020)	> 0.99	Permanent	-3.767 [0] (7/17/2020)	0.668	Permanent
5. Burkina Faso (11/3/2020 - 5/10/2020)	-3.092 [0] (9/13/2020)	0.948	Permanent	-3.826 [8] (9/6/2020)	0.634	Permanent
6. Burundi (1/4/2020 - 5/10/2020)	-4.779 [1] (7/9/2020)	0.130	Permanent	-4.438 [0] (7/9/2020)	0.266	Permanent
7. Cameroon (7/3/2020 - 5/10/2020)	-3.051 [0] (7/5/2020)	0.955	Permanent	-2.603 [0] (8/15/2020)	> 0.99	Permanent
8. Cape Verde (21/3/2020 - 5/10/2020)	-0.250 [0] (8/27/2020)	> 0.99	Permanent	-1.404 [7] (7/10/2020)	> 0.99	Permanent
9. Central African Republic (16/3/2020 - 5/10/2020)	-4.349 [10] (8/1/2020)	0.311	Permanent	-3.699 [9] (6/5/2020)	0.708	Permanent
10. Chad (20/3/2020 - 5/10/2020)	-7.175 [7] (5/5/2020)	< **0.01**	Transitory	-4.668 [7] (4/22/2020)	0.168	Permanent
11. Comoros (2/5/2020 - 5/10/2020)	-5.175 [0] (6/28/2020)	**0.050**	Transitory	-5.190 [0] (6/28/2020)	**0.048**	Transitory
12. Congo (16/3/2020 - 5/10/2020)	-2.756 [1] (7/8/2020)	0.986	Permanent	-3.247 [0] (7/8/2020)	0.912	Permanent
13. Cote d'Ivoire (12/3/2020 - 5/10/2020)	-3.174 [0] (6/15/2020)	0.931	Permanent	-2.618 [6] (9/1/2020)	> 0.99	Permanent
14. Democratic Republic of Congo (11/3/2020 - 5/10/2020)	-3.469 [9] (8/10/2020)	0.828	Permanent	-2.502 [11] (6/17/2020)	> 0.99	Permanent
15. Djibouti (19/3/2020 - 5/10/2020)	-6.848 [5] (5/20/2020)	< **0.01**	Transitory	-3.656 [4] (5/22/2020)	0.735	Permanent
16. Egypt (15/2/2020 - 5/10/2020)	-5.856 [7] (5/19/2020)	< **0.01**	Transitory	-5.008 [7] (4/21/2020)	**0.077**	Transitory
17. Equatorial Guinea (15/3/2020 - 5/10/2020)	-6.172 [0] (8/1/2020)	< **0.01**	Transitory	-2.991 [0] (6/19/2020)	0.963	Permanent
18. Eritrea (22/3/2020 - 5/10/2020)	-8.196 [0] (6/13/2020)	< **0.01**	Transitory	-5.015 [1] (6/10/2020)	**0.076**	Transitory
19. Ethiopia (14/3/2020 - 5/10/2020)	-4.322 [3] (7/7/2020)	0.325	Permanent	-4.804 [5] (7/2/2020)	0.123	Permanent
20. Gabon (13/3/2020 - 5/10/2020)	-3.585 [7] (7/22/2020)	0.774	Permanent	-2.795 [7] (7/15/2020)	0.983	Permanent
21. Gambia (18/3/2020 - 5/10/2020)	-3.522 [7] (6/23/2020)	0.804	Permanent	-3.992 [14] (7/28/2020)	0.527	Permanent
22. Ghana (13/3/2020 - 5/10/2020)	-2.395 [5] (9/5/2020)	> 0.99	Permanent	-2.408 [0] (3/17/2020)	> 0.99	Permanent
23. Guinea (14/3/2020 - 5/10/2020)	-5.325 [0] (9/14/2020)	**0.034**	Transitory	-4.938 [0] (9/14/2020)	**0.089**	Transitory
24. Guinea-Bissau (27/3/2020 - 5/10/2020)	-8.193 [2] (4/30/2020)	< **0.01**	Transitory	-4.815 [0] (5/3/2020)	0.120	Permanent
25. Kenya (14/3/2020 - 5/10/2020)	-7.835 [8] (6/10/2020)	< **0.01**	Transitory	-7.689 [8] (5/31/2020)	< **0.01**	Transitory
26. Lesotho (15/5/2020 - 5/10/2020)	-3.239 [0] (6/15/2020)	0.914	Permanent	-3.2583 [0] (6/15/2020)	0.908	Permanent
27. Liberia (17/3/2020 - 5/10/2020)	-4.074 [0] (6/18/2020)	0.472	Permanent	-3.638 [9] (4/5/2020)	0.745	Permanent
28. Libya (25/3/2020 - 5/10/2020)	-3.854 [2] (7/28/2020)	0.616	Permanent	-4.274 [14] (8/4/2020)	0.351	Permanent
29. Madagascar (21/3/2020 - 5/10/2020)	-6.445 [6] (7/6/2020)	< **0.01**	Transitory	-5.528 [6] (5/25/2020)	**0.019**	Transitory

30. Malawi (3/4/2020 - 5/10/2020)	-2.913 [8] (5/30/2020)	0.972	Permanent	-3.375 [8] (5/22/2020)	0.868	Permanent
31. Mali (26/3/2020 - 5/10/2020)	-6.267 [0] (6/4/2020)	**< 0.01**	Transitory	-4.166 [0] (5/22/2020)	0.416	Permanent
