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THE COVID-19 PANDEMIC AND DISRUPTION IN 2020: DEVELOPING A GOVERNMENT RESPONSE TRACKER FOR MALTA

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Policy Note

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The views expressed in this paper are the authors' own and do not necessarily reflect the views of the Central Bank of Malta.

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Abstract

This study constructs a COVID-19 response tracker for Malta following the methodology developed by the Oxford COVID-19 Government Response Tracker (OxCGRT) project. The tracker is based on data for 16 indicators that are in turn aggregated into a set of four indices – Government response index; Containment and health index; Economic support index; and Stringency index. After describing the construction of the tracker and outlining how Malta’s response evolved during 2020 and early 2021, the note studies the relationship between movements in this tracker and macroeconomic indicators such as economic sentiment, retail trade, industrial production and labour market variables, as well as with a novel database made available by Google on local mobility during the pandemic. The study also compares developments in Malta’s tracker with those in the Euro Area and its constituent Member States. A heatmap analysis shows how Malta’s response along the different dimensions of the index compares with its European peers.

JEL Classification: E00, H12, H51, I12, I15, I18, I19

Keywords: Pandemic, COVID-19, Coronavirus, Lockdowns, Containment, Malta

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Executive Summary

In 2020, the COVID-19 pandemic resulted in significant global social and economic disruption. However, the magnitude of these disruptions has varied significantly across countries. Divergences in government policy responses may explain several of the cross-country disparities. Given the wide array of measures and regulations introduced across different countries, creating a tool that enables a good understanding of the timing and stringency of responses is no easy task. This study constructs a COVID-19 response tracker for Malta following the methodology developed by the Oxford COVID-19 Government Response Tracker (OxCGRT) project, which allows for the daily observation of containment, economic and health response measures. Furthermore, the use of a standard methodology used by OxCGRT facilitates cross-country comparison. In this light this study aims to answer the following questions.

How can we keep track of the multifaceted measures introduced by the Maltese government in response to the COVID-19 pandemic?

The Oxford COVID-19 Government Response Tracker (OxCGRT) is a unique tool launched in March 2020 by a group of researchers at the Blavatnik School of Government and the University of Oxford. The exercise uses data from more than 180 countries and aims to track and compare policy responses around the world rigorously and consistently. The OxCGRT tool collects publicly available information on 20 indicators of government responses, 16 of which are of interest when computing the coronavirus response tracker. Eight of the policy indicators (C1-C8) record information on containment policies, such as school closures and movement restrictions. Two of the indicators (E1-E2) record economic policies, such as income support to citizens. Six of the indicators (H1-H3, H6-H8) record health system policies such as the COVID-19 testing regime, and most recently, vaccination policies. These are then aggregated into a set of four common indices to reflect the level of government action on the topics in question. However, these indices simply record the number and strictness of government policies and should not be interpreted as 'scoring' the appropriateness or effectiveness of a country's response.

Does Malta's Government Response Tracker help explain economic developments?

A full time-series of all indicators and indices for Malta is now publicly available on the OxCGRT website, together with the full repository for all the other countries in the project. Local events analysis shows that March 2020 was characterised by significant developments, leading to a steep rise in all indices. By April, the indices reached a peak, showing a high level

of 'lockdown-style' policies, which restrict people's behaviour. By the end of the year, although several new restrictions were in place, the indices were lower than this peak. The government response index is then compared to traditional and novel datasets. Comparisons with economic indicators show that a sharp increase in the index coincided with various movements in economic indicators. While economic data such as the retail trade turnover, industrial production and registered unemployed were quite resilient, with some even experiencing a rebound, indices that capture economic sentiment such as the Economic Sentiment Index are much more sensitive to the government response index. This shows a strong association between economic sentiment and containment measures put in place by a country's government. Furthermore, movements in the index are on average very meaningful in understanding local mobility, using data from google trends, especially during the initial phase of the pandemic. The google trend analysis, however, highlights the importance of learning behaviour of individuals and pandemic fatigue. These two factors are very difficult to capture quantitatively but have a big influence on individual mobility since any containment measures put in place by local authorities may not be fully observed by residents.

How does Malta's government response compare to other countries?

By April 2020, as COVID-19 spread, all countries across the globe show a very high level of government response. During summer 2020, with COVID-19 cases dwindling globally, there was a slight drop in government response due to a relaxation of containment measures, especially amongst European countries. However, as COVID-19 cases rose rapidly once again before the end of the year, government response once again became elevated in several countries, with European countries showing a notable increase in their index.

During March 2020, Malta and the Euro Area experienced a very similar steep incline in the GRI. However, Malta's peak GRI during April and May surpassed the Euro Area average. While containment measures and economic support measures for both Malta and the Euro Area are contributing in an equal manner to the GRI, it is the elevated health response and health-related measures which pushes Malta's index at such a high level. This reflects coordinated nationwide public information campaign, a very thorough testing regime, an extensive contact tracing system, as well as the mandatory wearing of facial coverings in establishments. This is confirmed in the heatmap analysis, which shows that Malta's health response indicators out-performs European peers.

How can we keep track of the various multifaceted measures introduced by the Maltese government in response to the COVID-19 pandemic?

The COVID-19 pandemic, also known as the coronavirus pandemic, was first identified in late 2019. The World Health Organization declared the outbreak as a public health emergency of international concern in January 2020 and subsequently as a pandemic in March 2020 (WHO, 2020). The pandemic brought about significant global social and economic disruption and an unprecedented global recession (Gopinath, G. 2020). However, the magnitude of these social and economic impacts has varied significantly across countries. Some have been very successful in preventing the spread of the disease, as well as limiting the extent of economic and social disturbances. There are several reasons why some countries might have been worse hit, both from a healthcare point of view and from the economic point of view. Differences in governmental policy responses may however explain several of the disparities. To understand which policies might be effective in controlling the outbreak, it is essential to have a good understanding of the timing and stringency of responses across the globe.

The Oxford COVID-19 Government Response Tracker (OxCGRT) is a unique tool launched in March 2020 by a group of researchers at the Blavatnik School of Government and the University of Oxford. The exercise has data from more than 180 countries and aims to track and compare policy responses around the world rigorously and consistently. The government response tracker for Malta was not included in OxCGRT's initial project. In light of this, the Central Bank of Malta embarked on a collaboration project with the University of Oxford to construct the index for Malta, hence creating a tool capable of direct comparison with other countries worldwide.

The OxCGRT tool collects publicly available information on 20 indicators of government responses, 16 of which are of interest when computing the coronavirus response tracker (Figure 1).² Eight of the policy indicators (C1-C8) record information on containment policies, such as school closures and movement restrictions. Two of the indicators (E1-E2) record economic policies, such as income support to citizens. Five of the indicators (H1-H3, H6-H8) record health system policies such as the COVID-19 testing regime, and most recently, vaccination policies. All the indices use ordinal indicators, where policies are ranked daily on a simple numerical scale. The project also records five non-ordinal indicators – E3, E4, H4, H5 and M1 – but these are excluded from the index calculations. Some indicators – C1-C7, E1, H1, H6, H7, H8 – have an additional binary flag variable that can be either 0 or 1. For C1-C7, H1, H6 and H8 this corresponds to the geographic scope of the policy. For E1, this flag

² For a full explanation of the methodology, consult OxCGRT's official methodological repository on https://github.com/OxCGRT/covid-policy-tracker/blob/master/documentation/index_methodology.md

variable corresponds to the sectoral scope of income support. For H7, this flag variable corresponds to whether the individual or government is funding the vaccination.

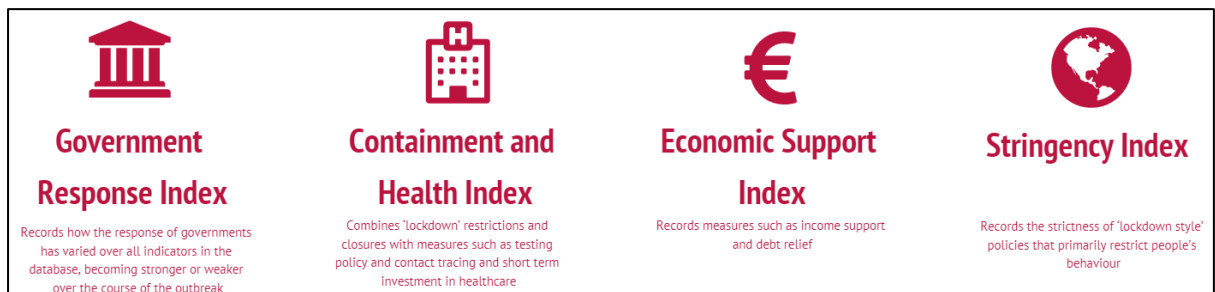
Figure 1: Indicators



Source: Author's elaboration from OxCGRT

The daily recorded data from the 16 indicators is aggregated into a set of four common indices (Figure 2). These report a number between 1 and 100 to reflect the level of government action on the areas monitored. Note that these indices simply record the number and strictness of government policies and should not be interpreted as 'scoring' the appropriateness or effectiveness of a country's response. A higher position in an index does not necessarily mean that a country's response is 'better' than others lower on the index.

Figure 2: Indices

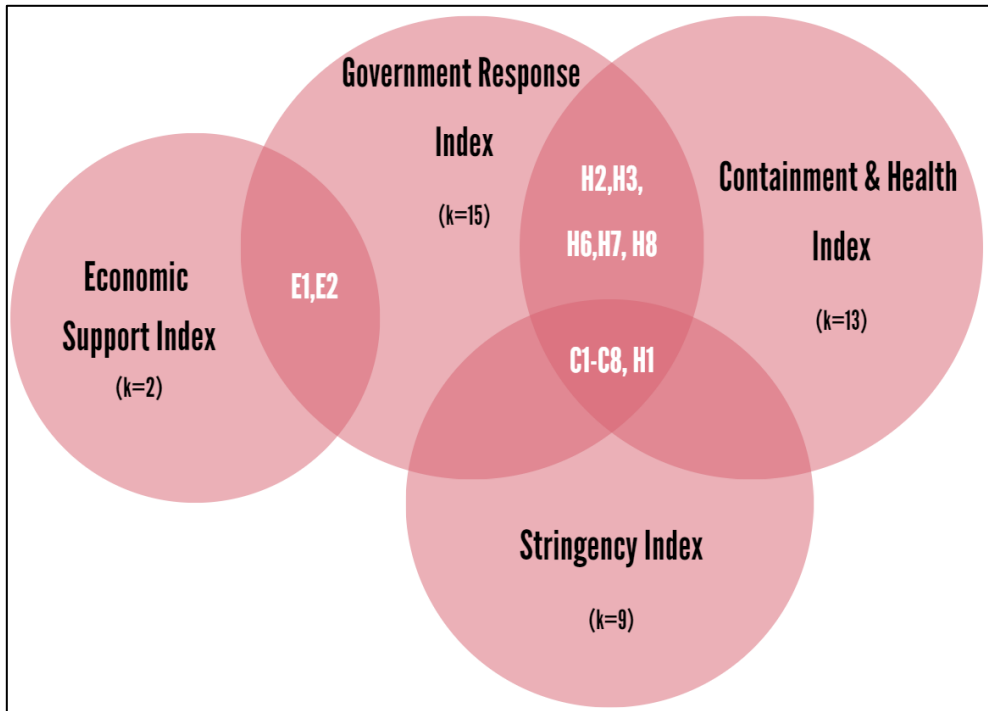


Source: Author's elaboration from OxCGRT

Different indices incorporate a combination of indicators (Figure 3). The government response index (hereafter, GRI) considers all 16 indicators (C1-C8, E1-E2, H1-H3, H6-H8), hence

recording government response across all containment, economic and health measures introduced. The Containment and Health index includes 14 containment and health related measures (C1-C8, H1-H3, H6-H8). As opposed to the government response index, this index does not factor in economic support provided by the government. The latter is calculated as a stand-alone index, known as the economic support index, which considers only indicators E1-E2. Finally, the exercise computes a stringency index, which records the strictness of lockdown style policies, which primarily restrict people’s behaviour (C1-C8, H1).

Figure 3: Indicators underpinning the indices.



Source: Author’s elaboration from OxCGRT

Because different indicators (j) have different maximum values (N_j) in their ordinal scales, and only some have flag variables, each sub-index score must be calculated separately. Each sub-index score (I) for any given indicator (j) on any given day (t), is calculated using equation 1:

$$(1) \quad I_{j,t} = \frac{100(v_{j,t} - 0.5(F_j - f_{j,t}))}{N_j}$$

Where:

- N_j : Maximum value of indicator.
- F_j : Equals to 1 if indicator has a flag.
- $v_{j,t}$: Recorded ordinal scale of indicator.
- $f_{j,t}$: Recorded binary flag.

This normalises the different ordinal scales to produce a sub-index score between 0 and 100 where each full point on the ordinal scale is equally spaced. For indicators that do have a flag variable, if this flag is recorded as 0, then this is treated as a half-step between ordinal values. Note that the database only contains flag values if the indicator has a non-zero value. If a government has no policy for a given indicator, then the corresponding flag is blank/null in the database. For the purposes of calculating the index, this is equal to a sub-index score of zero. The indices are then a simple average of the individual component indicators (Equation 2).

$$(2) \quad index = \frac{1}{k} \cdot \sum_{j=1}^k I_j$$

Where:

- k : Number of indicators within the index
- I_j : Sub-index score for an individual indicator (obtained above)

As governments across the world seek to reduce the spread of COVID-19 with a variety of measures, it is imperative to analyse which measures are effective and which are not. While the indices constructed here do not measure their effectiveness in a direct manner, they can be a useful input to other studies.

Indeed, given its cross-national, cross-temporal nature, the tracker provides valuable information on how government responses have evolved over the full period of the pandemic. Hence, policymakers and public health officials alike may find this tracker fundamental in their policy formulation.

