Covid-19 and the MCO: An Exit Strategy for Malaysia

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Executive Summary

On 25 January 2020 Malaysia detected the first cases of coronavirus disease 2019 (Covid-19) on its soil. As per 14 April there were 4987 cases recorded, 82 deaths and 2478 recoveries. The encouraging fact is that the average number of daily cases is stable (61.57) and the same goes with the average number of deaths (2.83), while the average number of daily recoveries is rapidly growing and now stands at 34.90. With a world average of 15.6 deaths every million citizen, Malaysia contained the number of deaths at 3 every million citizens, while Italy stands at 338 and Spain at 386.

On 18 March the movement control order (MCO) was introduced and subsequently extended until 28 April at least. While the initial appearing of Covid-19 heavily affected well defined industries such as aviation and tourism, and the Pakatan Harapan responded to the initial challenge with a RM 20 billion stimulus package (27 February), the introduction of the MCO, in the attempt to fight the "pandemic"[1], generated harms to the whole economic system. Recognizing the emergency created by the "lockdown", the Prihatin stimulus package (RM 230 billion) was announced on 27 March, followed by an additional support measure for small and medium enterprises (RM 10 billion) revealed on 6 April.

We can identify three macro-categories of economic problems created by the MCO which produce direct human consequences:

1. Supply chain disruptions and price hikes (short term).

2. Business bankrupts and job losses (medium term).

3. Social unrests (medium and long term).

In this scenario, Bank Negara Malaysia estimated that the GDP change in 2020 may oscillate between -2% and +0.5%. While we have doubts about the efficacy of the implemented monetary expansion (profit expectations are frustrated by uncertainty and by the lockdown and "easy credit" will not be enough to awake private investment), the adopted fiscal policy too presents criticalities (World Bank):

1. The components of the stimulus package are mostly off-budget measures with a relatively small direct fiscal injection.

2. Wage subsidies are limited and short-term by nature, and in the specific case of the Prihatin package they are accompanied by high qualification requirements.

3. Doubts are raised about the overall speed of implementation and disbursement of the fiscal stimulus package.

4. There are doubts on how to finance the stimulus package also at the light of falling commodity prices which affects Malaysia's non fiscal revenues.

It is important to stress the importance of avoiding over-reactions, in particular in developing countries, where the welfare safety net is less developed when compared with Western economies.

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[1]. *Pandemic comes from the Greek "pan" (all) and "demos" (people). We suggest prudence in using this term in the specific context of Malaysia.*

In order to suggest a MCO exit strategy, we produced an ARIMA estimation on the duration of the contagion in Malaysia; with all the "ifs" and "buts" underlying an econometric estimation, we foresee the phenomenon to slow down between the end of May and the beginning of June.

The exit strategy we propose is made of four steps.

Short run.

1. Reintroduce logistics among the essential services.
   The first and most urgent and easy measure to be adopted is to reintroduce logistics – each kind of logistics – among the essential services. Otherwise, the newly allowed businesses may experience bottlenecks and may be unable to reach the final customers.

2. Rapid feedback from MITI for the industry-related firms.

Medium run.

3. Gradual lift-up of MCO under strict sanitary conditions.
   The government, on the advice from public health authorities, should create a zoning system for production clusters or territories as a basis to gradually allowing employees to return to work and businesses to resume operating. At the same time, incentives could be provided to encourage business compliance on mandatory testing of all staffs and other precautionary measures like employees taking temperature before entering business premises or extensive sanitation of workplaces.

Medium and long run.

4. Fiscal incentives to automation.
   A clear incentive strategy, together with a long-term education reform, can favour a further technological jump in the manufacturing sector in Malaysia, reducing depandance on (foreign) labour intensive production processes and awakening domestic creative entrepreneurship.

1. Covid-19 in Malaysia: a brief history[2]

On 25 January 2020 Malaysia detected the first cases of coronavirus disease 2019 (Covid-19) on its soil; the affected persons were travellers who reached the country on the way back from China via Singapore. The number of total cases remained relatively low for around one and a half month, until when some localized clusters emerged in March; the most notable one was linked to a large Tablighi Jamaat religious gathering held in Sri Petaling at the end of February and early March, and it led to spikes in local cases but also to the exportation of cases to neighbouring countries.

**Figure 1: Total Covid-19 cases in Malaysia, total deaths and
total recoveries (25 Jan – 14 Apr).**
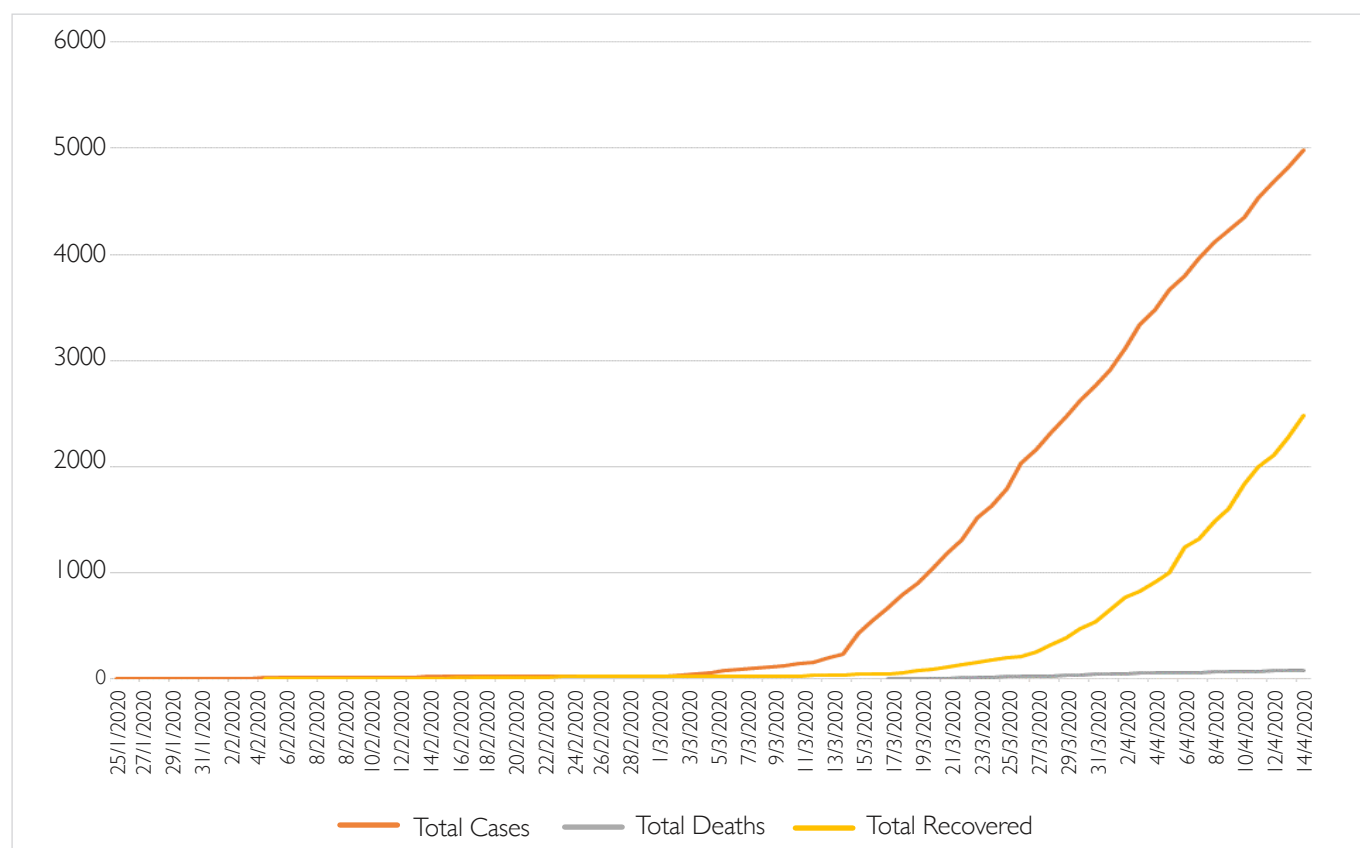
Source: our elaboration on official data.

Although Malaysia rapidly recorded the largest cumulative number of confirmed infections in Southeast Asia, the number of daily cases is declining. As per 10 April 2020, there were 4987 confirmed cases and 2478 recovered patients (Pfordten and Ahmad, 2020). The daily trend of the total cases, deaths and recoveries can be seen in Figure 2.