32. Mauritania (15/3/2020 - 5/10/2020)	-4.714 [5] (6/12/2020)	0.153	Permanent	-3.106 [10] (7/10/2020)	0.945	Permanent
33. Mauritius (20/3/2020 - 5/10/2020)	-14.152 [0] (4/5/2020)	**< 0.01**	Transitory	-11.309 [0] (4/3/2020)	**< 0.01**	Transitory
34. Morocco (3/3/2020 - 5/10/2020)	-1.981 [0] (7/14/2020)	> 0.99	Permanent	-3.298 [8] (9/5/2020)	0.896	Permanent
35. Mozambique (23/3/2020 - 5/10/2020)	-1.105 [1] (8/11/2020)	> 0.99	Permanent	-3.135 [7] (8/4/2020)	0.939	Permanent
36. Namibia (15/3/2020 - 5/10/2020)	-5.861 [7] (7/19/2020)	**< 0.01**	Transitory	-6.664 [7] (7/12/2020)	**< 0.01**	Transitory
37. Niger (21/3/2020 - 5/10/2020)	-13.783 [0] (4/5/2020)	**< 0.01**	Transitory	-9.623 [0] (4/4/2020)	**< 0.01**	Transitory
38. Nigeria (15/3/2020 - 5/10/2020)	-5.918 [0] (3/16/2020)	**< 0.01**	Transitory	-5.261 [0] (3/16/2020)	**0.040**	Transitory
39. Rwanda (15/3/2020 - 5/10/2020)	-3.899 [5] (6/30/2020)	0.589	Permanent	-2.846 [2] (6/28/2020)	0.979	Permanent
40. Sao Tome and Principe (9/4/2020 - 5/10/2020)	-4.670 [0] (5/26/2020)	0.167	Permanent	-3.742 [0] (6/7/2020)	0.683	Permanent
41. Senegal (3/3/2020 - 5/10/2020)	-5.829 [0] (3/16/2020)	**< 0.01**	Transitory	-5.410 [0] (3/14/2020)	**0.027**	Transitory
42. Seychelles (15/3/2020 - 5/10/2020)	-43.581 [13] (7/6/2020)	**< 0.01**	Transitory	-3.736 [2] (7/7/2020)	0.687	Permanent
43. Sierra Leone (1/4/2020 - 5/10/2020)	-5.315 [0] (7/7/2020)	**0.035**	Transitory	-4.809 [0] (7/12/2020)	0.122	Permanent
44. Somalia (17/3/2020 - 5/10/2020)	-6.750 [8] (5/28/2020)	**< 0.01**	Transitory	-5.016 [8] (5/25/2020)	**0.076**	Transitory
45. South Africa (6/3/2020 - 5/10/2020)	-10.117 [7] (8/17/2020)	**< 0.01**	Transitory	-6.626 [7] (9/28/2020)	**< 0.01**	Transitory
46. South Sudan (6/4/2020 - 5/10/2020)	-8.178 [3] (5/23/2020)	**< 0.01**	Transitory	-3.899 [12] (5/22/2020)	0.589	Permanent
47. Sudan (14/3/2020 - 5/10/2020)	-3.488 [0] (7/17/2020)	0.819	Permanent	-2.728 [6] (7/16/2020)	0.988	Permanent
48. Swaziland (15/3/2020 - 5/10/2020)	-4.129 [0] (3/31/2020)	0.439	Permanent	-3.366 [0] (3/29/2020)	0.871	Permanent
49. Tanzania (17/3/2020 - 5/10/2020)	-8.327 [14] (5/14/2020)	**< 0.01**	Transitory	-7.701 [12] (5/9/2020)	**< 0.01**	Transitory
50. Togo (7/3/2020 - 5/10/2020)	-3.333 [0] (6/29/2020)	0.884	Permanent	-3.057 [0] (6/29/2020)	0.954	Permanent
51. Tunisia (3/3/2020 - 5/10/2020)	0.319 [13] (9/3/2020)	> 0.99	Permanent	-3.346 [12] (8/11/2020)	0.879	Permanent
52. Uganda (22/3/2020 - 5/10/2020)	-3.717 [4] (8/24/2020)	0.698	Permanent	-4.819 [14] (8/10/2020)	0.119	Permanent
53. Western Sahara (26/4/2020 - 5/10/2020)	-8.275 [2] (6/27/2020)	**< 0.01**	Transitory	-3.502 [1] (6/30/2020)	0.812	Permanent
54. Zambia (19/3/2020 - 5/10/2020)	-3.988 [8] (6/14/2020)	0.530	Permanent	-3.353 [11] (7/8/2020)	0.876	Permanent
55. Zimbabwe (21/3/2020 - 5/10/2020)	-2.688 [0] (4/6/2020)	> 0.99	Permanent	-2.455 [0] (4/4/2020)	> 0.99	Permanent

Asia	Innovational Outlier, IO	*p*-value	Finding	Additive Outlier, AO	*p*-value	Finding
1. Afghanistan (25/2/2020 - 5/10/2020)	-6.271 [5] (5/15/2020)	< **0.01**	Transitory	-4.737 [5] (7/15/2020)	0.145	Permanent
2. Armenia (1/3/2020 - 5/10/2020)	-7.376 [7] (4/22/2020)	< **0.01**	Transitory	-7.274 [7] (3/29/2020)	< **0.01**	Transitory