A further strength and potential usage of the Coronavirus Government Response Tracker is that it creates an extensive and novel dataset that facilitates future econometric studies and economic analysis. Institutions such as the European Commission and the European Central Bank are already utilising extensively such indices. This is used both retrospectively (European Commission, 2020), via analysing the different policy directions taken by European countries, as well as prospectively (Battistini et al., 2020), by using the index to formulate different forecast scenarios. The tracker is also being used to a great extent as an input in various econometric and scientific studies (Chen et al., 2020, Buzrul et al., 2020, Siedschlaga et al., 2020). In addition to the indices, the availability of detailed daily information on each of the indicators, such as school closures and travel restrictions amongst others, enables a deeper analysis and data availability for future analysis and studies, even if focused on a very narrow scope.

Additionally, the ordinal scale method provides more detail and comparability than simple binary measures (ECDC, 2020). Furthermore, the time-series format of the data facilitates analysis and comparison, and is timely. In fact, the full tracker is updated daily and hence no lag in the availability of data is present.

The tracker, however, does have its limitations. Although the ordinal scale provides more comparability, it groups several responses in general buckets, which sometimes may be misleading. For example, if country A is vaccinating a large amount of health-care workers, while country B is also vaccinating health-care workers, but only at a tiny fraction of country A, both countries will be recorded on the same ordinal scale since both are in effect vaccinating health-care workers. Hence, while this exercise will put these two countries on an equal footing, country A in practice has a much better health response, which is not captured by the tracker. In addition, the construction of the index relies on some level of human judgement, and hence subject to interpretation.

Notwithstanding these caveats, the Coronavirus Government Response tracker aims to constantly improve and remain relevant by taking a 'building the airplane as we fly it' (Hale, 2020) approach. This is especially important when considering the fluidity of the COVID-19 global outlook. For example, during the beginning of the project, certain indicators such as H6 (Facial Coverings) or H7 (Vaccination policies) were not included in the tracker since at the time these were not relevant. However, given that in late 2020 facial covering regulations were becoming common and the first COVID-19 vaccines started being approved by the relevant authorities, these were subsequently updated retrospectively within the tracker to comprise such indicators. This will continue to happen throughout 2021, with new indicators and new categorisations to be introduced as new developments occur.

Does Malta's Government Response Tracker help explain economic developments?

A full time-series of all indicators and indices for Malta is now publicly available on the OxCGRT website, together with the full repository for all the other countries in the project.³ Given the fluidity of the pandemic, the tracker is continuously updated in order to immediately take into consideration any policy changes that occur across countries involved. This section first outlines how Malta's response to the pandemic evolved throughout 2020 and early 2021 using the Coronavirus Government Response Tracker. It then proceeds to establish to what extent it can shed light on the relationship between the various COVID-19 related measures and economic data.

Local Events

Figure 4 plots the four indices for Malta during 2020 and early 2021, together with a timeline of important policy changes. The first government response to COVID-19 in Malta can be first tracked in January, following the set-up of the coronavirus national response team. As a result, the GRI, as well as the stringency and containment and health indices rose. In February, passenger screening at Malta International Airport was subsequently introduced, thus resulting in a further increase in these. By the end of February, the Containment and Health index stood at 16.7, the GRI stood at 14.6, while the Stringency index stood at 11.1.

On the 7 of March 2020, Malta registered its first COVID-19 case, which led to a steep escalation of measures to stem the spread of the virus. As a result, all computed indices show a steep rise in Malta's government response to the pandemic. By mid-March, the first swabbing centre was opened to the public, travel bans to several countries were imposed, public events were restricted, while schools were closed and work from home was strongly encouraged. Authorities also urged the public to stay at home as much as possible. On 21 March, the unprecedented step of a total border closure was introduced, while on 23rd March 2020 the closure of non-essential retail shops and services was announced, resulting in a further heightening of the indices. By end-March 2020 testing regimes were enhanced, groups in public were restricted to not more than 5 individuals, while the elderly and the vulnerable were required to remain at home under almost all circumstances (Government of Malta, 2020). Furthermore, in early April, non-essential travel to Gozo was restricted. This meant that the peak of the indices during 2020 for Malta occurred across April and May. At this point, the stringency index stood at 87.0, showing a high level of 'lockdown-style' policies that restricted people's behaviour. The containment and health index and the GRI stood at 81.0 and 78.7

³ <https://www.bsg.ox.ac.uk/research/research-projects/coronavirus-government-response-tracker>

respectively, showing that government response across containment, health and economic aspects was very high during the period.

With regards to the economic support index, on 18 March 2020 the Maltese government announced the first package of fiscal support measures for businesses, which included various measures such as the postponement of certain tax payments and aid supporting teleworking initiatives, amongst others. On 24 March 2020, government announced the third financial package in a matter of days, which saw the launch of the COVID-19 wage supplement, as well as various debt relief measures. Given that these measures were kept in place across the remainder of 2020, the economic support index peaked and remained at a constant level of 62.5 throughout 2020.

On 22 May 2020, some non-essential retail establishments were allowed to re-open with various preventative measures in place, while on 5 June 2020 a widespread relaxation of measures took place. Childcare centres were re-opened, work from office was re-introduced, certain public events were allowed with mitigation measures in place, while non-essential travel to Gozo was once again permitted. Furthermore, the elderly and the vulnerable were no longer required to remain at home. Subsequently, the indices continued to fall in July, with the re-opening of schools for Skolasajf and with the partial re-opening of Malta International Airport to a selected number of destinations. In fact, excluding the first two months of 2020, the indices were at their lowest levels in July. During this period, the GRI stood at 45.3, the containment and health index stood at 42.9, while the stringency index fell to 31.5. This shows a low level of 'lockdown-style' policies in place, with minimal restrictions on people's behaviour during the period. However, health and economic measures remained strongly in place, as shown by the higher level of the GRI, when compared to the stringency index.

By August, COVID-19 cases had once again started to rise across Europe. The Maltese government and public health authorities responded by once again stepping up containment measures. Events and gatherings were again severely limited, nightclubs were shut, while groups in public were restricted, this time to not more than 15 individuals. As regards to travel, several travel-bans and quarantine requirements were re-introduced.

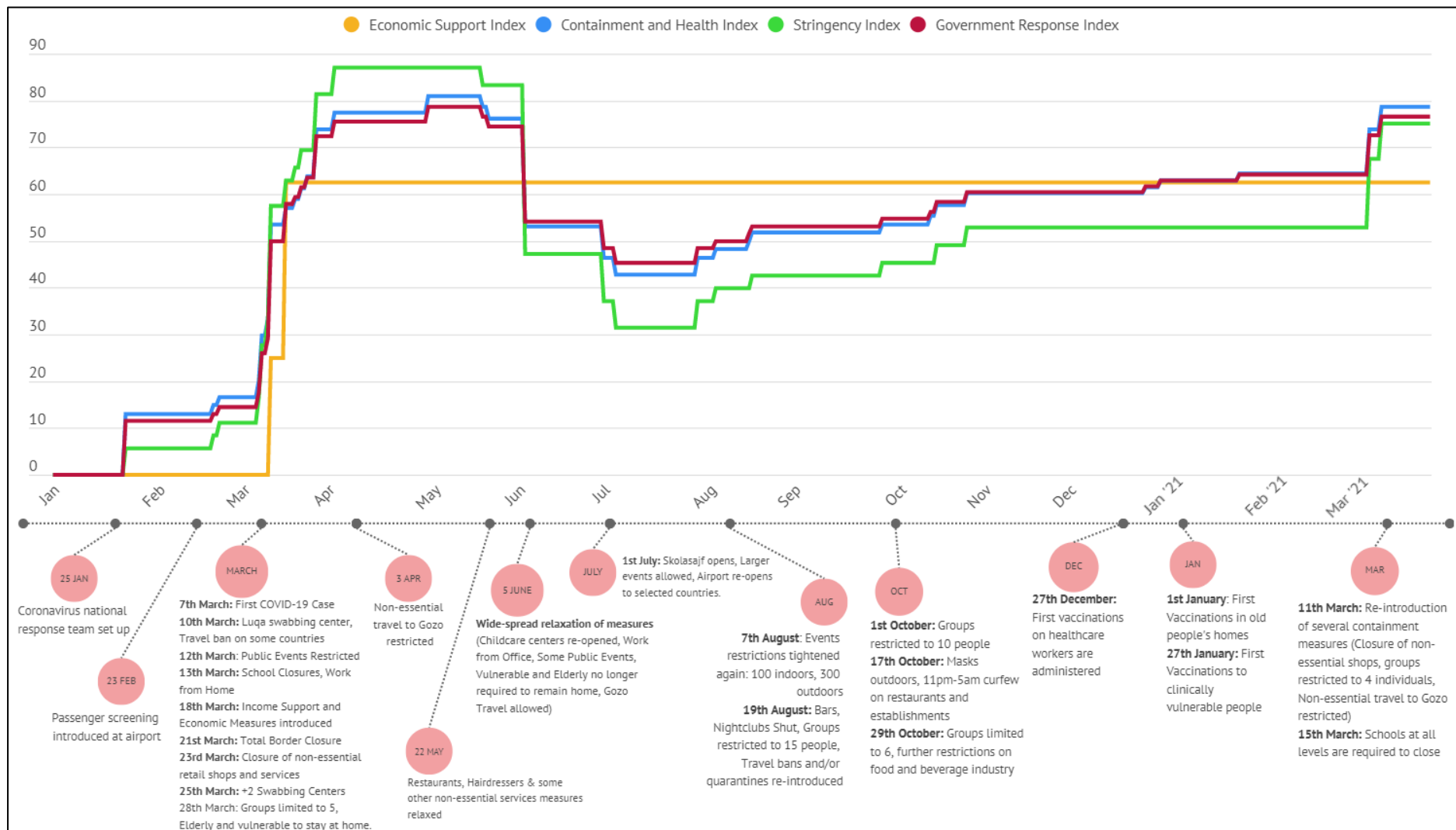
After two months of an approximately constant level of stringency, restrictions were stepped up in October. On 1st October 2020, groups were restricted to no more than 10 individuals. By the end of October, this requirement saw a further tightening, with groups restricted to no more than 6 individuals. Facial coverings were required outdoors at all times, while an 11pm-5am curfew on restaurants and establishments was introduced. In late October, further restrictions on the food and beverage industry were introduced, including the closure of bars and band clubs.

This level of stringency persisted throughout the remainder of 2020. Hence, during November and December, the GRI stabilised at 60.4, the containment and health index at 60.1, while the stringency index stood at 52.8. This shows that although several new restrictions were in place during the period, policies restricting people's behaviour, as captured by the stringency index, was lower than that registered during April/May 2020. However, both the health and economic response indices remained elevated. Hence, the containment and health index, and as a result the GRI, rose further due to the commencement of the vaccination programme on 27 December 2020.

January 2021 was characterised by vaccination programme developments. In the early days of January, the first residents in old people's homes were vaccinated. Subsequently, on 27 January, the vaccination programme was expanded to include medically vulnerable individuals. These developments were reflected in a slight increase in the GRI and the containment and health index.

The lack of new containment measures during January and February 2021 meant that the stringency index remained constant during the first two months of 2021. However, in response to a surge in COVID-19 cases, the Maltese government, in consultation with public health authorities, announced the re-introduction of several containment measures in March 2021. On 11 March 2021, the closure of several non-essential shops, group restrictions (to a maximum of 4 individuals, and later to only 2 individuals), and the ban of non-essential travel between Malta and Gozo saw a rapid increase in all the indices in question. These were further elevated with the closure of schools as from 15 March 2021. With regards to the vaccination programme, by mid-March 2021, coverage was expanded to include individuals aged 60 years and over. Rapid progress meant that this was further expanded to a broader availability, covering individuals aged 50 years and over, and subsequently individuals aged 40 years and over by the end of April 2021. These developments meant that as at end-March 2021, the containment and health index stood at 78.7, the GRI stood at 76.7 and the stringency index at 75.0, a significant 22.2 points higher than the stringency level at end-February. Interestingly, this means that during March 2021, the GRI and the containment and health index are almost equal to the level reached during April/May 2020. However, the stringency index as at end-March 2021 stood at 12.5 points lower, when compared to that observed in April/May 2020.

Figure 4: Coronavirus Government Response Tracker: Malta



Source: Author's calculations

Government Response Index and the Maltese Economy

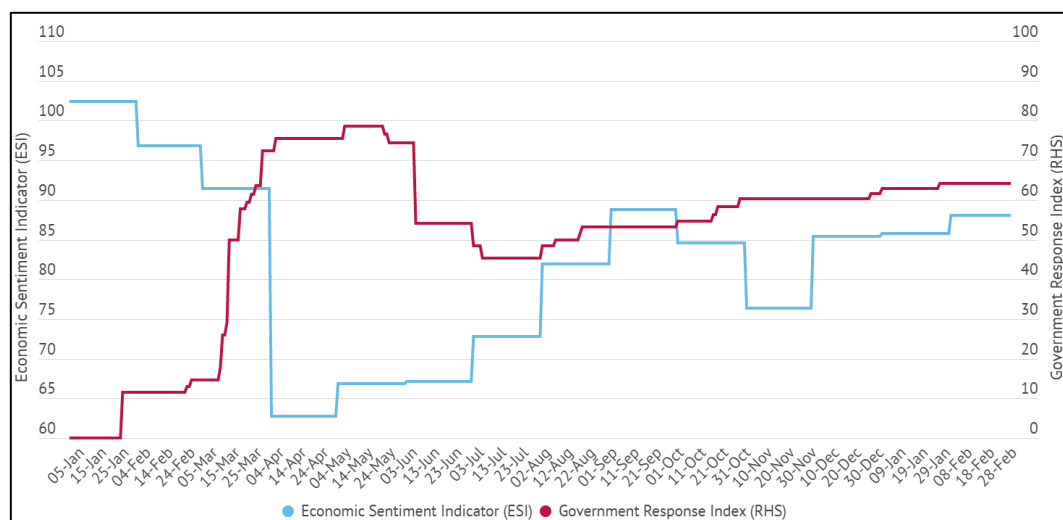
This section compares the GRI with various macroeconomic indicators using both traditional and novel datasets. In response to the COVID-19 outbreak, Google has launched the Community Mobility Reports, comprised of daily data showing movement trends by region.⁴ The data provides information on visits to several categorised locations, compared to a baseline period: the median value from the 5-week period between 3rd January 2020 and 6th February 2020. This enables easy week-on-week difference analysis since the baseline period is constant. However, a limitation of such data is that it does not account for seasonality.