[2.] *The main historical steps are reconstructed on the basis of the account reported by Wikipedia (https://en.wikipedia.org/wiki/2020_coronavirus_pandemic_in_Malaysia).*

Figure 2: Covid-19 daily percentual change in total cases, total deaths and total recoveries (25 Jan – 14 Apr)
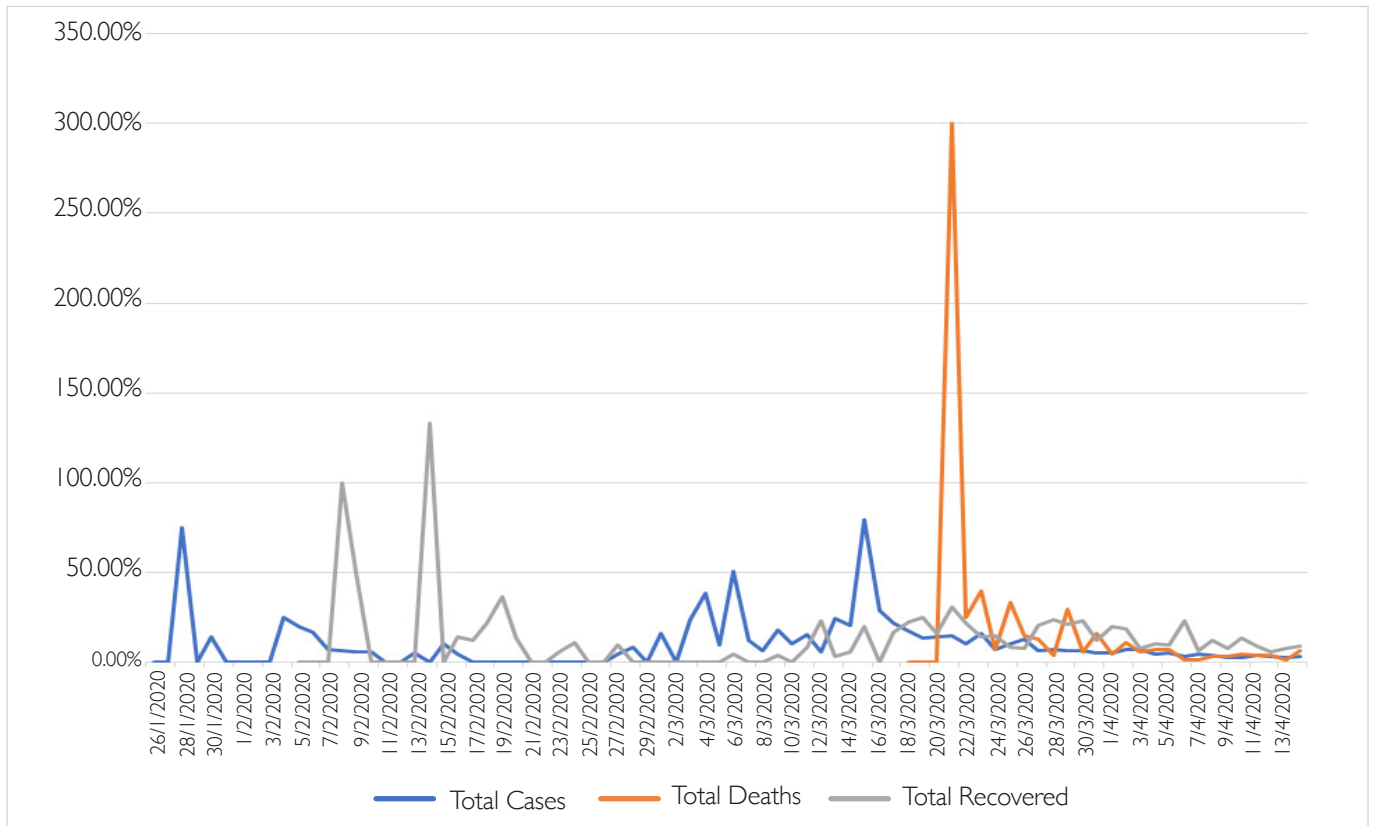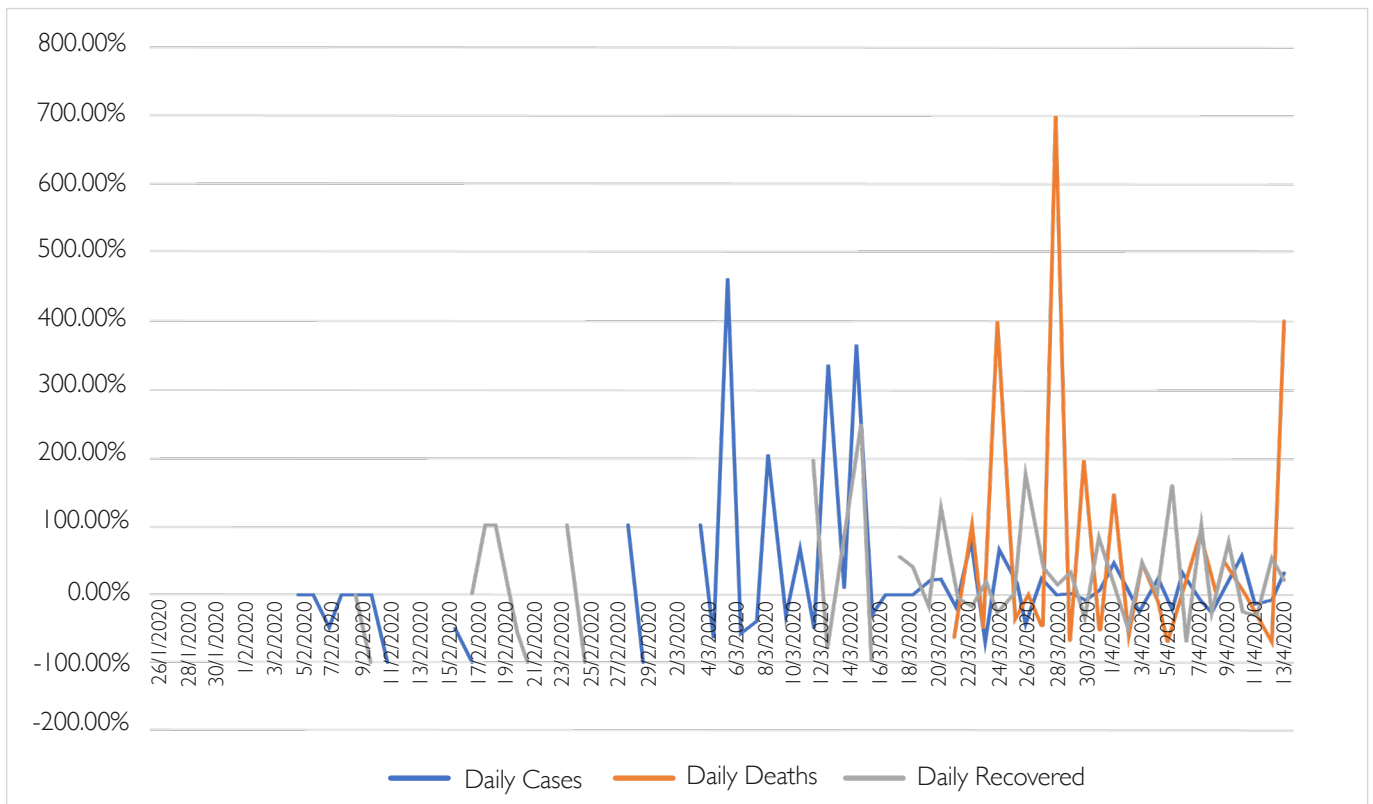

Source: our elaboration on official data.

In figure 3, instead, we reported the daily new cases, and in figure 4 the percentual change in daily new deaths, new cases and new recoveries.

Figure 3: Covid-19 daily new cases in Malaysia (25 Jan – 13 Apr).


Source: https://www.worldometers.info/coronavirus/country/malaysia/.
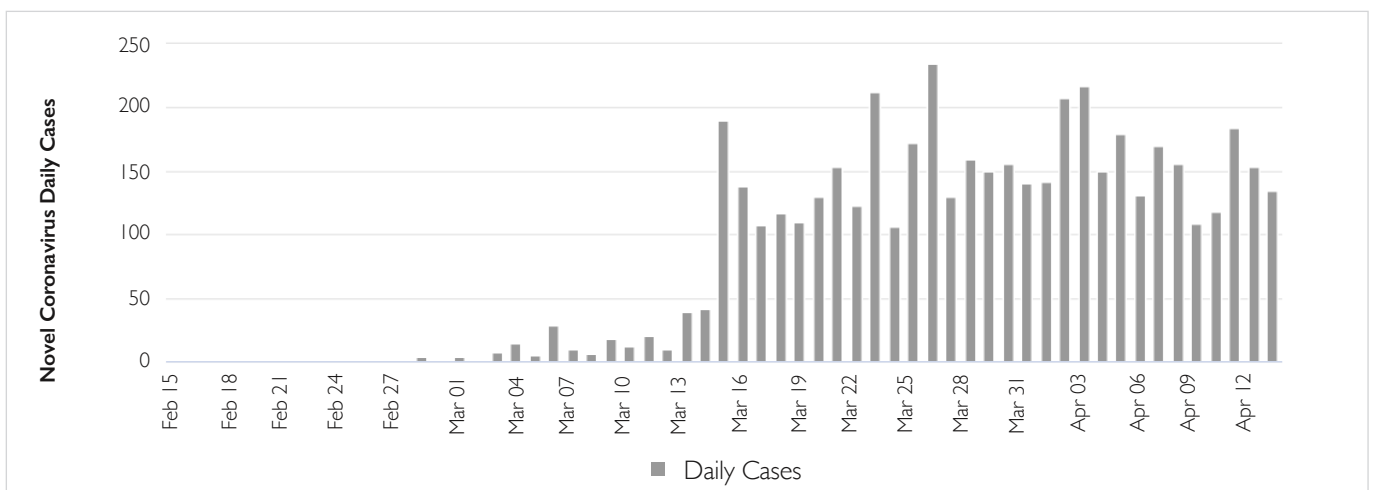
**Figure 4: Percentual change in new daily deaths, recoveries and cases
(25 January – 14 April).**

Source: our elaboration on official data.

The most encouraging data is that an increasing rate of testing has shown a relatively low fatality rate, 1.64%. Similarly, the recovery rate has constantly grown since 18 March and now it is 49.69% of the total cases. Figure 5 shows how the period with a declining recovery rate is the one of the first half of March, when the number of cases was growing at an accelerated pace. Instead, from 18 March the recoveries showed a comforting path.