3. Azerbaijan (29/2/2020 - 5/10/2020)	-5.129 [3] (4/10/2020)	**0.057**	Transitory	-5.177 [3] (4/7/2020)	**0.050**	Transitory
4. Bahrain (24/2/2020 - 5/10/2020)	-5.285 [0] (3/19/2020)	**0.038**	Transitory	-4.087 [0] (3/19/2020)	0.464	Permanent
5. Bangladesh (9/3/2020 - 5/10/2020)	-8.448 [0] (3/21/2020)	< **0.01**	Transitory	-6.634 [0] (3/25/2020)	< **0.01**	Transitory
6. Bhutan (6/3/2020 - 5/10/2020)	-3.043 [0] (8/25/2020)	0.956	Permanent	-2.815 [0] (7/13/2020)	0.982	Permanent
7. Brunei (10/3/2020 - 5/10/2020)	-18.238 [0] (3/18/2020)	< **0.01**	Transitory	-14.240 [0] (3/24/2020)	< **0.01**	Transitory
8. Cambodia (28/1/2020 - 5/10/2020)	-3.072 [0] (7/20/2020)	0.952	Permanent	-2.567 [5] (7/29/2020)	> 0.99	Permanent
9. China (31/12/2019 - 5/10/2020)	-9.789 [0] (2/12/2020)	< **0.01**	Transitory	-6.816 [12] (2/19/2020)	< **0.01**	Transitory
10. Georgia (27/2/2020 - 5/10/2020)	-4.015 [15] (9/6/2020)	0.510	Permanent	-5.466 [15] (9/1/2020)	**0.023**	Transitory
11. India (30/1/2020 - 5/10/2020)	-3.576 [9] (6/5/2020)	0.778	Permanent	-6.287 [6] (3/2/2020)	< **0.01**	Transitory
12. Indonesia (2/3/2020 - 5/10/2020)	0.656 [7] (8/26/2020)	> 0.99	Permanent	-3.603 [7] (7/3/2020)	0.765	Permanent
13. Iran (20/2/2020 - 5/10/2020)	-7.640 [0] (1/17/2020)	< **0.01**	Transitory	-4.695 [0] (1/15/2020)	0.159	Permanent
14. Iraq(25/2/2020 - 5/10/2020)	-3.928 [9] (5/15/2020)	0.570	Permanent	-3.393 [14] (8/5/2020)	0.861	Permanent
15. Israel (22/2/2020 - 5/10/2020)	-3.579 [11] (7/22/2020)	0.777	Permanent	-5.531 [11] (7/18/2020)	**0.019**	Transitory
16. Japan (15/1/2020 - 5/10/2020)	-4.812 [6] (6/16/2020)	0.121	Permanent	-4.861 [6] (6/10/2020)	0.108	Permanent
17. Jordan (3/3/2020 - 5/10/2020)	0.093 [13] (9/12/2020)	> 0.99	Permanent	-9.691 [14] (9/5/2020)	< **0.01**	Transitory
18. Kazakhstan (15/3/2020 - 5/10/2020)	-3.676 [0] (6/30/2020)	0.723	Permanent	-2.204 [0] (10/1/2020)	> 0.99	Permanent
19. Kuwait (24/2/2020 - 5/10/2020)	-11.847 [0] (3/19/2020)	< **0.01**	Transitory	-9.352 [0] (3/23/2020)	< **0.01**	Transitory
20. Kyrgyzstan (19/3/2020 - 5/10/2020)	-11.135 [2] (7/17/2020)	< **0.01**	Transitory	-2.966 [14] (7/4/2020)	0.966	Permanent
21. Laos (25/3/2020 - 5/10/2020)	-6.622 [0] (4/8/2020)	< **0.01**	Transitory	-6.587 [0] (4/8/2020)	< **0.01**	Transitory
22. Lebanon (22/2/2020 - 5/10/2020)	-1.729 [6] (9/10/2020)	> 0.99	Permanent	-4.745 [15] (8/6/2020)	0.142	Permanent
23. Malaysia (25/1/2020 - 5/10/2020)	-6.850 [0] (3/15/2020)	< **0.01**	Transitory	-6.224 [0] (3/15/2020)	< **0.01**	Transitory
24. Maldives (8/3/2020 - 5/10/2020)	-3.542 [4] (6/1/2020)	0.795	Permanent	-2.952 [8] (4/23/2020)	0.968	Permanent
25. Mongolia (10/3/2020 - 5/10/2020)	-5.623 [0] (5/15/2020)	**0.015**	Transitory	-3.081 [0] (7/13/2020)	0.950	Permanent
26. Myanmar (24/3/2020 - 5/10/2020)	-8.389 [14] (10/2/2020)	< **0.01**	Transitory	-7.098 [14] (9/8/2020)	< **0.01**	Transitory
27. Nepal (15/3/2020 - 5/10/2020)	0.305 [4] (7/29/2020)	> 0.99	Permanent	-2.899 [15] (6/14/2020)	0.974	Permanent
28. Oman (25/2/2020 - 5/10/2020)	-6.276 [15] (8/5/2020)	< **0.01**	Transitory	-5.938 [7] (4/14/2020)	< **0.01**	Transitory
29. Pakistan (27/2/2020 - 5/10/2020)	-5.692 [3] (5/28/2020)	**0.011**	Transitory	-4.560 [3] (5/24/2020)	0.207	Permanent