Google also provides data from an unbiased sample obtained from its search engine. The extensive amount of Google searches around the world, including Malta, makes Google Trends one of the world's largest real time datasets, enabling the analysis of what individuals in a determined location are currently interested in.⁵ Numbers represent search interest relative to the highest point on the chart for the given region and time. A value of 100 is the peak popularity for the term, while a value of 50 means that the term is half as popular.

Economic Sentiment

The Economic Sentiment indicator (ESI) shows that sentiment deteriorated in line with the increase in the GRI. In fact, during the first six months of 2020, the correlation coefficient between the two stood at -0.94, displaying a strong negative relationship. Subsequently, sentiment improved following the relaxation of measures, and deteriorated once again as the GRI increased during the second half of 2020. In general, the link between economic sentiment and the GRI has remained robust throughout 2020 and early 2021, with an overall correlation coefficient of -0.75 for the period.

Figure 5: Economic Sentiment Indicator vs GRI



Source: Author's calculations

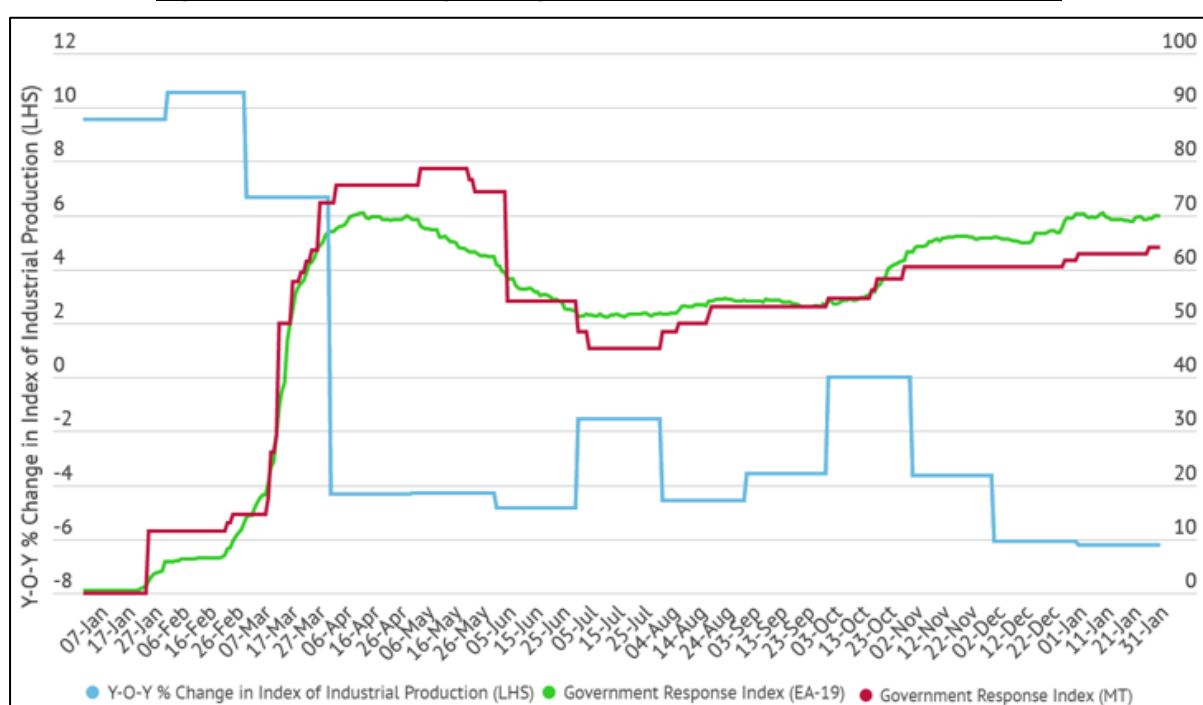
⁴ For more information on the dataset please refer to <https://www.google.com/covid19/mobility/>.

⁵ For more information on the dataset please refer to <https://trends.google.com/trends/>

Manufacturing

The year-on-year percentage change in industrial production experienced a sharp drop during the period of elevated containment measures during 2020Q2, with a -0.99 correlation coefficient for January-June 2020 confirming this. Although industrial production subsequently improved, it remained below its level when compared both to January/February 2020 as well as the corresponding period in 2019. An overall correlation coefficient of -0.86 suggests a strong negative relationship between the two. Furthermore, given that industrial production in Malta is mainly export-oriented, its developments may reflect the situation in source markets. In fact, its correlation coefficient with the Euro Area average GRI stands at -0.92, exhibiting an even stronger negative relationship when compared with the local GRI.

Figure 6: Y-O-Y Percentage Change in the Index of Industrial Production vs GRI



Source: Author's calculations

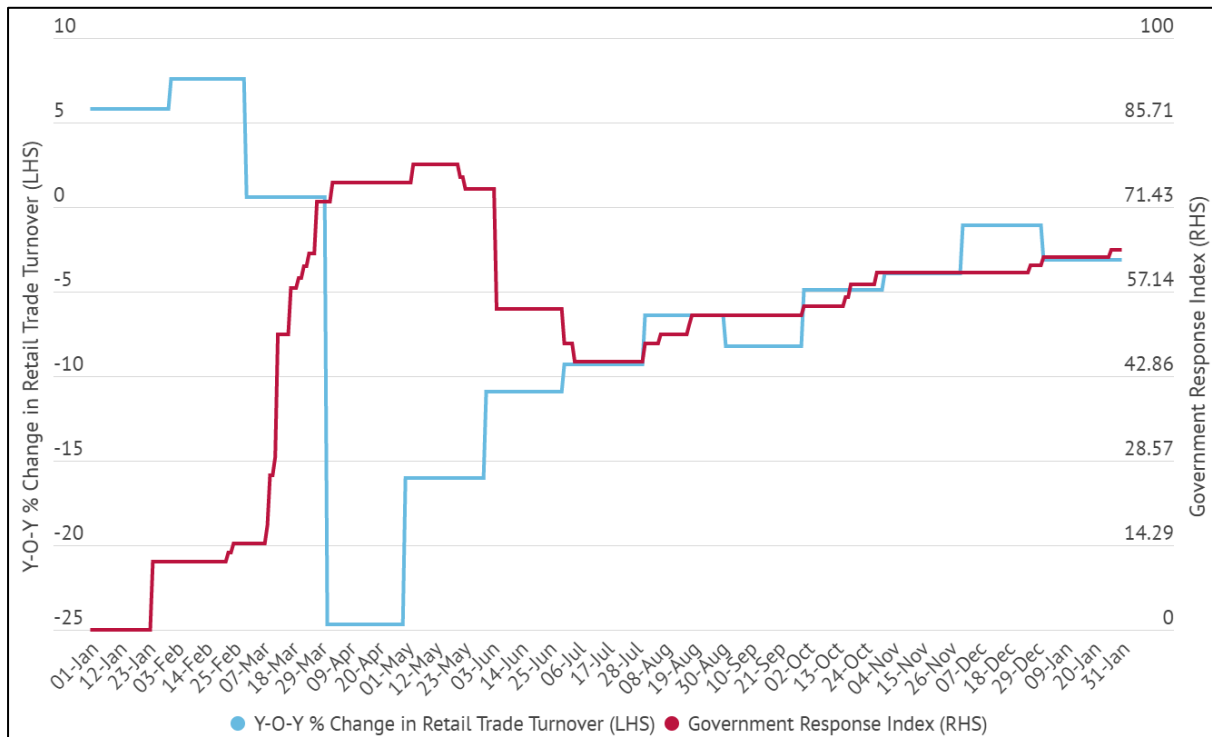
Services: Retail

Figure 7 plots the year-on-year percentage change of the retail trade turnover index and the GRI. Following the rise in containment measures, retail turnover dropped sharply when compared to the same period in 2019. The correlation coefficient for the first six months of 2020 stood at -0.93, exhibiting a strong negative relationship. Subsequently, retail trade turnover improved, but still remained lower than the levels of 2019 throughout the rest of 2020 and early 2021. The overall correlation coefficient stood at -0.79, suggesting a weakened negative relationship when compared to the first six months of 2020.

Similarly, Google Mobility data shows that following the forced closure of various non-essential shops and businesses, retail and recreation mobility dropped sharply (Figure 8). As

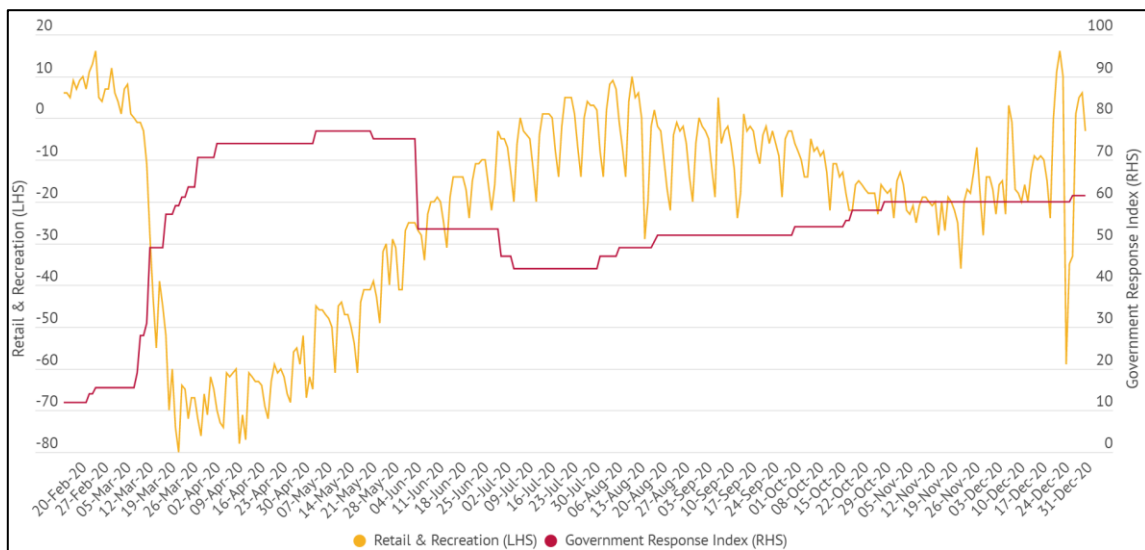
containment measures eased during the summer months, retail and recreation mobility rebounded, reaching February levels. Following the re-introduction of containment measures in late Q3, such as the closure of bars and clubs as well as the ban on mass events, retail and recreational mobility dropped sharply once again, although not to the same extent as experienced in March 2020. Hence, the relationship between retail and recreational mobility and the GRI remained modestly strong also during the second half of 2020, with a correlation coefficient of -0.72.

Figure 7: Y-O-Y Percentage Change in Retail Trade Turnover vs GRI



Source: Author's calculations

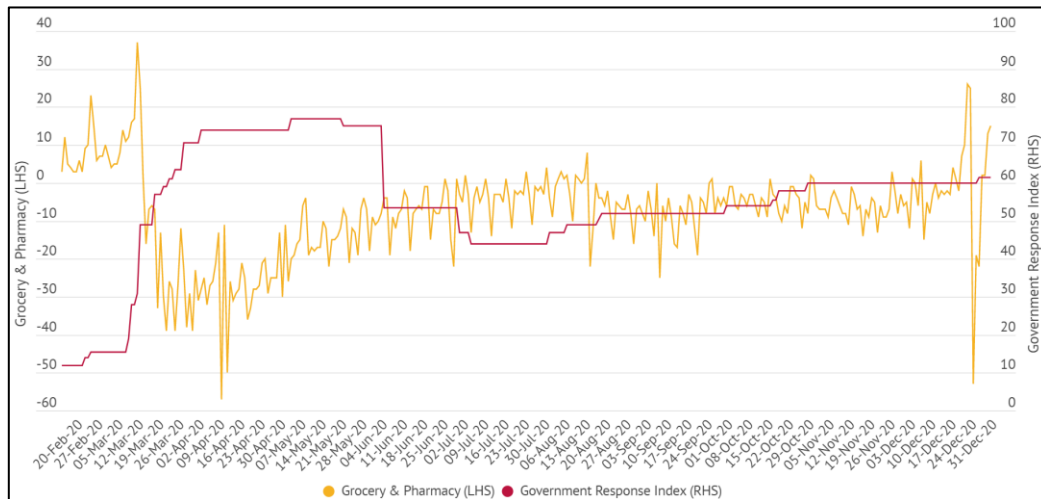
Figure 8: Retail & Recreational mobility vs GRI



Source: Author's calculations using Google Mobility data

On the other hand, grocery and pharmacy mobility (Figure 9) rose strongly during the early stages of the pandemic, and preceded the steep rise in the GRI, as elevated uncertainty led to hoarding. Following this sharp increase, this indicator drops sharply during the first two months of elevated government response. This subsequently rises, but still remains just below baseline mobility during the remainder of 2020. This might reflect a change in people's purchasing behaviour, with more individuals opting for online grocery shopping. The correlation coefficient between the two was -0.62.

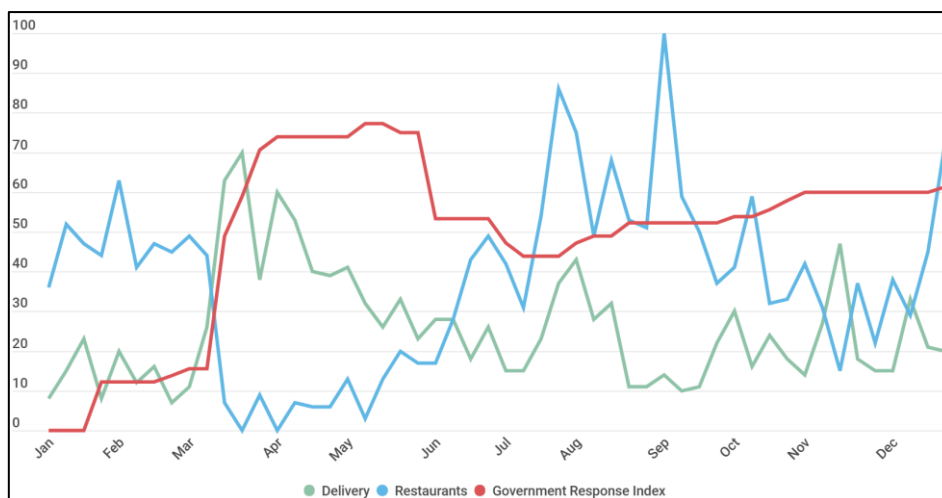
Figure 9: Grocery and Pharmacy mobility vs GRI



Source: Author's calculations using Google Mobility data

Figure 10 plot's Malta's GRI with searches under the delivery versus the restaurant category in Malta. During the early stages of the pandemic in March, searches for restaurants dropped significantly while interest in food delivery rose sharply. As containment measures eased during summer, searches for restaurants overtook searches for deliveries once again. However, as the GRI rose once again during 2020Q3, popularity of restaurants dipped, and ended the year trading popularity with deliveries.