Figure 5: Percentage of total recovered people and deaths over the total number of cases (25 Jan – 14 Apr).
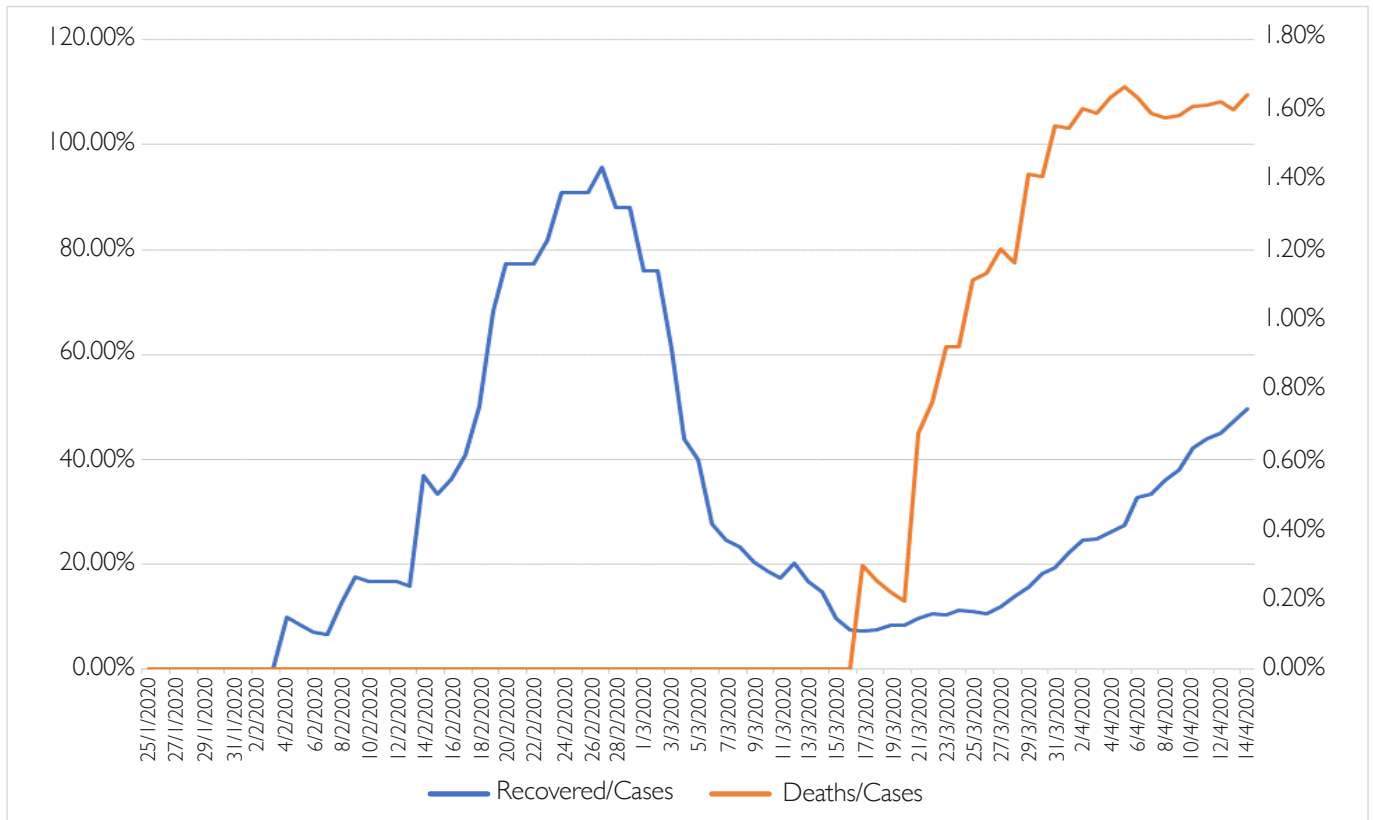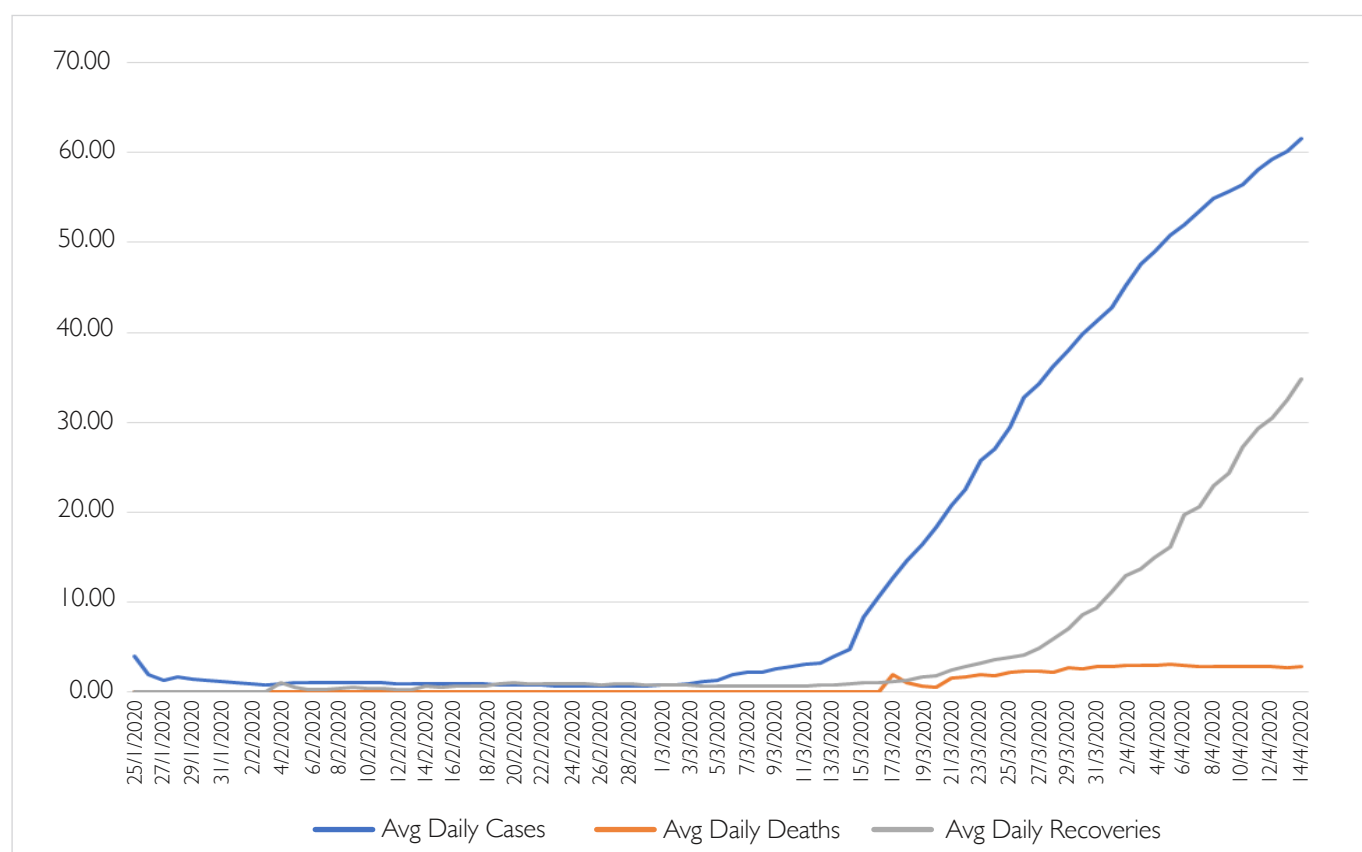

Source: our elaboration on official data.

Figure 6 is also encouraging. In fact, the main findings are:

- The average daily number of cases is growing at a declining rate.

- The average daily number of deaths is not growing.

- The average daily number of recoveries is growing at a good speed.

Figure 6: Average number of daily cases, deaths and recoveries.

Source: our elaboration on official data.

The findings reported in Figure 6 can be more easily captured with a glance if we look at Figure 7, where it is reported the percentual change in the daily average new cases, deaths and recoveries. In fact, in Figure 7 the orange (average daily deaths) and the blue (average daily cases) lines are close to the 0%, meaning that the average number of cases and deaths is not changing significantly; the grey line (average daily recoveries), instead is in positive territory, meaning that the average number of daily recoveries is constantly increasing. Currently, the average daily new cases are 61.57, the average daily deaths 2.83 and the average daily recoveries 34.90.