30. Palestine (6/3/2020 - 5/10/2020)	-2.976 [9] (6/5/2020)	0.965	Permanent	-2.690 [3] (7/2/2020)	> 0.99	Permanent
31. Philippines (30/1/2020 - 5/10/2020)	-3.890 [4] (6/14/2020)	0.595	Permanent	-3.534 [6] (7/1/2020)	0.799	Permanent
32. Qatar (1/3/2020 - 5/10/2020)	-5.473 [4] (5/5/2020)	**0.022**	Transitory	-4.543 [4] (7/1/2020)	0.218	Permanent

33. Saudi Arabia (3/3/2020 - 5/10/2020)	-3.663 [1] (6/5/2020)	0.731	Permanent	-3.189 [1] (6/4/2020)	0.927	Permanent
34. Singapore (24/1/2020 - 5/10/2020)	-4.588 [2] (4/16/2020)	0.198	Permanent	-2.890 [3] (4/8/2020)	0.975	Permanent
35. South Korea (20/1/2020 - 5/10/2020)	-4.287 [2] (2/20/2020)	0.344	Permanent	-4.038 [2] (5/12/2020)	0.496	Permanent
36. Sri Lanka (28/1/2020 - 5/10/2020)	-2.941 [0] (1/4/2020)	0.969	Permanent	#1		
37. Syria (23/3/2020 - 5/10/2020)	-4.763 [6] (7/7/2020)	0.136	Permanent	-5.017 [6] (7/12/2020)	**0.075**	Transitory
38. Taiwan (21/1/2020 - 5/10/2020)	-11.448 [3] (3/18/2020)	**< 0.01**	Transitory	-4.684 [4] (4/19/2020)	0.163	Permanent
39. Tajikistan (1/5/2020 - 5/10/2020)	-8.876 [2] (5/21/2020)	**< 0.01**	Transitory	-6.081 [0] (5/14/2020)	**< 0.01**	Transitory
40. Thailand (13/1/2020 - 5/10/2020)	-19.269 [0] (3/20/2020)	**< 0.01**	Transitory	-13.896 [0] (3/20/2020)	**< 0.01**	Transitory
41. Timor (22/3/2020 - 5/10/2020)	-17.9945 [2] (4/16/2020)	**< 0.01**	Transitory	-5.327 [7] (4/22/2020)	**0.034**	Transitory
42. Turkey (12/3/2020 - 5/10/2020)	-11.470 [0] (4/1/2020)	**< 0.01**	Transitory	-7.656 [0] (3/30/2020)	**< 0.01**	Transitory
43. United Arab Emirates (27/1/2020 - 5/10/2020)	-4.436 [7] (7/31/2020)	0.267	Permanent	-3.443 [7] (7/25/2020)	0.839	Permanent
44. Uzbekistan (16/3/2020 - 5/10/2020)	-4.241 [4] (6/17/2020)	0.369	Permanent	-4.148 [4] (6/14/2020)	0.427	Permanent
45. Vietnam (24/1/2020 - 5/10/2020)	-7.189 [1] (7/29/2020)	**< 0.01**	Transitory	-4.454 [7] (7/26/2020)	0.258	Permanent
46. Yemen (10/4/2020 - 5/10/2020)	-3.871 [0] (7/29/2020)	0.605	Permanent	-2.638 [2] (8/7/2020)	> 0.99	Permanent

Europe	Innovational Outlier, IO	*p*-value	Finding	Additive Outlier, AO	*p*-value	Finding
1. Albania (9/3/2020 - 5/10/2020)	-4.149 [2] (5/31/2020)	0.427	Permanent	-2.091 [2] (6/15/2020)	> 0.99	Permanent
2. Andorra (3/3/2020 - 5/10/2020)	-5.728 [7] (8/27/2020)	**< 0.01**	Transitory	-4.243 [7] (8/26/2020)	0.368	Permanent
3. Austria (26/2/2020 - 5/10/2020)	-3.497 [14] (8/20/2020)	0.814	Permanent	-3.506 [4] (8/16/2020)	0.810	Permanent
4. Belarus (28/2/2020 - 5/10/2020)	-7.935 [7] (4/5/2020)	**< 0.01**	Transitory	-6.738 [3] (4/9/2020)	**< 0.01**	Transitory
5. Belgium (4/2/2020 - 5/10/2020)	-3.276 [12] (8/12/2020)	0.903	Permanent	-6.256 [7] (9/28/2020)	**< 0.01**	Transitory
6. Bosnia and Herzegovina (6/3/2020 - 5/10/2020	-6.701 [1] (6/1/2020)	**< 0.01**	Transitory	-5.599 [0] (6/5/2020)	**0.016**	Transitory
7. Bulgaria (8/3/2020 - 5/10/2020)	-4.758 [7] (5/22/2020)	0.137	Permanent	-4.688 [7] (6/7/2020)	0.161	Permanent
8. Croatia (26/2/2020 - 5/10/2020)	-4.743 [9] (7/20/2020)	0.143	Permanent	-4.298 [9] (7/20/2020)	0.338	Permanent
9. Cyprus (10/3/2020 - 5/10/2020)	-4.808 [7] (9/1/2020)	0.122	Permanent	-3.731 [6] (9/25/2020)	0.690	Permanent
10. Czech Rep. (2/3/2020 - 5/10/2020)	-1.245 [15] (8/26/2020)	> 0.99	Permanent	-2.235 [14] (6/17/2020)	> 0.99	Permanent