Figure 10: Delivery & Restaurant vs GRI

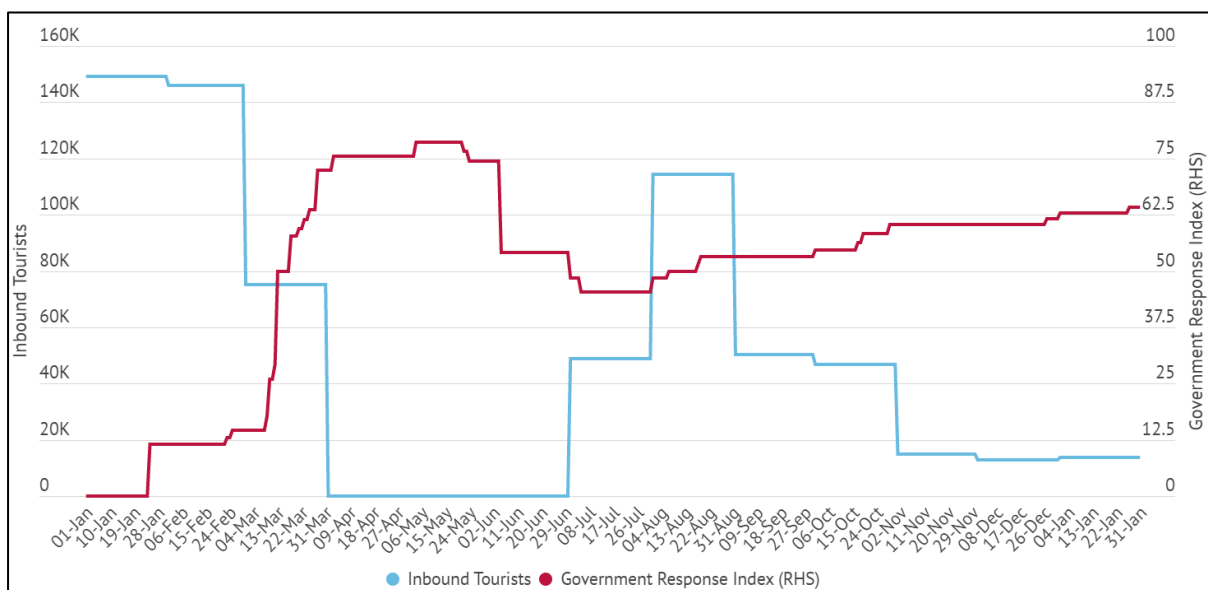


Source: Author's calculations using Google Mobility data

Services: Tourism

The total border closure in March 2020, as captured by the GRI, led to a complete halt in inbound tourism in 2020Q2 (Figure 11). During July and August, as the border re-opened to selected countries, the GRI declined while inbound tourism increased. Nevertheless, the number of inbound tourists remained below levels in January and February 2020 despite the typical peaks during the summer months. As the GRI increased once again, and various new travel restrictions were established, both in Malta and in other European countries, inbound tourism dropped to very low levels once again. A correlation coefficient of -0.90 confirms a strong negative relationship between the two.

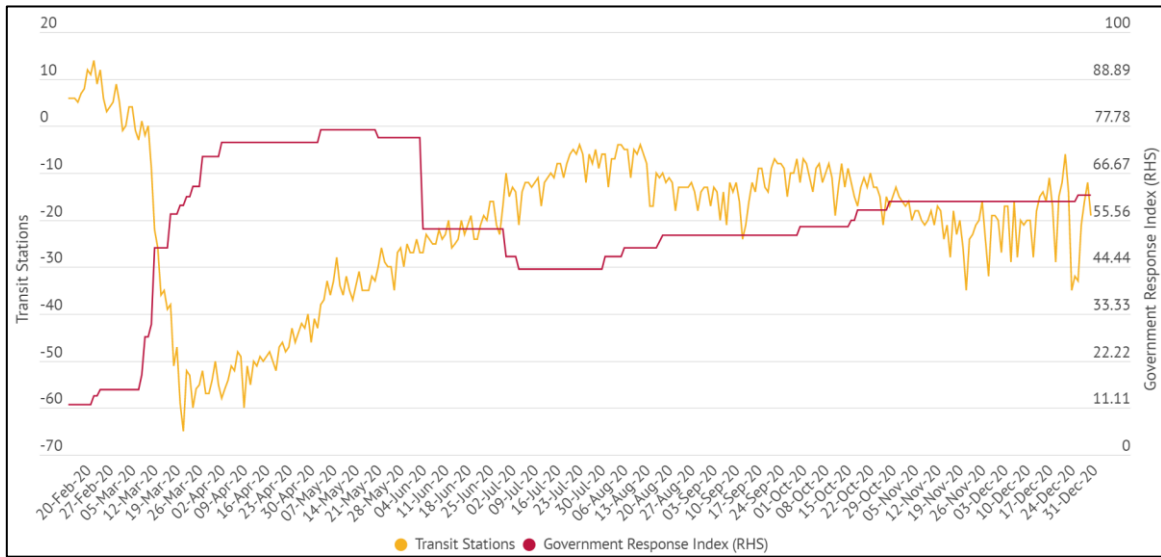
Figure 11: Inbound Tourism vs GRI



Source: Author's calculations

Meanwhile, Figure 12 plots transit station mobility with the GRI. This category comprises seaports, taxi stands, car rental agencies and bus stops, amongst others. The pattern in transit mobility follows closely that of the GRI. It exhibited a sharp drop reflecting the total border closure and restrictions on non-essential travel to Gozo. During summer, transit station mobility rose but remained below the baseline throughout. It dropped once again during Q3, which reflects an increase in travel restrictions. The correlation coefficient is -0.78, again suggesting a strong negative relationship between the two.

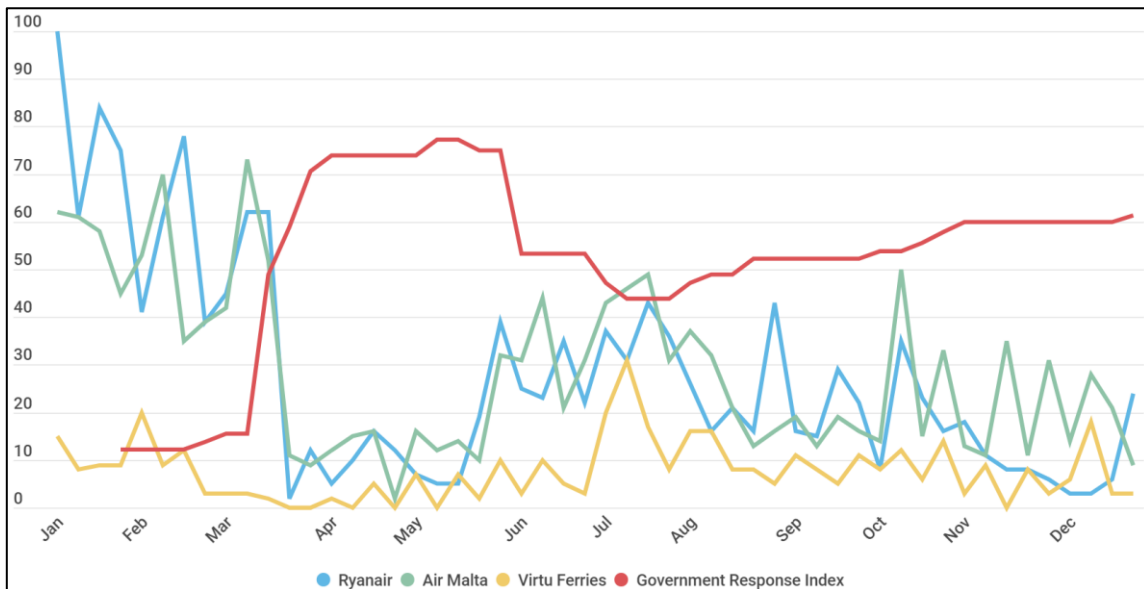
Figure 12: Transit Station Mobility vs GRI



Source: Author's calculations using Google Mobility data

Figure 13 compares Malta's GRI with searches for the terms 'Ryanair', 'Air Malta' and 'Virtu Ferries', which are three key players in connecting the Maltese Islands with other countries. Interest in the three terms dip significantly as containment measures, notably Malta's total border closure, increased. As containment measures were relaxed, and subsequently Malta's borders opened to some countries, interest in the two airlines picked up but remained low.

Figure 13: Ryanair, Air Malta & Virtu Ferries vs GRI

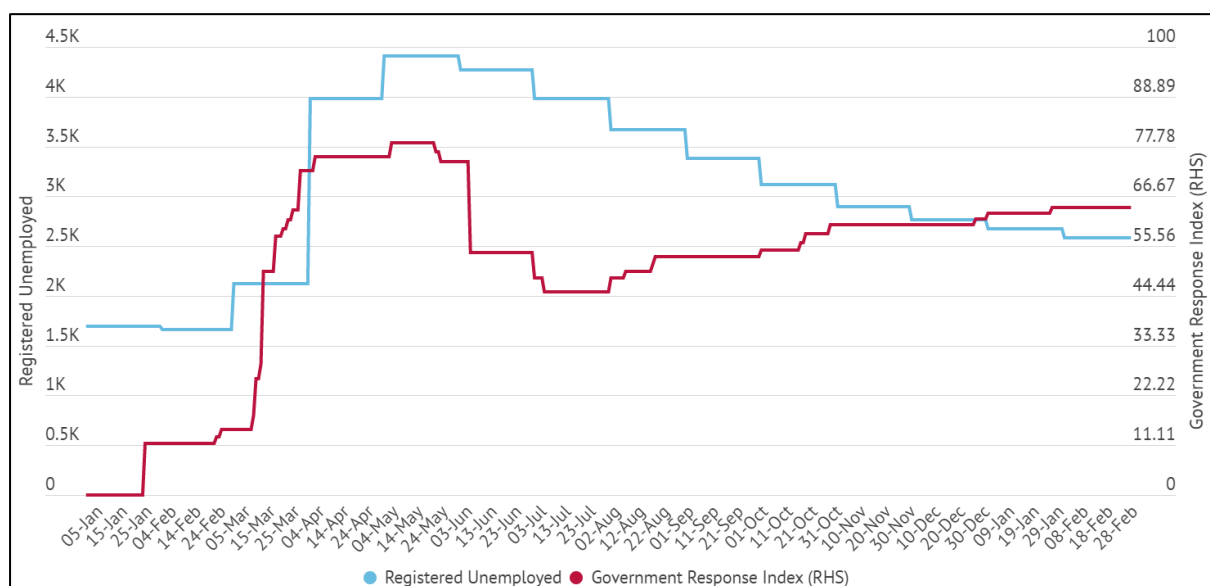


Source: Author's calculations using Google Mobility data

Labour Market

Figure 14 shows that the number of registered unemployed rose to 3979 in April 2020, from 1659 in February 2020. This continued to rise, reaching 4409 in May. However, as containment measures were relaxed in June, the number of registered unemployed individuals show a month-by-month decline, reaching 2585 in January 2021. Despite the resurgence in containment measures since August, the number of unemployed persons registering for work maintained its downward trend. The overall correlation coefficient is 0.74, exhibiting a strong positive relationship. This is however significantly less than the 0.91 coefficient for the first six months of 2020.

Figure 14: Registered Unemployed vs GRI



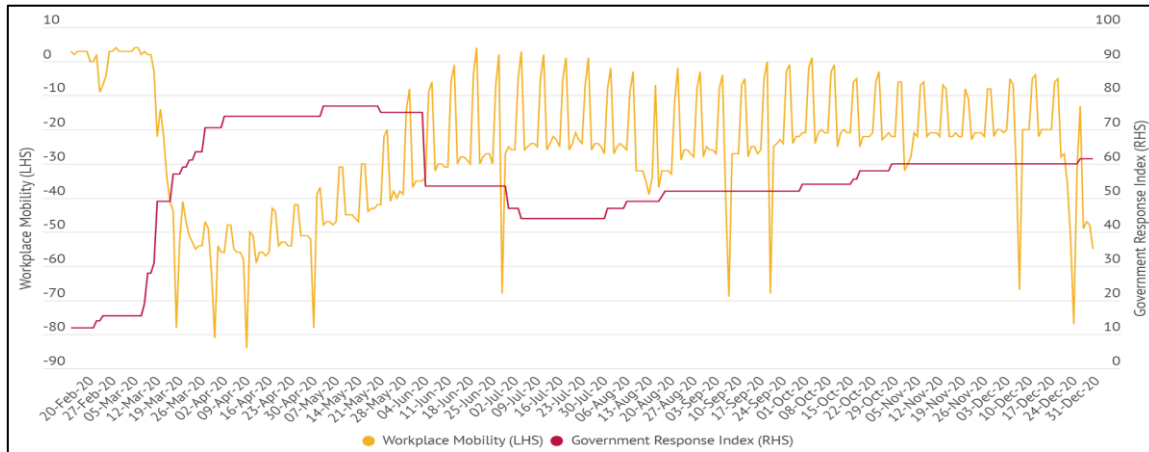
Source: Author's calculations

Meanwhile, workplace mobility dropped sharply during March, coinciding with a steep rise in residential mobility (Figures 15 and 16). These developments reflected the closure of non-essential businesses, shorter working weeks and increased teleworking arrangements. This shows the increased propensity to stay at home in line with imposed containment measures. Indeed, during four public holidays (19 March, 31 March, 10 April and 1 May) – a period in which the GRI was elevated - residential mobility was high. As containment measures were eased during the summer months, workplace mobility rose but remained below baseline mobility, which suggests that some work-from-home practices were maintained (Debono, 2021). Workplace mobility remained broadly flat in the second half of 2020, and similar to trends in residential mobility, its relationship with the GRI weakened.⁶ In fact, the overall correlation coefficient between the two stood at -0.64. However, the relationship between the

⁶ Note that any jumpiness during late December is due to the festive season, and hence any meaningful conclusions from such period has to be interpreted with caution.