Figure 7: Percentual change in the daily average of new cases, deaths and recoveries.
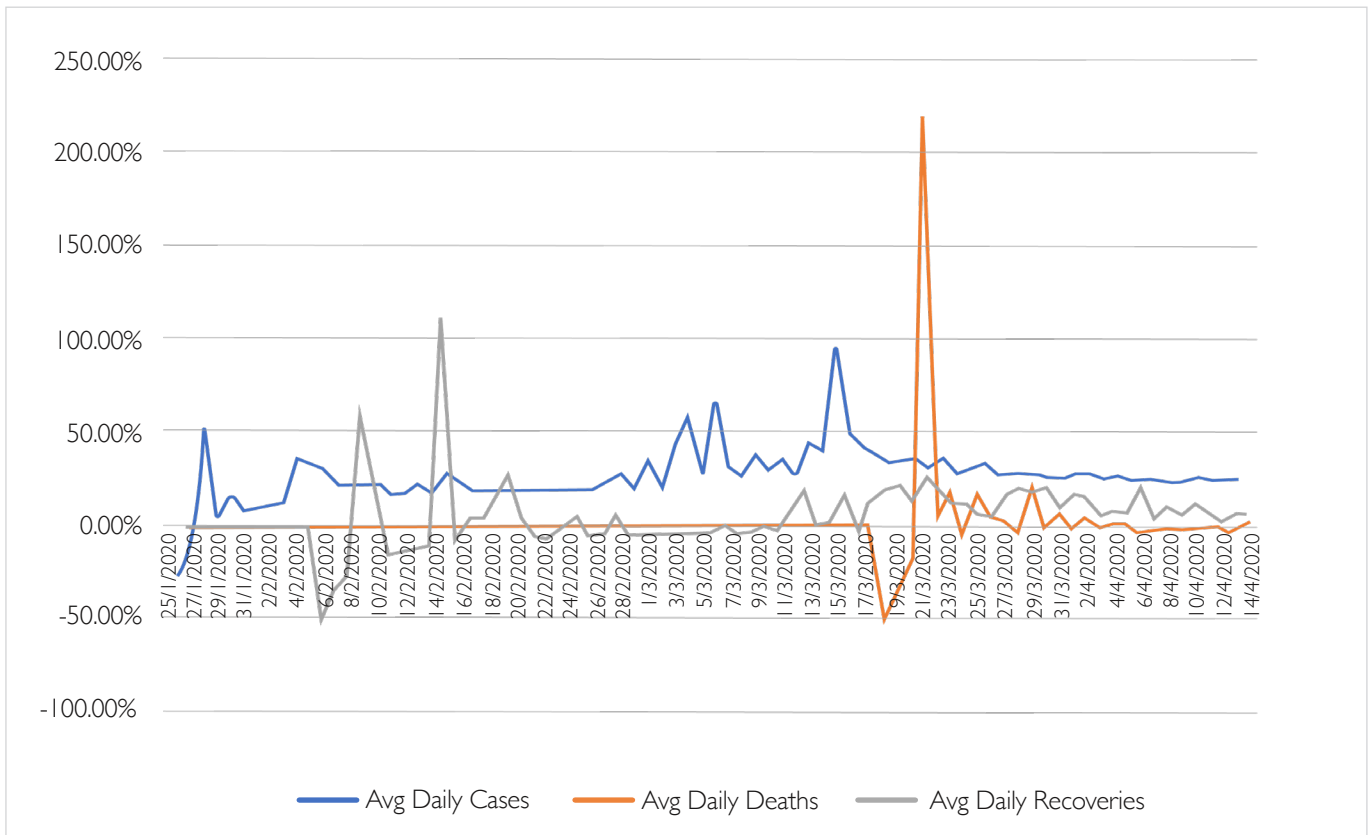
Source: our elaboration on official data.

As it will be seen more in the detail in section 2, on 16 March the Malaysian government announced a "Movement Control Order" (MCO), initially planned to last until 31 March and then extended until 14 April; on 10 April a further extension until 28 April was announced. While the World Health Organization expects the peak of the spread to be reached in mid-April, the so-called lockdown of the country and the division of the economy between essential and non-essential services have ignited a debate about the potential negative consequences created by the MCO on the economy and in particular on the weakest segments of the population. To respond to the economic emergency, the Malaysian government has already intervened three times with different stimulus packages, but, as it will be discussed below, some voices are raising asking a MCO exit strategy in order to avoid that the economic effects of the lockdown would be stronger than the direct pandemic effects.

2. The MCO and the stimulus package

Both the previous Pakatan Harapan cabinet and the current one have taken action to mitigate the economic impact of covid-19. Before the political change that brought to the formation of a new coalition, more or less until the end of February, the impression was that the effects of the pandemic would have been limited to certain industries, such as tourism and aviation, which were directly affected by the new international scenario characterized by growing limitations to travels and movements.

The Pakatan Harapan government, in the middle of its political crisis, announced a stimulus package of RM 20 billion on 27 February. The main points are summarized in Figure 8.

Figure 8: The PH stimulus package.

Source: Ernst & Young (2020c), p. 10.

While the first stimulus package was trying to address the most urgent woes brought by the new pandemic into the economic system, the introduction of the movement control order from 18 March completely changed the scenario. In fact, the policy specifically designed to contain the pandemic diffusion on the Malaysian territory affected the generality of the economic system. It is important to realize, in fact, that the economic difficulties presently affecting Malaysia are generated mainly by the MCO rather than by the covid-19 itself. We will discuss this more in detail in section 3.

The wide effects of the MCO on the economy brought the new cabinet to announce a second stimulus package on 27 March, which added RM 230 billion to the previous RM 20 billion. The main points of the so called Prihatin stimulus package are summarized in Figure 9.

**Figure 9: Main points of the Prihatin stimulus package.**
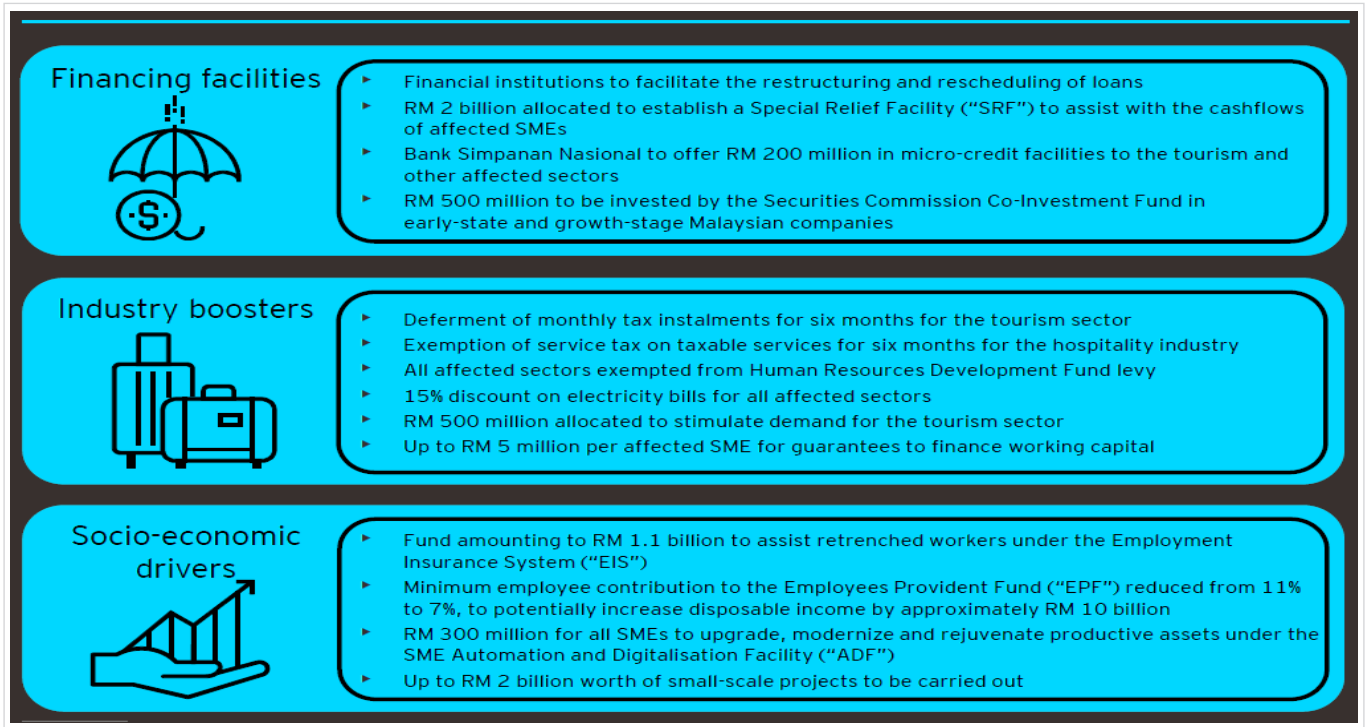
Source: Ernst & Young (2020c), p. 13. For more details see Ernst & Young (2020b), pp. 2-6.

The Prihatin package seems to recognize that one of the main problems created by a halt in the economic activity is the very survival of businesses, putting at risk thousands, if not millions, of jobs (MIER, 2020, p. 2 talked of 2.4 million jobs). This is the reason why a good amount of the huge package (17% of the Malaysian GDP) was allocated to wage subsidies. However, the relevance of small and medium enterprises and microbusinesses create more than one issue on the fund allocation and implementation.

The crucial importance of SMEs for the Malaysian economy is recognized by an additional allocation of RM 10 billion announced on 6 April. Small and medium enterprises, in fact, represents around 90% of the Malaysian firms, produce 40% of the GDP and employ two thirds of the workforce (Ernst & Young, 2020c, p. 12). The main points of the enforced Prihatin package are shown in Figure 10.

Figure 10: The enforced Prihatin package.
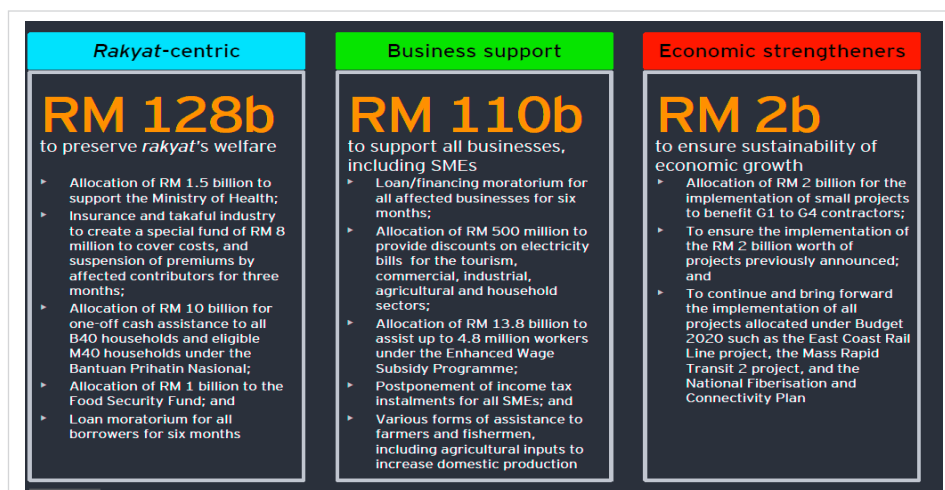
Source: Ernst & Young (2020c), p. 14.