11. Denmark (27/2/2020 - 5/10/2020)	-3.461 [14] (8/25/2020)	0.832	Permanent	-4.180 [7] (8/12/2020)	0.407	Permanent
12. Estonia (28/2/2020 - 5/10/2020)	-2.556 [9] (9/20/2020)	> 0.99	Permanent	-3.024 [8] (9/24/2020)	0.959	Permanent
13. Faeroe Islands (6/3/2020 - 5/10/2020)	-4.504 [0] (8/7/2020)	0.236	Permanent	-4.629 [9] (7/30/2020)	0.182	Permanent
14. Finland (30/1/2020 - 5/10/2020)	-5.752 [0] (3/27/2020)	**< 0.01**	Transitory	-5.144 [0] (3/27/2020)	**0.055**	Transitory

15. France (25/1/2020 - 5/10/2020)	-5.552 [7] (8/16/2020)	**0.018**	Transitory	-6.056 [7] (4/8/2020)	< **0.01**	Transitory
16. Germany (28/1/2020 - 5/10/2020)	-6.465 [10] (3/19/2020)	< **0.01**	Transitory	-5.426 [6] (9/28/2020)	**0.026**	Transitory
17. Gibraltar (20/3/2020 - 5/10/2020)	-5.075 [2] (8/24/2020)	**0.066**	Transitory	-5.006 [5] (8/22/2020)	**0.077**	Transitory
18.Greece (27/2/2020 - 5/10/2020)	-3.884 [7] (7/15/2020)	0.598	Permanent	-3.149 [6] (7/9/2020)	0.936	Permanent
19. Guernsey (20/3/2020 - 5/10/2020)	-23.021 [0] (4/1/2020)	< **0.01**	Transitory	-16.525 [0] (4/1/2020)	< **0.01**	Transitory
20. Hungary (5/3/2020 - 5/10/2020)	-6.169 [0] (8/24/2020)	< **0.01**	Transitory	-4.920 [10] (9/22/2020)	**0.093**	Transitory
21. Iceland (29/2/2020 - 5/10/2020)	-5.447 [5] (3/19/2020)	**0.024**	Transitory	-5.395 [5] (3/6/2020)	**0.028**	Transitory
22. Ireland (1/3/2020 - 5/10/2020)	-6.363 [0] (3/26/2020)	< **0.01**	Transitory	-5.701 [0] (3/26/2020)	**0.011**	Transitory
23. Isle of Man (21/3/2020 - 5/10/2020)	-13.371 [0] (4/3/2020)	< **0.01**	Transitory	-11.228 [0] (4/3/2020)	< **0.01**	Transitory
24. Italy (31/1/2020 - 5/10/2020)	-4.680 [9] (3/11/2020)	0.164	Permanent	-5.187 [5] (9/29/2020)	**0.049**	Transitory
25. Jersey (20/3/2020 - 5/10/2020)	-13.874 [14] (8/3/2020)	< **0.01**	Transitory	-9.844 [0] (4/3/2020)	< **0.01**	Transitory
26. Kosovo (14/3/2020 - 5/10/2020)	3.453 [0] (3/30/2020)	0.835	Permanent	-4.859 [12] (7/5/2020)	0.109	Permanent
27. Latvia (8/3/2020 - 5/10/2020)	-3.457 [4] (9/30/2020)	0.833	Permanent	-2.772 [4] (9/27/2020)	0.985	Permanent
28. Liechtenstein (5/3/2020 - 5/10/2020)	-9.159 [0] (3/18/2020)	< **0.01**	Transitory	-8.730 [0] (3/18/2020)	< **0.01**	Transitory
29. Lithuania (28/2/2020 - 5/10/2020)	-3.816 [8] (9/7/2020)	0.640	Permanent	-2.994 [5] (9/5/2020)	0.963	Permanent
30. Luxembourg (1/3/2020 - 5/10/2020)	-3.318 [0] (8/27/2020)	0.889	Permanent	-5.131 [15] (8/13/2020)	**0.057**	Transitory
31. Macedonia (27/2/2020 - 5/10/2020)	-4.390 [8] (5/2/2020)	0.290	Permanent	-5.054 [0] (5/5/2020)	**0.070**	Transitory
32. Malta (7/3/2020 - 5/10/2020)	-3.992 [3] (7/12/2020)	0.527	Permanent	-3.621 [3] (7/12/2020)	0.755	Permanent
33. Moldova (8/3/2020 - 5/10/2020)	-1.013 [9] (8/1/2020)	> 0.99	Permanent	-1.288 [14] (7/18/2020)	> 0.99	Permanent
34. Monaco (29/2/2020 - 5/10/2020)	-3.656 [7] (7/6/2020)	0.735	Permanent	-3.781 [7] (6/29/2020)	0.660	Permanent
35. Montenegro (18/3/2020 - 5/10/2020)	-3.884 [12] (8/10/2020)	0.598	Permanent	-7.307 [12] (7/21/2020)	< **0.01**	Transitory
36. Netherlands (28/2/2020 - 5/10/2020)	-3.063 [10] (9/3/2020)	0.953	Permanent	-1.856 [2] (4/29/2020)	> 0.99	Permanent
37. Norway (27/2/2020 - 5/10/2020)	-7.282 [7] (3/10/2020)	< **0.01**	Transitory	-6.517 [7] (3/2/2020)	< **0.01**	Transitory