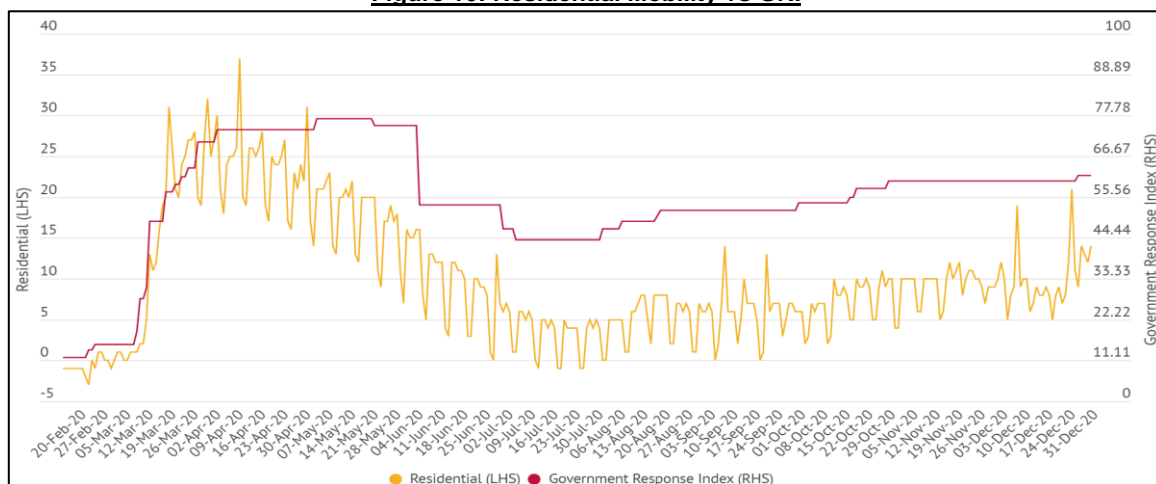
GRI and residential mobility weakened during the third and final quarter of 2020, in part reflecting the lower emphasis on lockdown-style measures. Notwithstanding this, a strong relationship between the two is confirmed with a correlation coefficient of 0.74.

Figure 15: Workplace Mobility vs GRI



Source: Author's calculations using Google Mobility data

Figure 16: Residential Mobility vs GRI



Source: Author's calculations using Google Mobility data

Figure 17 presents a correlation matrix between the GRI and the indicators analysed above for the whole period under consideration. Figure 18 presents a correlation coefficient for the same indicators, but focusing solely on the first six months of 2020. Inbound tourism registered the highest correlation with the GRI in both instances, with a 0.97 correlation during the January-June 2020 period dropping slightly to 0.9 overall. The remaining economic categories exhibit very strong correlations during the first six months of 2020, confirming the strong COVID-19 shock. However, the remaining economic variables experienced a notable drop in their overall correlation coefficient. This might serve as an insight on the learning behaviour and adaptation of individuals and sectors to the new circumstances, and hence of the economy as a whole.

In line with these developments, transit station mobility is the mobility category with the highest correlation to the GRI, with a correlation coefficient of 0.85 during the first six months of 2020, dropping to 0.78 overall. This was followed by residential and retail & recreational mobility, with just like economic variables, both showing strong, albeit weakening relationships. As expected a priori, given their nature, park & outdoor mobility and grocery & pharmacy mobility have the overall lowest correlation with the GRI.

Figure 17: GRI vs Indicators: Overall Correlation Matrix

GRI	1	GRI	1
Registered Unemployed	0.74	Parks and Outdoor	0.48
ESI	0.75	Grocery and Pharmacy	0.61
Y-O-Y Change: Retail Trade Turnover	0.79	Workplace	0.65
Y-O-Y Change: Index of Industrial Production	0.87	Retail and Recreation	0.71
Inbound Tourism	0.9	Residential	0.74
		Transit Stations	0.78
	0.9		0.78

Source: Author's calculations

Figure 18: GRI vs Indicators: January-June 2020 Correlation Matrix

GRI	1	GRI	1
Registered Unemployed	0.91	Parks and Outdoor	0.51
ESI	0.94	Grocery and Pharmacy	0.73
Y-O-Y Change: Retail Trade Turnover	0.93	Workplace	0.8
Y-O-Y Change: Index of Industrial Production	0.92	Retail and Recreation	0.83
Inbound Tourism	0.97	Residential	0.81
		Transit Stations	0.85
	0.97		0.85

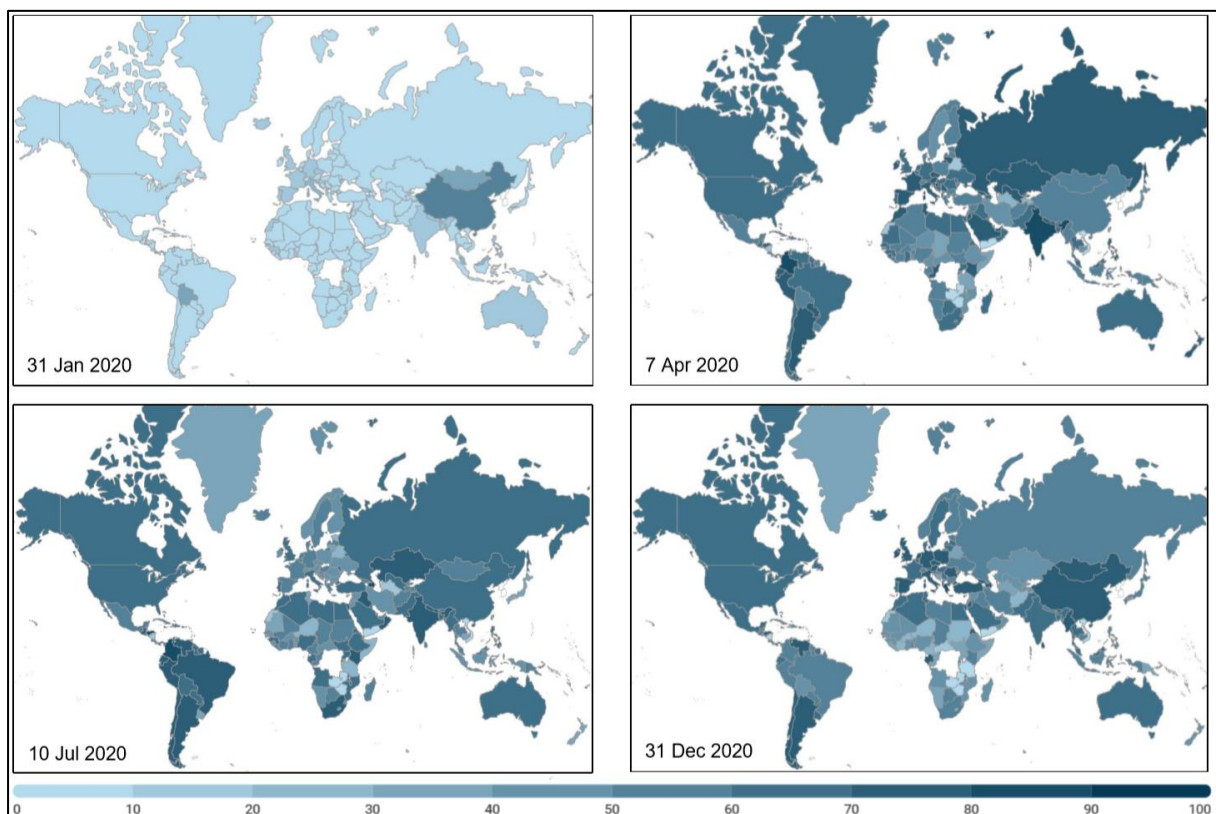
Source: Author's calculations

How does Malta's government response compare to other countries?

One of the main advantages of the Oxford GRI methodology is that it allows comparisons across countries. Figure 19 maps out the GRI for a selected number of countries, taking snapshots at four different dates in 2020. Similar maps for developments in the Containment and Health index, Stringency index and Economic Support Index may be found in **Annex 1**.

At end-January 2020 (top left panel, Figure 19), elevated government response was focused on China and some neighbouring countries, with minimal government response in the remaining regions. By April 2020, as COVID-19 developed from an outbreak in China to a global pandemic, all countries across the globe exhibited a very high level of COVID-19 government response (top right panel, Figure 19). During summer 2020, with COVID-19 cases dwindling globally, there was a slight drop in government response due to a relaxation of containment measures (bottom left panel, Figure 19). This is especially evident across European countries, with the GRI declining more than in other continents. By the end of the year, as COVID-19 cases rose rapidly once again, government response rose sharply in several countries, with European countries showing a notable increase in their index.

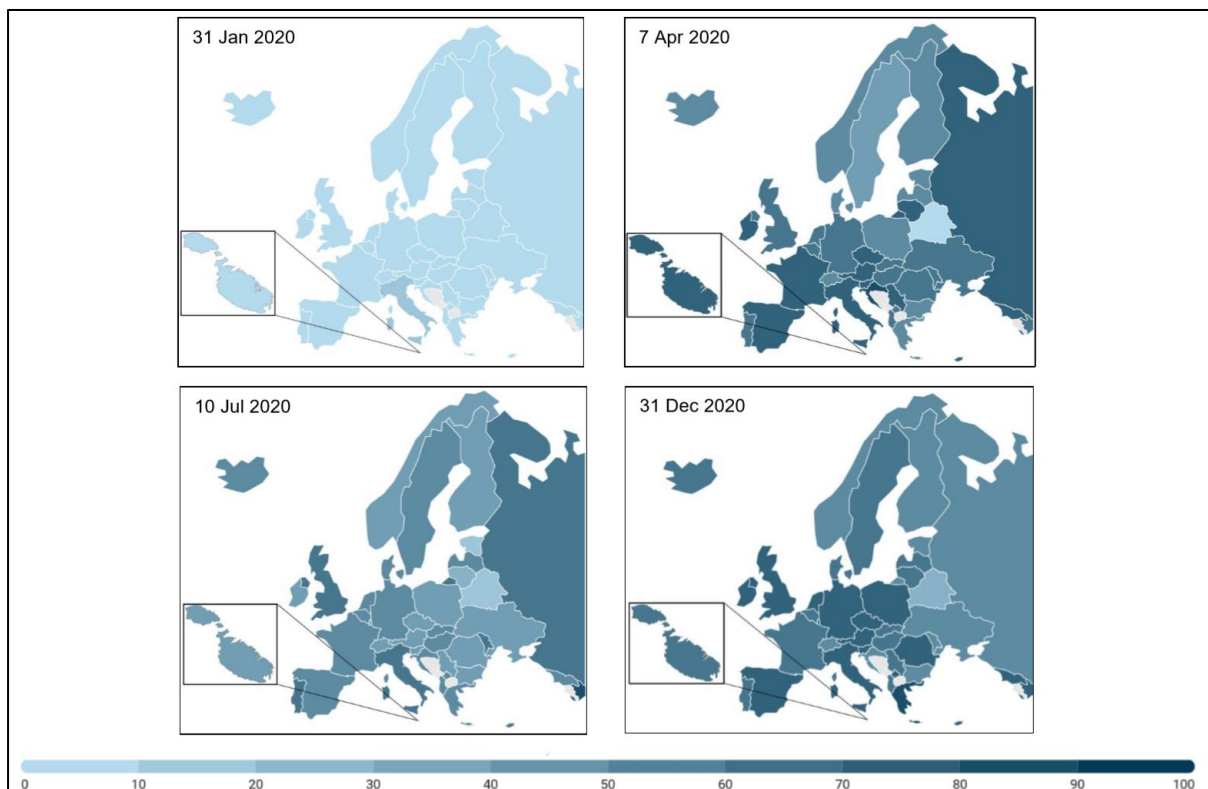
Figure 19: Global Government Response Index in 2020



Source: Author's calculations based on OxCGRT

Figure 20 maps out the GRI for all European countries included in the exercise. In January 2020 (top left panel, Figure 19) all European countries, including Malta, had a very low level of government response, with no country having an index higher than 20. By April (top right panel, Figure 20), as Europe became the epicentre of the pandemic, all countries significantly ramped up their response. Malta had one of the highest government response indices amongst all European countries during the period. During summer (bottom left panel, Figure 20), almost all countries experienced a fall in their GRI, as a result of a widespread relaxation of stringency measures. This time, Malta was at the lower end of the spectrum in terms of stringency. By the end of 2020, however, (bottom right panel, Figure 20) all countries raised again containment measures.