With the emergence and the extension of the covid-19 pandemic, not only the government intervened with an enormous effort of fiscal policy; the central bank also deployed monetary policy instruments to try to mitigate the economic shock. On 3 March 2020, the overnight policy rate was reduced from 2.75% to a historically low level of 2.5%; moreover, the monetary authority decreased the statutory reserve requirement from 3% to 2%. Figure 11 summarizes the actions taken by Bank Negara Malaysia to play its role against covid-19.

Figure 11: Monetary policies deployed by Bank Negara Malaysia.
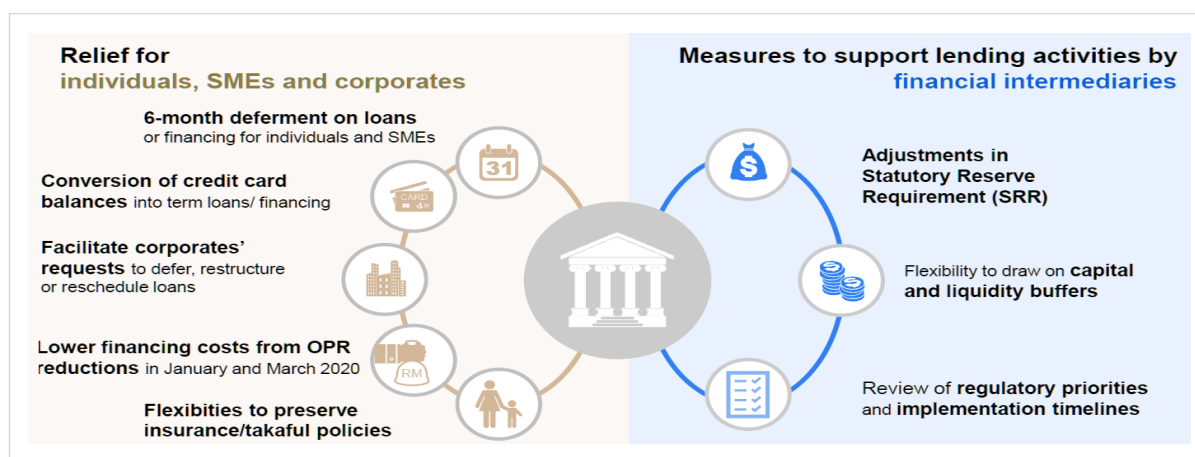
Source: Bank Negara Malaysia (2020), p. 5.

3. The MCO and the Malaysian economy

It is clear that covid-19 has been faced by the Malaysian authorities with strength both from the medical perspective (MCO) and from the policy perspective; both fiscal and monetary stimuli have been implemented. However, in order to understand if the adopted cure is the right one, it is necessary to understand which disease we are dealing with.

An economic crisis can be endogenous or exogenous. In the first case, it originates from within the economic system, from elements which can be defined as economic; it is the case, in example, of the 2007-2008 economic crisis, which was generated by the interaction between the housing and the credit markets, and eventually supported by favourable monetary policies. In the second case, instead, an economic downturn is driven by phenomena which are not primarily economic; it can be the case of an earthquake which destroys the production capacity of a certain region, or a war. With covid-19 we are experiencing a third type of phenomenon: surely, coronavirus is an exogeneous element and it should fall under the second category; however, contrary to what happens with a war or a massive natural disaster, covid-19 would be unable to produce economic instability *per se*, beyond some directly affected industries, such as aviation and tourism; the impact on the economic system is not coming from the virus but from the implementation of policies designed – at least, this is the hope – to fight it.

In fact, we are experiencing a trade-off between the MCO direct fight to prevent the spread of the pandemic and the economic woes it is generating. However, it is important not to fall into the trap of presenting a dichotomy between saving human lives and saving the economy; such an argument is based on a false assumption: the idea that the economy is an *it*, while people are *he* and *she*; however, it is not like this, the economy is very much made of *he* and *she*, it does not exist as a *it*. As Professor Horwitz (Ball State University) put it:

We need to stop creating a false dichotomy between 'economic costs' and 'human costs'. All economic costs are human costs and all human costs have economic costs. What do you think the economy is, if it's not a complex adaptive system of human interaction? And when we make choices as humans, or choices about policy that affect humans, we have to recognize those have economic costs as well.

For example, I do not know if shutting down the US economy as we have is the best way to fight this disease. I DO know that those economic costs also come with human costs as unemployment and poverty (even short term) are associated with all kinds of negative physical and mental health outcomes. Some people will get sick and die because of the lockdowns. Whether it's the right policy, I'm not sure. But note the intertwining of economic and human costs.

Again, the economy is human beings and every human choice has an economic dimension to it. To treat the economy as somehow abstract from actual flesh-and-blood humans has been the problem with mainstream economics for almost 100 years. Don't make that mistake.

Therefore, economic woes turn into human woes. We can identify three macro-categories of economic problems created by the MCO which produce direct human consequences:

- Supply chain disruptions (short term).

- Business bankrupts and job losses (medium term).

- Social unrests (medium and long term).

One of the most evident ways in which the MCO is creating troubles to the economy is the disruption in the supply chains (Todd, 2020); the situation is made more dangerous by the division between essential and non-essential services. As it is easy to imagine, such division is easier in theory than in practice. An example will help to understand: the panic buying which happened in Malaysia just before the movement control order (MCO) generated an increase in branded egg demand. LK Fresh Egg's Managing Director Tan Leng Yee told Asian Agribiz, "We are experiencing a 300% surge in demand from our retailers since the panic buying started. I would assume the same for other branded eggs as opposed to lose eggs. However, we do have constrains with packaging materials (trays, cartons, boxes) since there's been disruption in the supply chain since the MCO" (Ramanee, 2020).

The consequences of supply chain disruptions, which emerge from the difficulty to clearly distinguish between essential and non-essential services in an integrated world, are more extensive than what it can be imagined at the first sight. In fact, examples like the one in the previous paragraph, lead to a conflict between supply and demand that, by creating shortages, increases prices. In a nutshell, prolonged disruption to supply chains bring to less availability of products and higher prices[3].

The longer the MCO is prolonged, instead, the higher the risk to see a growing number of business failures and job losses. A recent survey (Bedi, 2020) showed that almost 50% of the self-employed workers already lost their jobs. This is all the more true due to the structure of the Malaysian economy, characterized by the relevant presence of SMEs, as described in the previous section. MIER (2020, p. 2) estimated the potential loss of 2.4 million jobs, 67% regarding unskilled workers.

As mentioned, self-employed Malaysians are already taking a hard hit, according to the latest survey by the Department of Statistics Malaysia. The data showed that 46.6% of those self-employed have gone without any income as a result of the outbreak. About 53.4% continue to work but with lower income, while a third of self-employed workers have seen their income reduced by more than 90%. Over two-thirds (71.4%) had less than a month worth of savings.

The survey, which was conducted on 168,182 respondents from March 23 to 31, saw the agriculture and services sectors record the highest levels of job losses at 21.9% and 15% respectively. For the agriculture sector, 33% of workers in the fisheries subsector reported job losses, and 21.1% in agriculture and plantation.

In the services sector, there were 35.4% job losses in the food and beverages subsector, followed by the transport and storage subsector with 18.7%. Meanwhile, 86.1% of employers said their earnings were affected, with 65.9% experiencing a decline of over 50%.

Eighty-five percent of workers at government-linked companies (GLCs) and multinational companies (MNCs), however, reported usual income, while 58.5% in the private sector said their income remained stable so far. More than 50% of employers said they had enough savings for at least a month.

However, only 71.3% of employers were ready for another MCO extension. Most workers in GLCs and MNCs said they are ready for an extension as they have enough savings for up to two months (Zainuddin, 2020). The results of the survey are summarized in Figure 12.


[3.] *The government has recently decided to impose a maximum price control scheme on essential items starting from April 15 until the end of the movement control order (MCO) period. However, price control is not a good measure to mitigate the upward movement of prices during a period of emergency.*

In front of rising prices, suppliers receive the information that more product is in demand and they can do what is in their power to meet that demand and get higher revenues. With new supply entering the market, the upward tensions can be mitigated and eventually prices can go back to their original level or even decrease if the supply grows beyond the actual demand (pushed by the initially rising prices). Such a readjustment process does not happen overnight, and neither is perfect; it takes time and evolves in steps. However, although prices need to be allowed to grow for a certain period in order for the market process to complete its readjustment process and the outcome will never be perfect, such an outcome is still better than the alternative – price control.