38. Poland (4/3/2020 - 5/10/2020)	-3.549 [9] (8/4/2020)	0.792	Permanent	-3.427 [1] (7/25/2020)	0.846	Permanent
39. Portugal (3/3/2020 - 5/10/2020)	-4.702 [6] (3/20/2020)	0.157	Permanent	-4.573 [6] (7/13/2020)	0.206	Permanent
40. Romania (27/2/2020 - 5/10/2020)	-3.898 [13] (6/26/2020)	0.590	Permanent	-3.741 [7] (5/3/2020)	0.684	Permanent
41. Russia (1/2/2020 - 5/10/2020)	-8.001 [0] (1/17/2020)	< **0.01**	Transitory	-6.601 [2] (3/18/2020)	< **0.01**	Transitory
42. San Marino (28/2/2020 - 5/10/2020)	-6.562 [0] (4/8/2020)	< **0.01**	Transitory	-4.392 [0] (3/19/2020)	0.289	Permanent
43. Serbia (7/3/2020 - 5/10/2020)	-5.052 [6] (4/17/2020)	**0.070**	Transitory	-3.896 [2] (7/12/2020)	0.591	Permanent
44. Slovakia (7/3/2020 - 5/10/2020)	-0.152 [8] (9/22/2020)	> 0.99	Permanent	-3.044 [10] (8/27/2020)	0.956	Permanent
45. Slovenia (5/3/2020 - 5/10/2020)	-4.179 [14] (8/24/2020)	0.408	Permanent	-2.826 [8] (8/10/2020)	0.981	Permanent
46. Spain (1/2/2020 - 4/10/2020)	-3.506 [14] (8/24/2020)	0.810	Permanent	-6.798 [7] (9/27/2020)	< **0.01**	Transitory
47. Sweden (1/2/2020 - 2/10/2020)	-4.854 [0] (1/4/2020)	0.110	Permanent	-4.657 [7] (9/25/2020)	0.172	Permanent

48. Switzerland (26/2/2020 - 5/10/2020)	-5.789 [9] (3/15/2020)	< **0.01**	Transitory	-6.146 [7] (4/21/2020)	< **0.01**	Transitory
49. Ukraine (4/3/2020 - 5/10/2020)	0.8467 [2] (8/2/2020)	> 0.99	Permanent	-0.802 [14] (9/19/2020)	> 0.99	Permanent
50. United Kingdom (1/2/2020 - 5/10/2020)	-3.020 [9] (10/3/2020)	0.959	Permanent	-5.092 [6] (9/29/2020)	**0.063**	Transitory
51. Vatican (7/3/2020 - 5/10/2020)	-13.794 [13] (4/29/2020)	< **0.01**	Transitory	-7.179 [0] (3/26/2020)	< **0.01**	Transitory

North America	Innovational Outlier, IO	*p*-value	Finding	Additive Outlier, AO	*p*-value	Finding
1. Anguilla (27/3/2020 - 5/10/2020)	-23483964 [0] (4/2/2020)	< **0.01**	Transitory	-94.631 [0] (4/2/2020)	< **0.01**	Transitory
2. Antigua and Barbuda (15/3/2020 - 5/10/2020)	-9.753 [0] (6/24/2020)	< **0.01**	Transitory	-2.681 [0] (6/10/2020)	> 0.99	Permanent
3. Aruba (13/3/2020 - 5/10/2020)	-5.575 [7] (7/26/2020)	**0.017**	Transitory	-7.607 [14] (8/5/2020)	< **0.01**	Transitory
4. Bahamas (16/3/2020 - 5/10/2020)	-4.981 [4] (7/9/2020)	**0.081**	Transitory	-3.736 [0] (7/12/2020)	0.687	Permanent
5. Barbados (18/3/2020 - 5/10/2020)	-6.211 [4] (8/1/2020)	< **0.01**	Transitory	-4.345 [0] (8/3/2020)	0.313	Permanent
6. Belize (24/3/2020 - 5/10/2020)	-5.341 [1] (7/27/2020)	**0.032**	Transitory	-4.930 [9] (8/11/2020)	**0.091**	Transitory
7. Bermuda (20/3/2020 - 5/10/2020)	-9.399 [6] (4/15/2020)	< **0.01**	Transitory	-4.626 [0] (4/30/2020)	0.183	Permanent
8. Bonaire Sint Eustatius and Saba (2/4/2020 - 5/10/2020)	0.395 [14] (9/18/2020)	> 0.99	Permanent	-7.594 [7] (9/5/2020)	< **0.01**	Transitory
9. British Virgin Islands (27/3/2020 - 5/10/2020)	-4.802 [7] (9/13/2020)	0.124	Permanent	-5.109 [14] (8/22/2020)	**0.060**	Transitory
10. Canada (26/1/2020 - 5/10/2020)	-4.916 [7] (9/8/2020)	**0.094**	Transitory	-5.069 [7] (3/19/2020)	**0.067**	Transitory
11. Cayman Islands (20/3/2020 - 5/10/2020)	-7.423 [2] (5/19/2020)	< **0.01**	Transitory	-5.222 [0] (5/22/2020)	**0.045**	Transitory
12. Costa Rica (7/3/2020 - 5/10/2020)	-4.265 [8] (7/26/2020)	0.356	Permanent	-3.815 [7] (4/7/2020)	0.641	Permanent