Figure 20: European Government Response Index in 2020

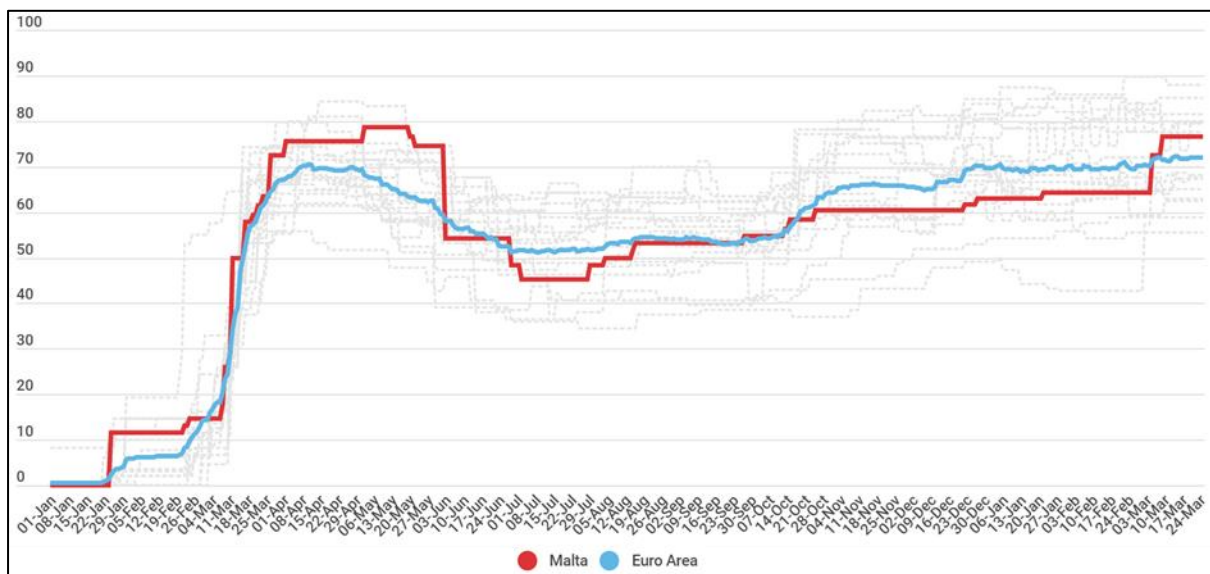


Source: Author's calculations based on OxCGRT

Figure 21 compares Malta's GRI with the Euro Area average. The chart also plots the indices of the individual Euro Area countries, indicating that while they tend to move together over time, the Euro Area average masks considerable heterogeneity, especially in the latter half of 2020. During March 2020, Malta and the Euro Area experienced a very similar steep incline in the GRI. However, Malta's peak GRI during April and May surpassed the Euro Area average. After a steep drop of the GRI on 5 June 2020, the index continued to decline until July, when Malta's index declined below the Euro Area average. After the re-introduction of several measures during September and October 2020, Malta's index was very comparable

to the Euro Area average. During this period, although containment measures were increased, they remained below the level of the Euro Area average, and it is the health and economic measures that pushed Malta's index to be on a comparable level. During the last two months of 2020 and early 2021, as COVID-19 cases rose significantly across Europe, the Euro Area GRI average experienced a higher increase than Malta's index, pushing the Euro Area average above Malta's index once again. However, with the reintroduction of new containment measures in March 2021, Malta's GRI surpassed the Euro Area average once again.

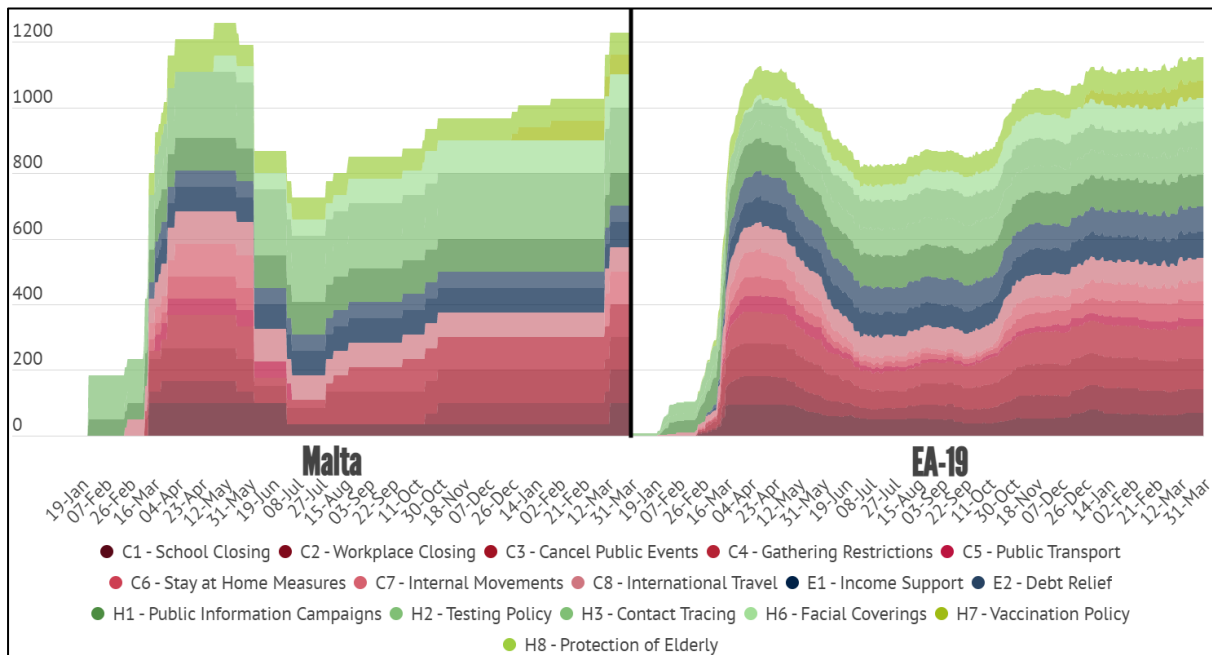
Figure 21: Malta vs EA-19 (Government Response Index)



Source: Author's calculations based on OxCGR

Figure 22 analyses the underlying indicators contributing to the level of the two indices during 2020. While containment measures (red) and economic support measures (blue) for both Malta and the Euro Area contributed in an equal manner to the GRI, it is the elevated health response and health-related measures (green) that pushed Malta's index at such a high level during the April/May period. This reflects coordinated nationwide public information campaign, a very thorough testing regime, an extensive contact tracing system, as well as the mandatory wearing of facial coverings in establishments. Figure 22 also confirms that although the health-related measures and economic support measures remained strongly in place during the latter part of 2020, it is the relaxation in containment measures and 'lockdown-style' policies that contributed to the drop in the index. Meanwhile, elevated Euro Area response persisted throughout the remainder of 2020 and early 2021. Once again this is due to the introduction of 'lockdown' style policies in various Euro Area countries. However, upon the introduction of new containment measures in March 2021, Malta's 'lockdown' style policies are slightly higher than the Euro Area average, which together with the enhanced health response contributes to the higher GRI level.

Figure 22: Malta vs EA-19 (Indicators)



Source: Author's calculations based on OxCGRT

Comparing Euro Area countries: An in-depth look at the indices

This section aims to obtain a deeper understanding on the indicators underpinning the indices across the individual Euro Area economies. Heatmaps comparing the overall containment, economic and health responses for all Euro Area countries are presented, whereby a darker shade of red indicates an elevated response within the category in question. Detailed heatmaps for each indicator within the coronavirus government response tracker are presented in **Annex 2**.

Containment Measures

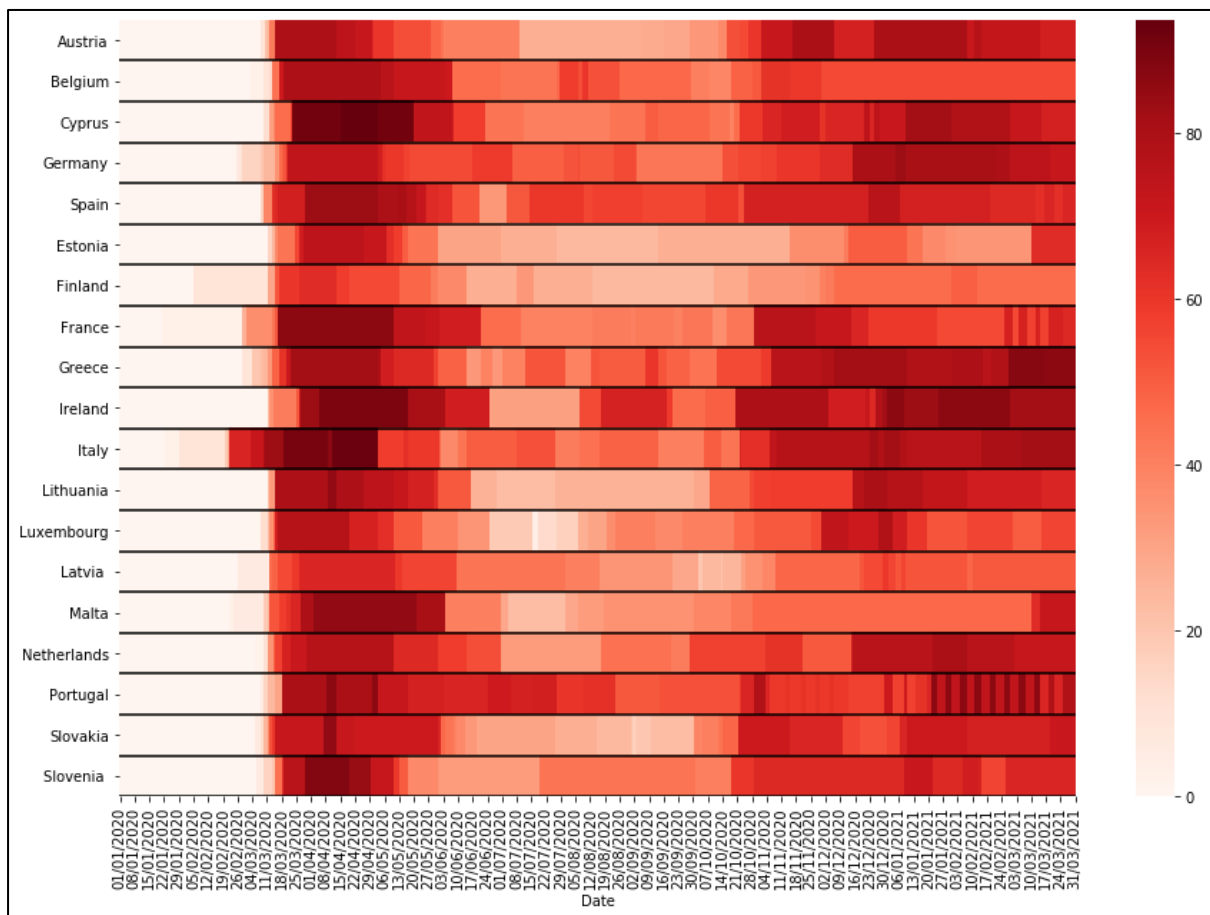
Figure 23 presents a heatmap for the eight containment measures within the OxCGRT project. All Euro Area countries exhibit high and prolonged containment levels during the March/April 2020 period, especially Cyprus, Ireland, Italy and Malta. While during summer all countries eased restrictions, containment measures were gradually re-introduced after summer, with some countries even imposing containment measures comparable to the March/April 2020 period.

During March/April 2020, all Euro Area countries except Austria, Belgium and Finland required schools to close at all levels. After the subsequent relaxation of such measures, during the latter stages of 2020, 11 of the 19 countries re-introduced such a measure, with Malta not being one of the countries this time round. Meanwhile, Malta, Finland and Greece imposed relatively less strict workplace closure policies when compared to other countries. However,

with the focus of COVID-19 containment placed on social distancing, restrictions on public events and gatherings are high for all Euro Area countries.

Although the GRI rose following its brief relaxation in summer, one can observe a shift in the type of policies adopted. Indeed, one can observe a much larger divergence across countries with respect to measures such as public transport restrictions, stay-at-home requirements and restrictions on internal movements. For example, Malta, Estonia and Slovenia did not re-introduce any stay-at-home measures after summer. Similarly, Malta, Belgium, Estonia, Finland, and Latvia did not restrict internal movement post-June 2020. However, restrictions on international travel were re-introduced again. Although during the first period nine of the Euro Area countries had a total border closure, this was not re-introduced in any of the countries post-June 2020.

Figure 23: Average containment indicators for Euro Area countries



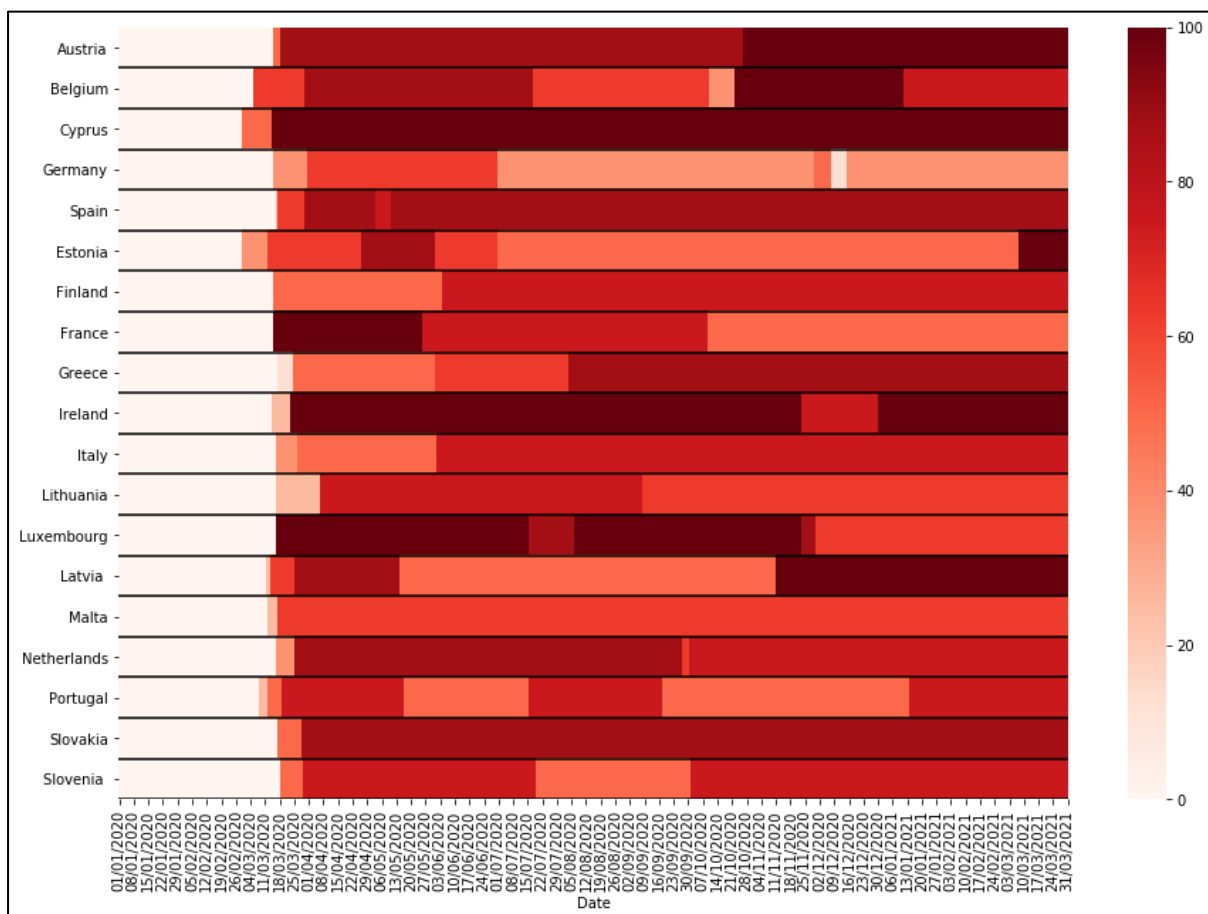
Source: Author's calculations based on OxCGRT (2020)

Economic Support Measures

Figure 24 presents a heatmap for economic support measures introduced in Euro Area countries. Euro Area countries took different approaches on supporting the economy, with countries such as Cyprus, Ireland and Luxembourg exhibiting high economic support measures.