If rising demand, pushing prices upward, is met by price ceilings, suppliers will not get "the signal" that more product is in demand and will not receive the "incentive" wrapping that signal. Therefore, they will not adjust their supply because the ceiling is blocking prices from playing their information transmission function. The final result is that part of the demand will remain unsatisfied; which means, in less technical terms, empty shelves

Figure 12: Survey on the economic effects of covid-19.
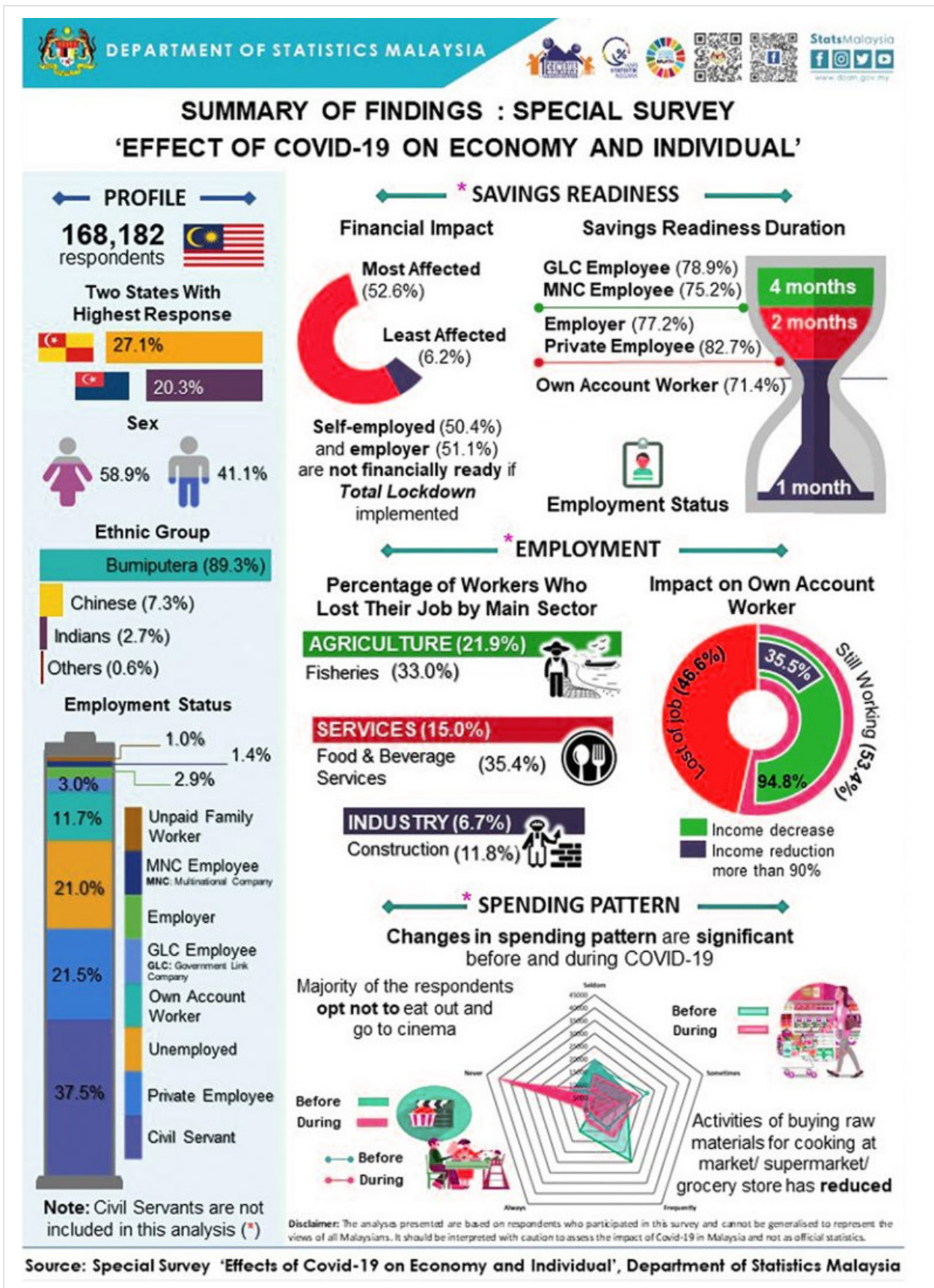
Source: Zainuddin (2020).

Finally, rising prices and unemployment, with the effects on immigrant workers paid on a daily basis, can turn into a social bomb, with the serious risk of social unrests. We know that in Sicily, Italy, newly unemployed people raided supermarkets looking for food.

If these are the microeconomic consequences brought in by covid-19 and the MCO, the macroeconomic side cannot be disregarded. Bank Negara Malaysia estimated that the GDP change in 2020 may oscillate between -2% and +0.5% (Ernst & Young, 2020c, p. 4). Ernst & Young (2020c, p. 5) foresees a GDP decline of 1.6%, while private consumption may decline of 5.4% and the unemployment could grow to 3.5%. Moreover, from January the Malaysian ringgit has depreciated by nearly 7% (World Bank, 2020b, p. 14). The World Bank (2020b, p. 16) is estimating a GDP decline for 2020 between 0.1 and 4.6%, depending on the duration of the outbreak and the movement control order. The stimulus package and lower oil revenues will, furthermore, increase the fiscal deficit.

In this scenario, how adequate are the monetary and fiscal responses implemented so far? With regard to monetary policy, there are doubts about the efficacy of easier credit conditions; the main mover for investments is profit expectations and, in the present circumstances, such expectations are frustrated by the general climate of uncertainty and credit facilitations do not stand a chance in reviving them (Ferlito, 2020b). From a different perspective, it seems that the central bank is trying to use the reflation levy, which however would eventually work with an economy on a deflationary path, while in the current scenario we are experiencing both inflationary and deflationary tendencies, which could produce different outcomes in different industries.

The adopted fiscal policy too presents criticalities, as explained by the World Bank (2020b, p. 22):

- The components of the stimulus package are mostly off-budget measures with a relatively small direct fiscal injection.

- Wage subsidies are limited and short-term by nature, and in the specific case of the Prihatin package they are accompanied by high qualification requirements.

- Doubts are raised about the overall speed of implementation and disbursement of the fiscal stimulus package.

Moreover, there are doubts on how to finance the stimulus package (World Bank, 2020b, pp. 23-26) also at the light of falling commodity prices which affects Malaysia's non fiscal revenues (World Bank, 2020a, p. 179).

Finally, it is important to stress the importance of avoid over-reactions; containing and stimulus policies should be consistent with the actual extent of the pandemic in a specific country and dictated by a serious analysis of the trade-offs in order to avoid unintended consequences, in particular in developing countries, where the welfare safety net is less developed when compared with Western economies (Loayza and Pennings, 2020).

Knowing that a silver bullet does not exist, we wish to understand if a different path is possible. In particular, we are interested to understand if the collateral damages of an MCO can be avoided, or at least reduced, without compromising on people's medical security. In order to explore alternative possibilities, we started by trying to estimate the duration of the covid-19 pandemic in Malaysia.

4. How long will it last?

In order to estimate the pandemic duration in Malaysia, we used an ARIMA estimation[4]. Before explaining the results, it is important to clarify what they can say and what they *cannot* say. First of all, we have worked on the daily deaths rather than on the daily cases; in fact, while the number of cases is deeply affected by the number of performed tests, the number of deaths is objective and, in the case of Malaysia, affected by a lower degree of variability[5].

It is important to clarify that an econometric interpolation is the attempt to estimate the future behaviour of a statistical data distribution given its past behaviour; potential exogenous shocks happening in the future are not possible to be captured. Therefore, the estimation keeps into account the MCO past period but cannot take into account an extension or a removal; the longer and less variable the available statistical series the more precise can be the estimation.

The graphs below, thus, are simply telling us that, given the behaviour of the daily number of deaths so far, the future distribution of the series is expected to behave in a certain way, *ceteris paribus*. Moreover, the extension of the green lines is telling us that the degree of uncertainty is extremely high and therefore, while the estimation has a value as statistical reference and can be used in order to develop future policies, it cannot be interpreted as a certain truth. In fact, the elements affecting the number of cases and deaths are numerous and casual links are yet to be identified. We know, in example, that the age distribution plays a role in the pandemic diffusion; but, by observing the world data, also weather conditions seem to have an impact. It has also to be considered the importance of cultural facts, like the role that hand kissing plays in certain community within Malaysia; similarly, it cannot be disregarded that diabetes, hypertension and obesity are present in Malaysia more than in other neighbour countries. Finally, it is important to observe that Malaysians seem to be particularly subject to lung infections: pneumonia was the second case of death among Malaysians in 2018 (11.8%), killing 18267 individuals, while it counted for 12.7% of deaths in 2017 (Department of Statistics Malaysia, 2019, p. 1).

Finally, the probability of presence of latent asymptomatic cases remains a likely cause of virus spread until a vaccine is discovered, projecting the duration of the phenomenon beyond the horizon imagined so far. All these elements add uncertainty in the scenario and invite to prudence when reading the results.

The forecast algorithm for the best scenario indicates that the new daily deaths in Malaysia are stabilized and should drop near to zero on April 23, 2020, at least (Figure 13). On the contrary, the worst scenario seems to suggest that Malaysia requires a longer time period to defeat the Covid-2019 epidemic. Specifically, the new daily deaths could reach the zero on June 3, 2020, at least (Figure 14). At the end of the epidemic, the estimated total deaths should be between 80 and 90 in the best scenario, and between 101 and 139 in the worst scenario. These values also allow to provide an approximation of the average total number of COVID-2019 cases. In fact, by multiplying the estimated total deaths for the Malaysia's mortality rate from COVID-2019 (1,63% at the moment of the analysis)[6], we obtain a number between 4,908 and 5,521 in the best scenario, and between 6,196 and 8,528 in the worst scenario (Table 4).[7]

[4.] *A detailed explanation of the model is reported in the Appendix.*
[5.] *The average number of daily deaths is 2.80, with a standard deviation of 2.06.*
[6.] *We mean the ratio between the total observed number of deaths from COVID-2019 and the total confirmed case on April 6, 2020.*
[7.] *The range takes account of standard error.*

These results seem to be consistent. In fact, the correlograms of residuals (Figures 15 and 16) indicates the absence of significative spikes, by suggesting the goodness of fit of both statistical models.