13. Cuba (12/3/2020 - 5/10/2020)	-3.094 [5] (8/28/2020)	0.948	Permanent	-2.902 [5] (8/30/2020)	0.973	Permanent
14. Curacao (13/3/2020 - 5/10/2020)	-5.933 [12] (9/30/2020)	< **0.01**	Transitory	-3.823 [7] (8/25/2020)	0.636	Permanent
15. Dominica (23/3/2020 - 5/10/2020)	-6.966 [0] (9/10/2020)	< **0.01**	Transitory	-8.346 [2] (9/8/2020)	< **0.01**	Transitory
16. Dominican Republic (2/3/2020 - 5/10/2020)	-5.482 [0] (3/15/2020)	**0.022**	Transitory	-4.564 [0] (3/16/2020)	0.210	Permanent
17. El Salvador (19/3/2020 - 5/10/2020)	-4.759 [0] (3/30/2020)	0.137	Permanent	-4.288 [5] (5/26/2020)	0.344	Permanent
18. Greenland (20/3/2020 - 5/10/2020)	-9.533 [0] (3/25/2020)	< **0.01**	Transitory	-10.203 [0] (3/23/2020)	< **0.01**	Transitory
19. Grenada (23/3/2020 - 5/10/2020)	-10.636 [7] (4/25/2020)	< **0.01**	Transitory	-7.423 [3] (4/28/2020)	< **0.01**	Transitory
20. Guatemala (15/3/2020 - 5/10/2020)	-4.380 [0] (3/31/2020)	0.295	Permanent	-3.654 [0] (3/29/2020)	0.736	Permanent
21. Haiti (20/3/2020 - 5/10/2020)	-7.442 [0] (5/3/2020)	< **0.01**	Transitory	-4.893 [8] (7/8/2020)	**0.100**	Transitory
22. Honduras (12/3/2020 - 5/10/2020)	-5.938 [0] (4/1/2020)	< **0.01**	Transitory	-4.232 [0] (3/30/2020)	0.375	Permanent

23. Jamaica (12/3/2020 - 5/10/2020)	-5.041 [2] (8/13/2020)	**0.072**	Transitory	-4.977 [12] (8/21/2020)	**0.082**	Transitory
24. Mexico (29/2/2020 - 5/10/2020)	-12.290 [0] (3/27/2020)	< **0.01**	Transitory	-7.164 [0] (3/27/2020)	< **0.01**	Transitory
25. Montserrat (21/3/2020 - 5/10/2020)	-7.871 [0] (4/8/2020)	< **0.01**	Transitory	-7.902 [0] (4/8/2020)	< **0.01**	Transitory
26. Nicaragua (19/3/2020 - 5/10/2020)	-3.107 [10] (6/30/2020)	0.945	Permanent	-3.114 [10] (6/27/2020)	0.944	Permanent
27. Panama (10/3/2020 - 5/10/2020)	-6.451 [0] (3/26/2020)	< **0.01**	Transitory	-4.559 [0] (3/24/2020)	0.212	Permanent
28. Puerto Rico (28/3/2020 - 5/10/2020)	-4.165 [9] (7/11/2020)	0.416	Permanent	-3.260 [10] (9/10/2020)	0.907	Permanent
29. Saint Kitts and Nevis (26/3/2020 - 5/10/2020)	-6.187 [0] (9/21/2020)	< **0.01**	Transitory	-9.956 [0] (3/29/2020)	< **0.01**	Transitory
30. Saint Lucia (15/3/2020 - 5/10/2020)	-9.927 [0] (3/29/2020)	< **0.01**	Transitory	-9.804 [0] (3/29/2020)	< **0.01**	Transitory
31. Saint Vincent and the Grenadines (13/3/2020 - 5/10/2020)	-6.931 [1] (7/17/2020)	< **0.01**	Transitory	-3.442 [6] (7/14/2020)	0.840	Permanent
32. Sint Maarten (Dutch part) (3/3/2020 - 5/10/2020)	-3.523 [4] (7/6/2020)	0.803	Permanent	-3.525 [0] (7/7/2020)	0.802	Permanent
33. Trinidad and Tobago (13/3/2020 - 5/10/2020)	-5.540 [12] (8/9/2020)	**0.018**	Transitory	-5.0364 [1] (8/8/2020)	**0.072**	Transitory
34. Turks and Caicos Islands (25/3/2020 - 5/10/2020)	-4.953 [13] (7/11/2020)	**0.086**	Transitory	-5.232 [14] (8/8/2020)	**0.043**	Transitory
35. United States (21/1/2020 - 5/10/2020)	-5.790 [0] (1/17/2020)	< **0.01**	Transitory	-7.006 [7] (5/15/2020)	< **0.01**	Transitory
36. United States Virgin Islands (24/3/2020 - 5/10/2020)	-3.473 [8] (6/11/2020)	0.826	Permanent	-3.974 [8] (7/27/2020)	0.540	Permanent

Oceania	Innovational Outlier, IO	*p*-value	Finding	Additive Outlier, AO	*p*-value	Finding
1. Australia (25/1/2020 - 5/10/2020)	-5.317 [4] (5/31/2020)	**0.034**	Transitory	-5.659 [7] (3/18/2020)	**0.013**	Transitory