All Euro Area countries introduced a variety of income support measures to support employees hit by the economic effects of the COVID-19 pandemic during March 2020. Furthermore, all countries bar Estonia and Latvia sustained such support throughout the remainder of 2020. Similarly, almost all Euro Area countries introduced narrow or broad debt-relief measures during March, with Germany and France being the only countries not to sustain such debt-relief measures throughout all the remainder of 2020. For a detailed description of the economic support measures introduced during the course of 2020, refer to Hutchinson et al. (2020) and Anderson et al. (2020).

Figure 24: Average economic indicators for Euro Area countries

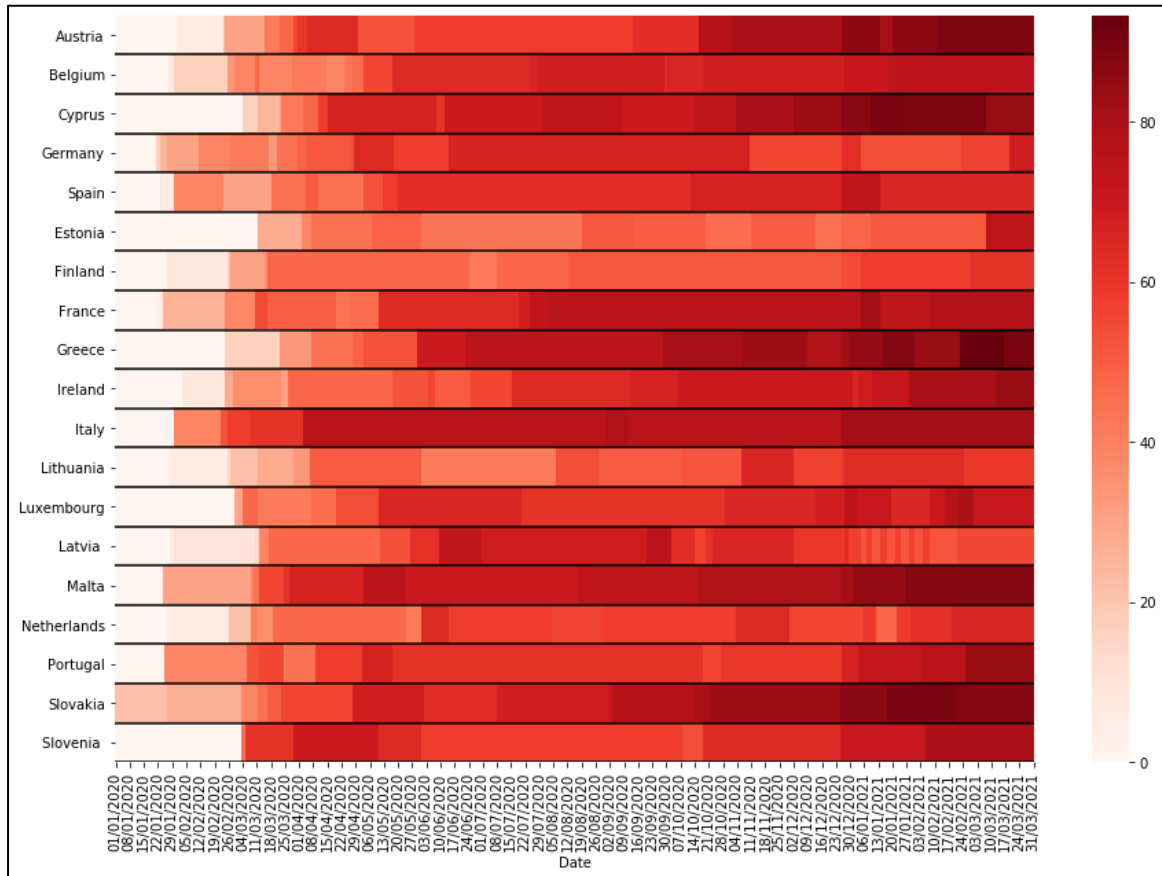


Source: Author's calculations based on OxCGRT (2020)

Health Response Measures

Figure 25 presents a heatmap for health response measures in Euro Area countries. For a prolonged period, Malta had a higher health response than many of its European peers, along with Cyprus, Luxembourg, Slovakia and France. All countries except Latvia maintained extensive coordinated public information campaigns throughout 2020. However, testing policies across Euro Area countries vary significantly. Malta was one of the first countries to introduce generally available testing. Malta had one of the highest scores in terms of contact tracing throughout 2020. Meanwhile, Malta was one of nine countries to introduce the strictest measure of facial covering wearing at all times when out of home. Following the approval of the first COVID-19 vaccine in late December 2020, Malta was one of fifteen countries to start vaccinating citizens on the earliest day possible, with different Euro Area countries taking diverging approaches on which groups should be first to receive the vaccine. With Malta's vaccination programme running smoothly, the country managed to vaccinate a wide spectrum of categories by March 2021. These include healthcare and long-term care workers, elderly citizens, the clinically vulnerable, front line workers, educators and citizens aged 60 years and over. In fact, by April 2021, over 50% of the Maltese adult population received a first dose, while around 25% were fully vaccinated.

Figure 25: Average health response indicators for Euro Area countries



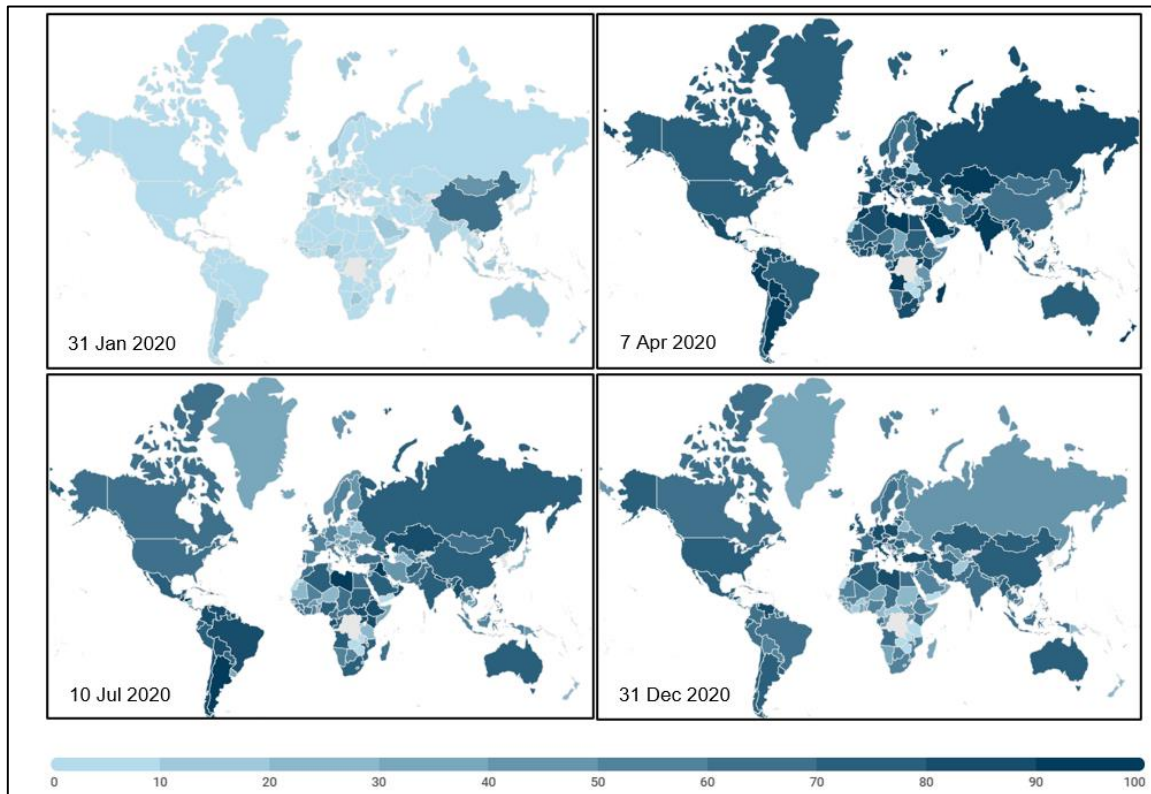
Source: Author's calculations based on OxCGRT (2020)

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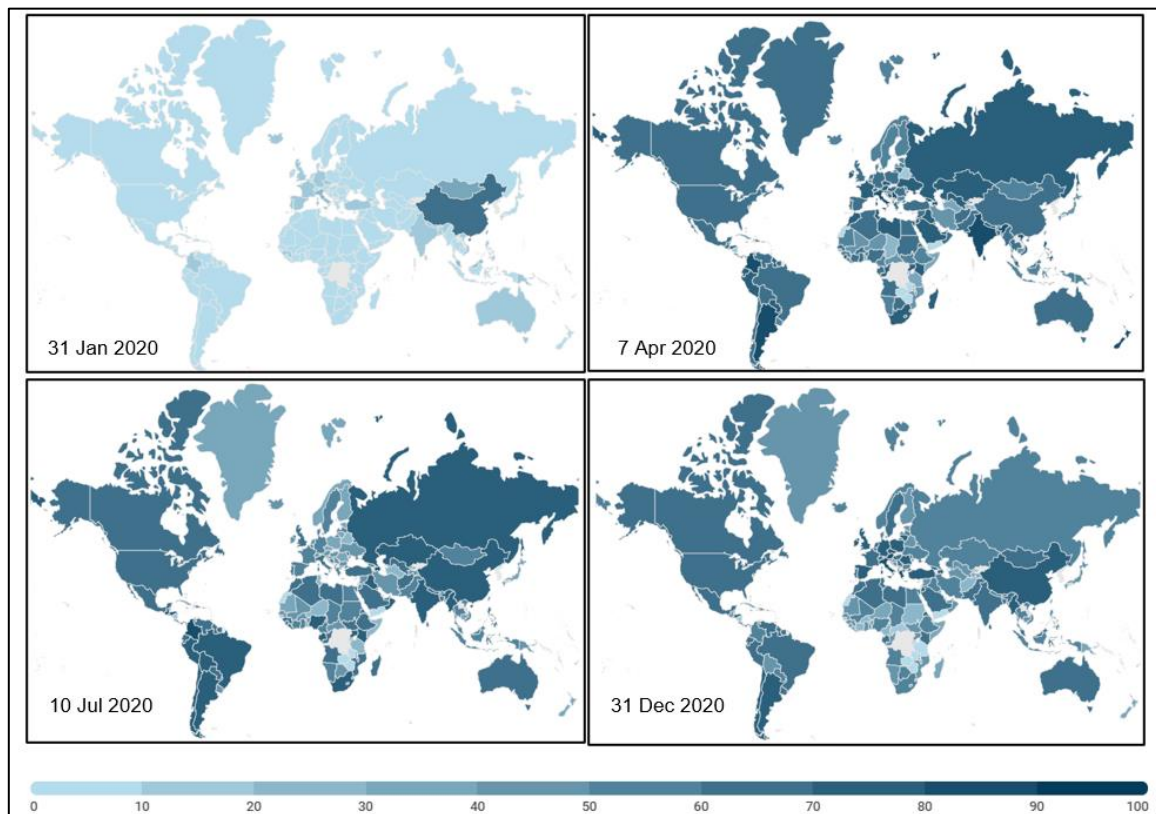
Annex 1