Figure 13: Results of ARIMA forecast approach (best scenario) for Malaysia.
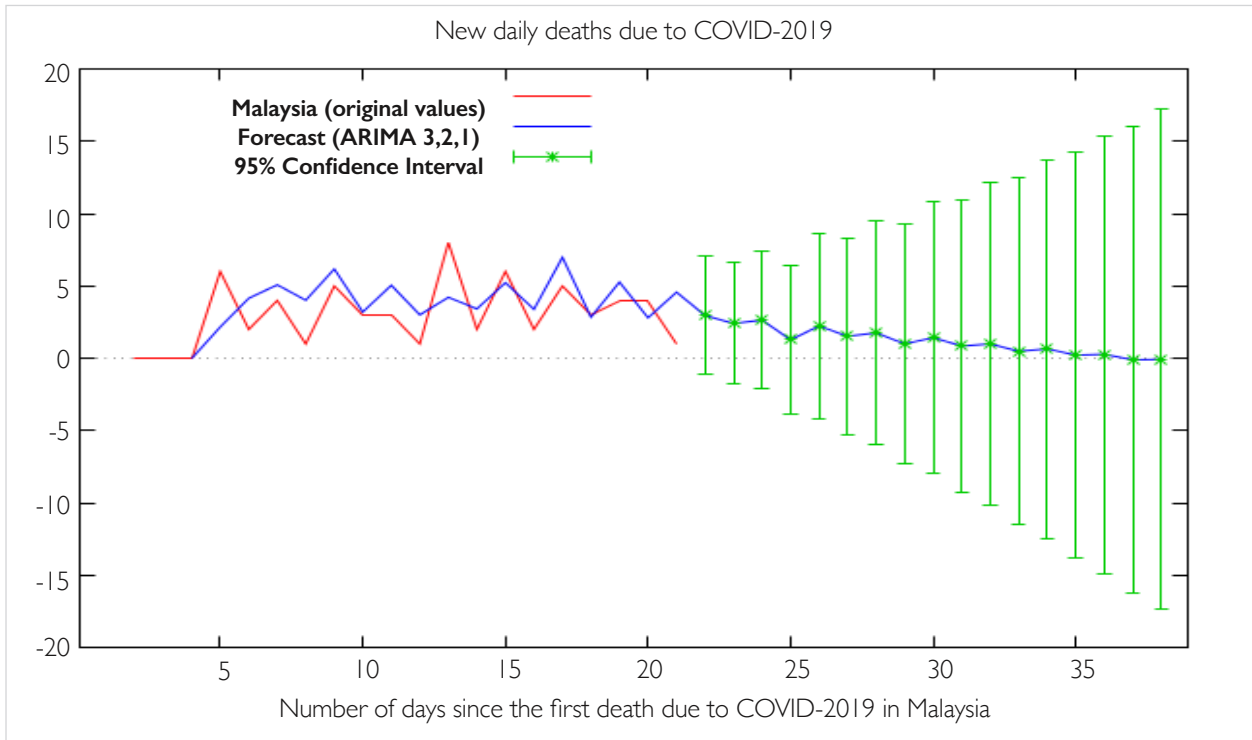
Figure 14: Results of ARIMA forecast approach (worst scenario) for Malaysia.
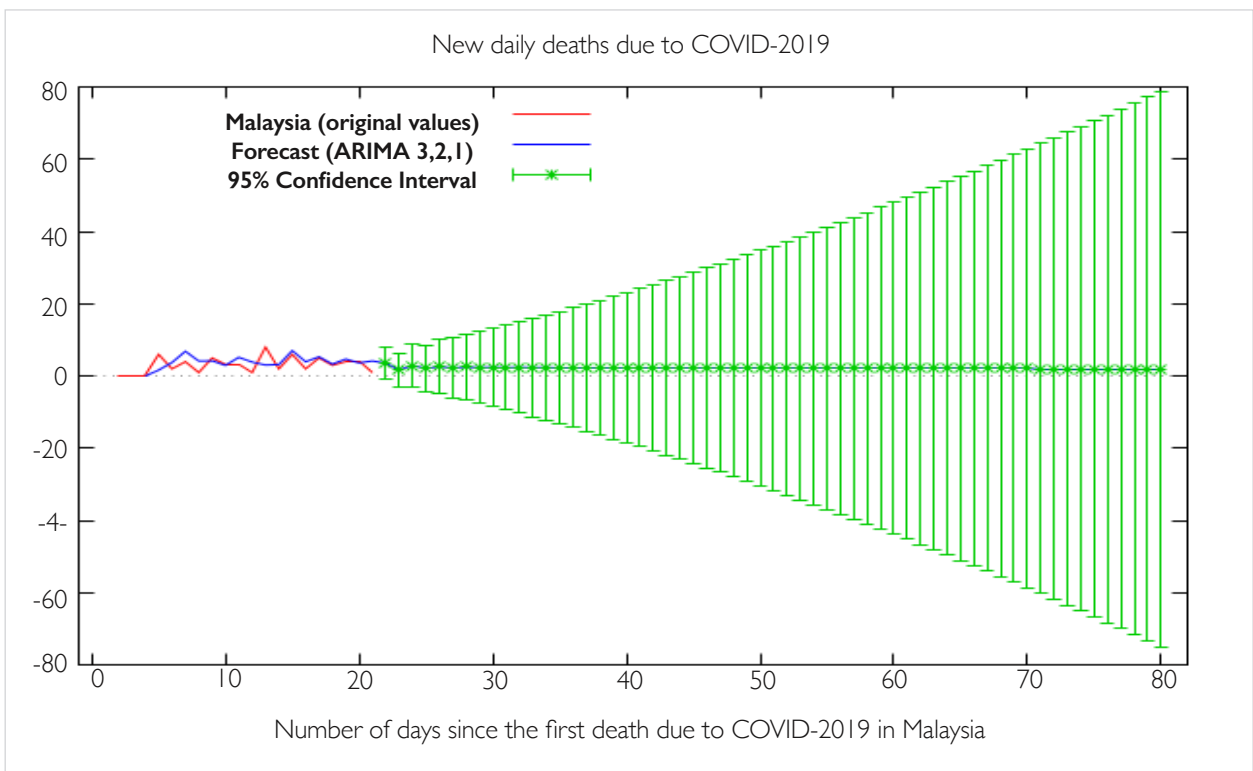
5. Imagining the future: an exit strategy

The MCO extension announced on 10 April did not come without surprises; in fact, few hours after the announcement, Senior Minister Datuk Seri Azmin Ali communicated an additional list of businesses allowed to operate during the movement control order (Koya, 2020). The list is quite comprehensive and includes, among others: automotive industry (limited to exports of CBU, parts and components, plus after-sale services); machinery and equipment industry; aerospace industry; construction projects and services related to construction works; science, professional and technical services, including R&D; social health services; hardware shops, electrical and electronic (E&E) shops and optometrists in the wholesale and retail industry; laundry services; barber shops and hair salons. A MITI authorization is needed to operate and businesses expect MITI to operate at a faster pace compared with the previous requests.

Such exemptions seem to suggest that the government is aware that a total lockdown of the economy is not sustainable in the medium run for the reasons we have described in the previous sections. It is clear that the government is thinking about an exit strategy and realized that cash handouts are not enough to keep the economy alive and vibrant (Salman, 2020). It seems to be the right direction and needs to be supported by additional measures to prevent future contagions which go beyond the MCO and include massive testing and sanitations. We consider that business re-opening should be accompanied by those measures.

Looking at the duration of the pandemic, which seem will lose steam by the beginning of June in the worst scenario, here below we present a set of additional measures which try to seek a balance between the need of minimizing the economic damage and protecting people's health, as people's safety should remain the primary concern (Ernst & Young, 2020a, p. 2). These measures look at the short run (expected duration of the pandemic), the medium run (post-MCO period) and the long run (restructuring of the economic system).

1. Short run: Reintroduce logistics among the essential services.

It is clear that, if distinguishing between essential and non-essential services is easier in theory than in practice, the distinction becomes even more complicated when we have to apply it directly to logistic operations. The recent congestions at ports and the partial extension of operations is the proof that the distinction has more value on the theoretical level than on the practical one.

The first and most urgent and easy measure to be adopted is thus to reintroduce logistics – each kind of logistics – among the essential services. Otherwise, the newly allowed businesses may experience bottlenecks and may be unable to reach the final customers.

2. Short run: Rapid feedback from MITI for the industry-related firms.

While those firms with some extent of manufacturing operations were able to receive a feedback from MITI about the allowed scale of their operations in around ten days, many others are still waiting for news, while MITI officers are unreachable both via email and via telephone.

Certainty of what can be and what cannot be done is key in order to smooth operations and avoid business panic. In order to implement this point, we can imagine an exemption to the MCO granted on a Self-Declaration basis for businesses meeting certain criteria, including contribution to the supply chain of essential goods.

3. Medium run: Gradual lift-up of MCO under strict sanitary conditions.

We need a clear strategy to bring the economy back to normalcy gradually, but with greater speed and clarity. Ad hoc lists of newly allowed businesses will not remove the veil of uncertainty obscuring the economic sky. As recently suggested by IDEAS (2020), the government, on the advice from public health authorities, should create a zoning system for production clusters or territories as a basis to gradually allowing employees to return to work and businesses to resume operating. Better location-based targeting can also allow the government to expand the list of exempted sectors to include vital enabling industries and supply chains which have been coming under strain. At the same time, incentives could be provided to encourage business compliance on mandatory testing of all staffs and other precautionary measures like employees taking temperature before entering business premises or extensive sanitation of workplaces[8]. In this context, state governments and relevant regulators should be empowered with well-defined roles. It is clear that support on testing and sanitation will be much more effective that generalized subsidies, which are short-lived and dispersive by nature.

In addition to exemptions granted on the basis of industry (mentioned above), the government could start to identify Green Spots of very low levels of infection. Employees living and working in these green spots could then be eligible for Self-Declared exemptions.

Exempted businesses would have to comply with strict Testing and Control Protocols including mandatory testing of all staff and other protocols such as routine temperature taking.

The costs of testing and eligible medical equipment (e.g. thermometers) could be made tax deductible.