2. Fiji (20/3/2020 - 5/10/2020)	-4.499 [1] (7/8/2020)	0.238	Permanent	-3.941 [14] (6/29/2020)	0.562	Permanent
3. French Polynesia (19/3/2020 - 5/10/2020)	-4.579 [14] (8/14/2020)	0.203	Permanent	-4.279 [14] (8/11/2020)	0.348	Permanent
4. Guam (19/3/2020 - 5/10/2020)	-6.154 [7] (8/7/2020)	< **0.01**	Transitory	-4.690 [14] (8/14/2020)	0.161	Permanent
5. New Caledonia (21/3/2020 - 5/10/2020)	-11.785 [0] (9/4/2020)	< **0.01**	Transitory	-11.009 [0] (9/4/2020)	< **0.01**	Transitory
6. New Zealand (28/2/2020 - 5/10/2020)	-18.910 [0] (3/24/2020)	< **0.01**	Transitory	-15.026 [0] (3/25/2020)	< **0.01**	Transitory
7. Northern Mariana Islands (31/3/2020 - 5/10/2020)	-4.832 [0] (6/25/2020)	0.116	Permanent	-4.868 [0] (6/25/2020)	0.107	Permanent
8. Papua New Guinea (21/3/2020 - 5/10/2020)	-6.930 [13] (7/5/2020)	< **0.01**	Transitory	-5.828 [13] (7/26/2020)	< **0.01**	Transitory

South America	Innovational Outlier, IO	*p*-value	Finding	Additive Outlier, AO	*p*-value	Finding
1. Argentina (4/3/2020 - 5/10/2020)	-1.257 [8] (7/27/2020)	> 0.99	Permanent	-3.109 [8] (6/22/2020)	0.945	Permanent
2. Bolivia (12/3/2020 - 5/10/2020)	-6.281 [0] (4/2/2020)	**< 0.01**	Transitory	-5.104 [0] (3/31/2020)	**0.061**	Transitory
3. Brazil (26/2/2020 - 5/10/2020)	-4.654 [14] (9/20/2020)	0.172	Permanent	-4.331 [7] (4/3/2020)	0.320	Permanent
4. Chile (4/3/2020 - 5/10/2020)	-3.142 [0] (6/7/2020)	0.938	Permanent	-4.231 [14] (6/11/2020)	0.375	Permanent
5. Colombia (7/3/2020 - 5/10/2020)	-5.004 [7] (6/5/2020)	**0.078**	Transitory	-5.357 [7] (6/6/2020)	**0.031**	Transitory
6. Ecuador (1/3/2020 - 5/10/2020)	-2.690 [0] (3/3/2020)	>0.99	Permanent	-3.347 [8] (4/19/2020)	0.879	Permanent
7. Falkland Islands (4/4/2020 - 5/10/2020)	-98.230 [10] (5/7/2020)	**< 0.01**	Transitory	-17.344 [0] (4/14/2020)	**< 0.01**	Transitory
8. Guyana (13/3/2020 - 5/10/2020)	-3.239 [0] (8/3/2020)	0.914	Permanent	-2.751 [2] (8/1/2020)	0.986	Permanent
9. Paraguay (8/3/2020 - 5/10/2020)	-5.176 [1] (7/31/2020)	**0.050**	Transitory	-3.344 [7] (6/22/2020)	0.880	Permanent
10. Peru (7/3/2020 - 5/10/2020)	-6.281 [0] (3/17/2020)	**< 0.01**	Transitory	-5.520 [7] (5/28/2020)	**0.019**	Transitory
11. Suriname (15/3/2020 - 5/10/2020)	-4.529 [7] (6/29/2020)	0.224	Permanent	-5.157 [8] (6/21/2020)	**0.053**	Transitory
12. Uruguay (15/3/2020 - 5/10/2020)	-4.837 [1] (7/23/2020)	0.115	Permanent	-4.066 [1] (7/24/2020)	0.477	Permanent
13. Venezuela (15/3/2020 - 5/10/2020)	-4.988 [0] (6/28/2020)	**0.080**	Transitory	-4.409 [0] (7/1/2020)	0.280	Permanent

Notes: The null hypothesis, H_0 is the total confirmed cases of Covid-19 have a unit root (i.e. permanent). The bolded *p*-value (probability value) indicates the rejection of the null hypothesis, at least 0.10 or 10% - it suggests that the total confirmed cases of Covid-19 are stationary (i.e. transitory). Both the IO and AO models both have trend specification of trend and intercept for both basic and breaking. The figure in [.] is the optimum lag length as selected by Schwarz Criterion (SC). The date in (.) is the suggested break date in which to minimizes the Dickey-Fuller t-statistic. #1 refers to 'Near singular matrix error' by Eviews econometric software computation.