4. Medium and long run: Fiscal incentives to automation.

The present economic situation can become an opportunity to look for further ways to automation. Recognizing the potential risks posed by massive concentrations of workers can be a further incentive to introduce capital-intensive processes where they are still absent.

A clear incentive strategy, together with a long-term education reform, can favour a further technological jump in the manufacturing sector in Malaysia, awakening domestic creative entrepreneurship (Ferlito, 2020a).

[8.] *De Walque et al. (2020, p. 1) identified two tests: «The first—a PCR assay—identifies people currently infected by testing for the presence of live virus in the subject. The second—an antibody test—identifies those rendered immune after being infected by searching for COVID-19-specific antibodies. The first test can help contain the disease because it facilitates the identification of infected persons, the tracing of their contacts, and isolation in the very early stages of an epidemic—or after a period of suppression, in case of a resurgent epidemic. The second can help us assess the extent of immunity in the general population or subgroups, to finetune social isolation and to manage health care resources».*

Appendix: Explanation of the ARIMA model

Autoregressive integrated moving average (ARIMA) model could be considered one of the most used prediction models for epidemic time series (Rios et al. 2000; Li et al. 2012; Zhang et al. 2014). It is frequently used with non-stationary time series in order to capture the linear trend of an epidemic/disease. In particular, it allows to predict a given time series by considering its own lags, i.e. previous values, and lagged forecast error. To be performed, ARIMA requires the estimation of three parameters: the lag order (p), the degree of differencing (d), and the order of moving average (q).

The optimal ARIMA model parameters have been chosen i) by using the Akaike's information criterion (AIC); ii) by investigating the correlograms of the residuals, i.e. the autocorrelation function (ACF) and the partial autocorrelation function (PACF); and iii) by testing common statistical assumptions about residuals.

Specifically, we follow the approach of He and Tao (2018) and Wang et al. (2018)[9]. In first instance, we check if the time series of death due to COVID-2019 in Malaysia are stationary by using two different approach: the Augmented Dickey-Fuller's (1981) (ADF) test and the Elliott, Rothenberg, and Stock (1992) (ERS) test. Both tests (table 1) show that the variable has a unit root and need to be transformed into a stationary process.

Then, to identify the parameters, we use four model selection criteria: the Akaike's information criterion (AIC), the root mean square error (RMSE), the mean absolute error (MAE), and the collinearity.[10] The first and the second best ARIMA models according to the minimization of the four criteria are (3, 2, 1) and (2, 2, 1).

Finally, we implement three different tests to perform diagnostic cheeks on the residuals: i) the Doornik and Hansen's (1994) test for normality; ii) the Engle's (1982) Lagrange Multiplier test for the ARCH (autoregressive conditional heteroskedasticity) effect; and iii) the Ljung-Box's test for autocorrelation. All tests allow to accept the null hypothesis of normality, homoskedasticity, and independence of the residuals (Table 3).

Figure 15: Correlograms of residuals for the best scenario.
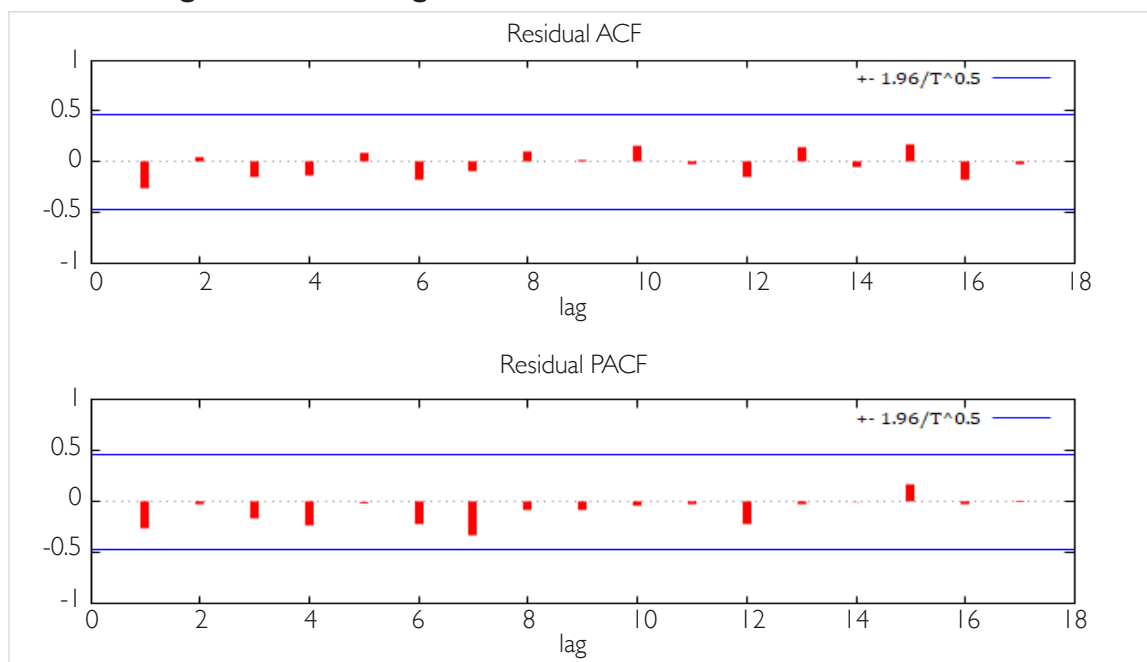
[9.] To carry out the econometric analysis I used Gretl-2020a Software (http://gretl.sourceforge.net/win32/index_it.html).
[10.] According to Belsley-Kuh-Welsch (1980) collinearity diagnostic, since conditional values are lower than 10, there is no evidence of excessive collinearity.

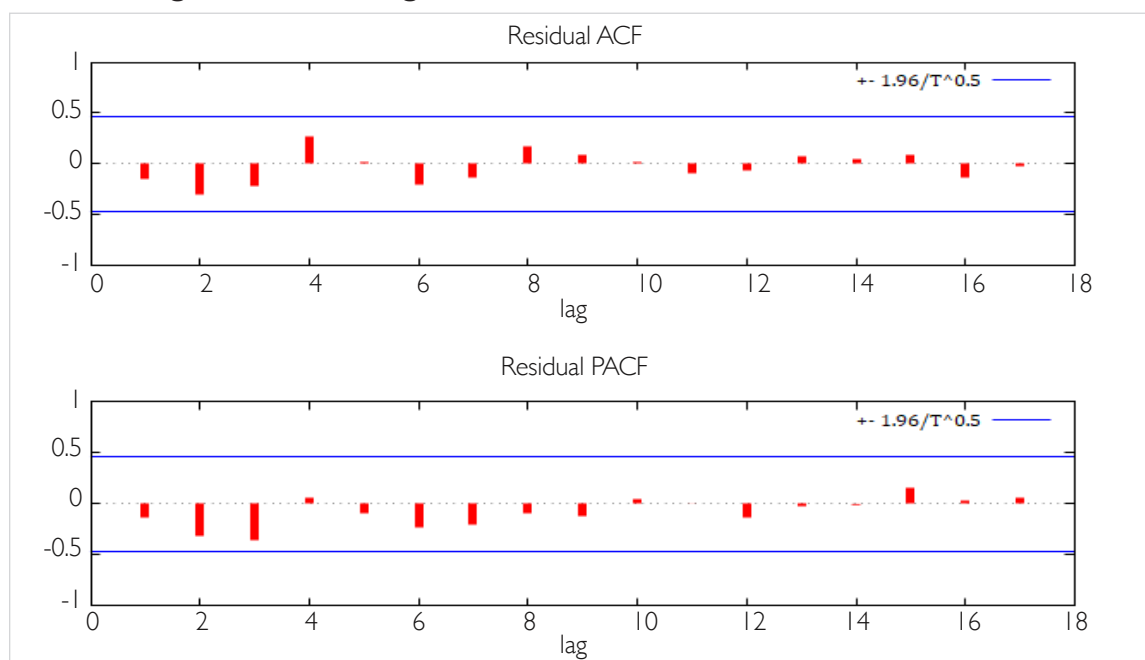**Figure 16: Correlograms of residuals for the worst scenario.**

Table 1: Results of ADF and ERS test for unit root.

	Daily cases		At first difference	
	ADF	ERS	ADF	ERS
Malaysia (deaths)	-6.105***	-2.8682	-12.0941***	10.9634***

Notes: for lag length selection we used AIC approach.
*Significance level: 0.01***; 0.05**; 0.1**

Table 2: The optimal parameters for ARIMA models.

Regions	AR-I-MA parameters	AIC value	RMSE	MAE	Conditional values
Malaysia (best)	(3, 2, 1)	91.8446	2.0781	1.7235	1 to 6.18
Malaysia (worst)	(2, 2, 1)	92.8467	2.3016	1.7766	1 to 3.53

Table 3: The results of normality, ARCH, and autocorrelation tests for the ARIMA models (Figures 11-12).

	Doornik-Hansen test for normality		Engle's LM test for ARCH effect		Ljung Box test for autocorrelation	
	Value	p-value	Value†	p-value	Value	p-value
Malaysia (best)	4.070	0.1307	9.9769	0.2667	5.5511	0.4753
Malaysia (worst)	5.899	0.0524	9.0484	0.3382	8.6561	0.2783

*Significance level: 0.01***; 0.05**; 0.1**.*
†We used 8 lags because of lack of sufficient degrees of freedom.

Table 4: Summary of the results of ARIMA models (Figures 11-12).

	Inflection point (days)	Inflection point (date)	Total deaths (estimation)	Total cases (estimation)
Malaysia (best)	After 17 days	After April 23, 2020	80 to 90	4,908 to 5,521
Malaysia (worst)	After 58 days	After June 3, 2020	101 to 139	6,196 to 8,528

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