ANNEX 1 Figure 1: Stringency Index



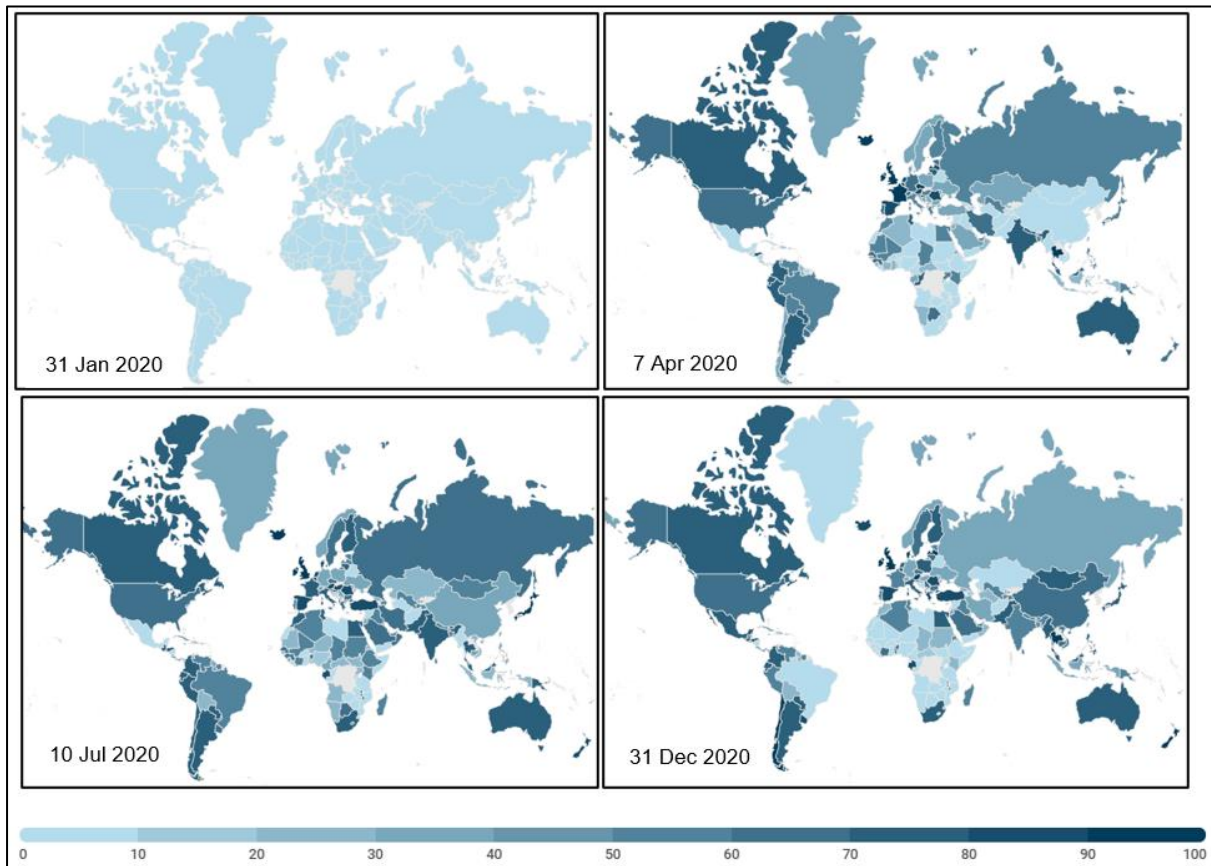
Source: Author's calculations based on OxCGRT

ANNEX 1 Figure 2: Containment and Health Index



Source: Author's calculations based on OxCGRT

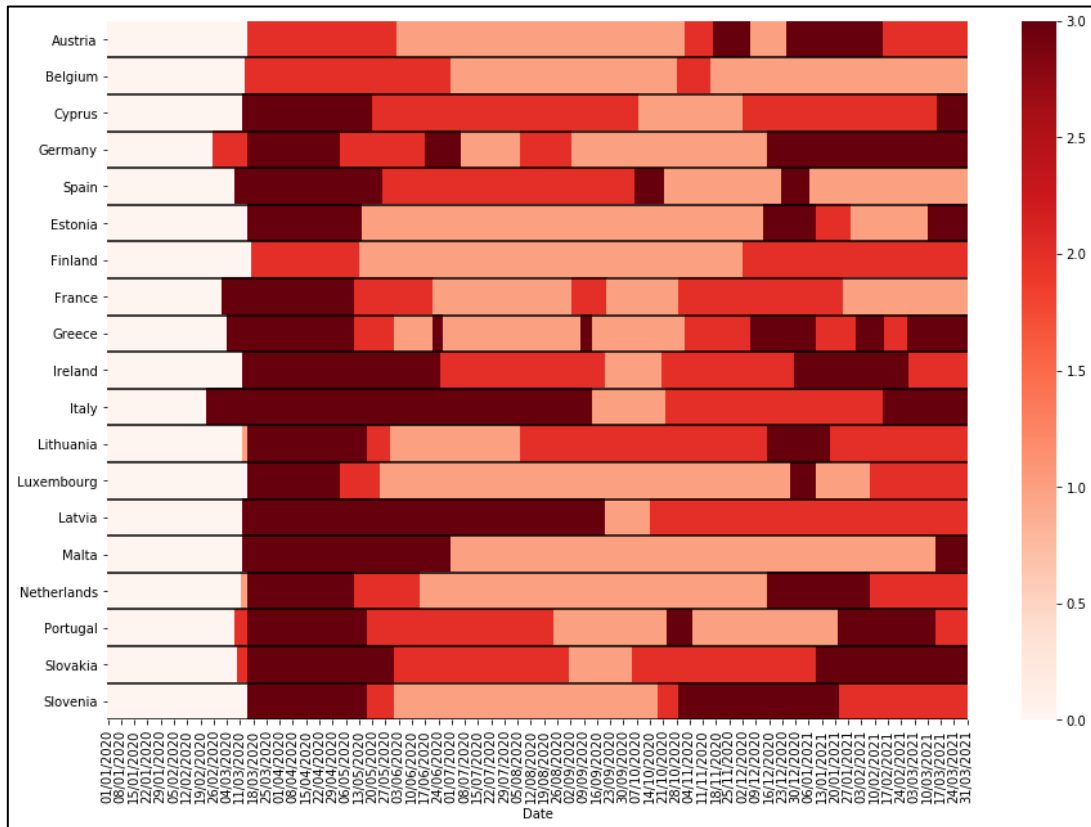
ANNEX 1 Figure 3: Economic Support Index



Source: Author's calculations based on OxCGRT

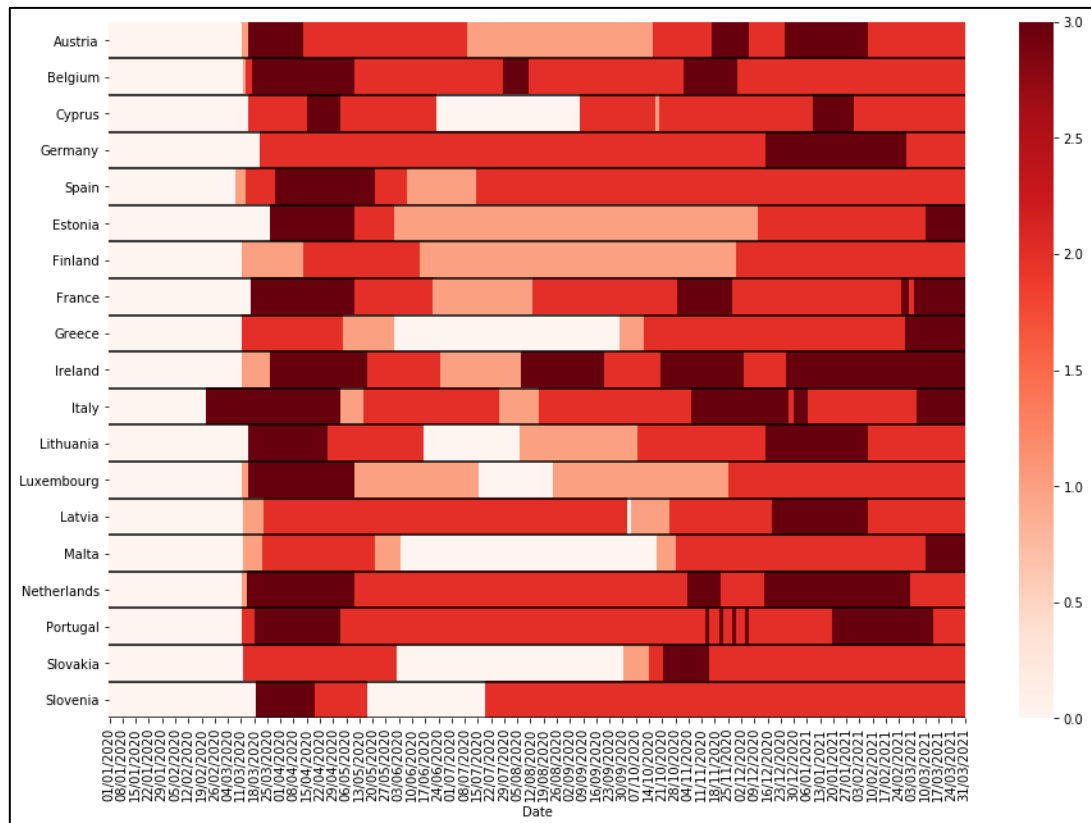
Annex 2

ANNEX 2 Figure 1: C1 – School Closures



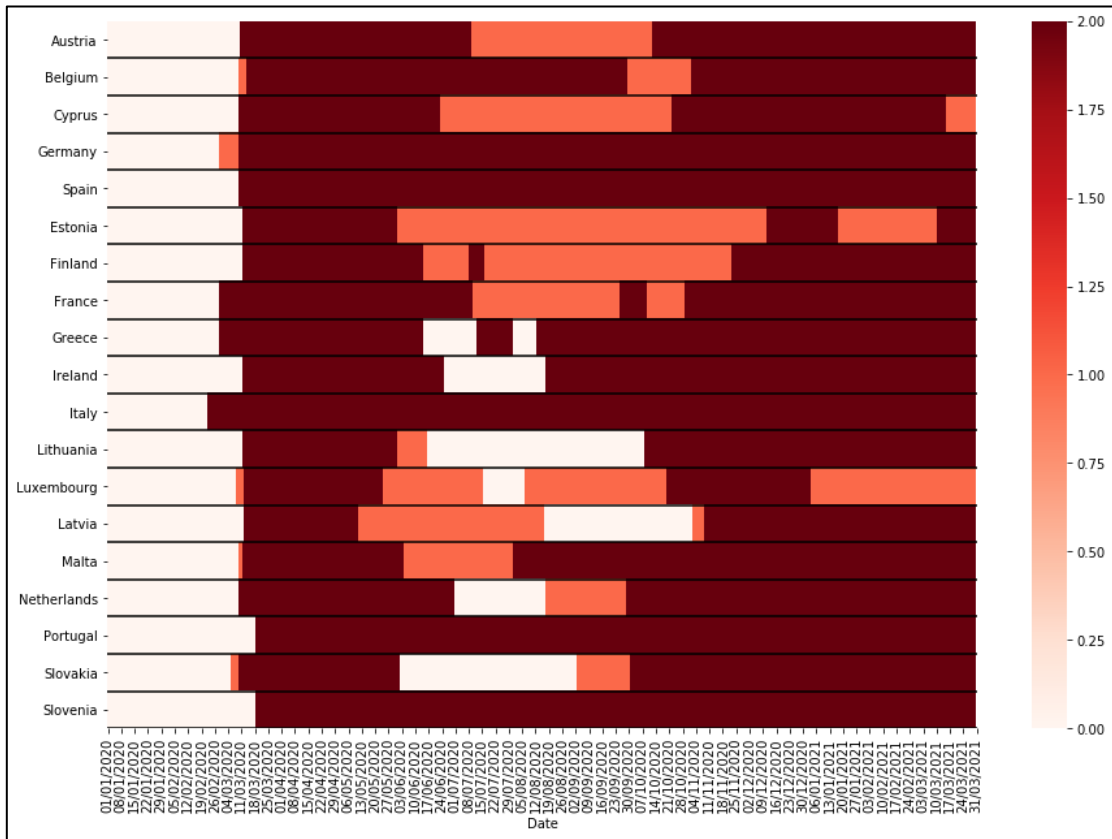
Source: Author's calculations based on OxCGRT

ANNEX 2 Figure 2: C2 – Workplace Closures



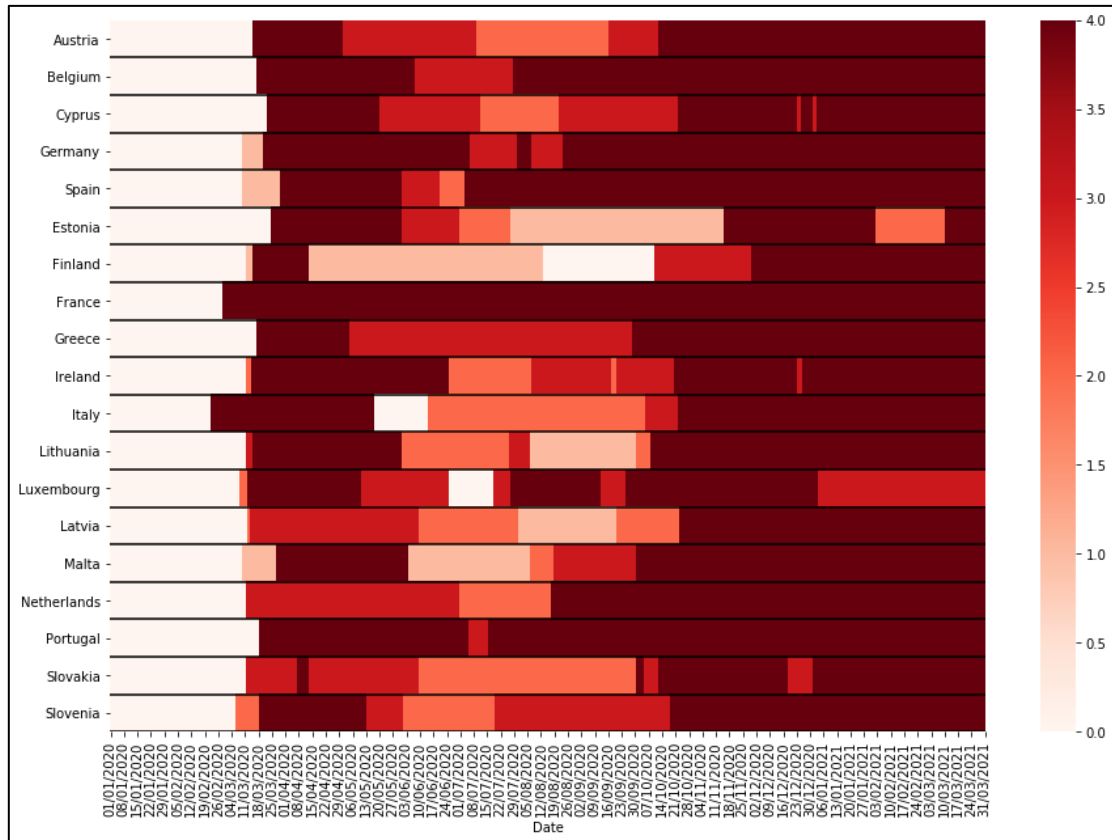
Source: Author's calculations based on OxCGRT

ANNEX 2 Figure 3: C3 – Cancel Public Events



Source: Author's calculations based on OxCGRT

ANNEX 2 Figure 4: C4 – Restrictions on Gatherings



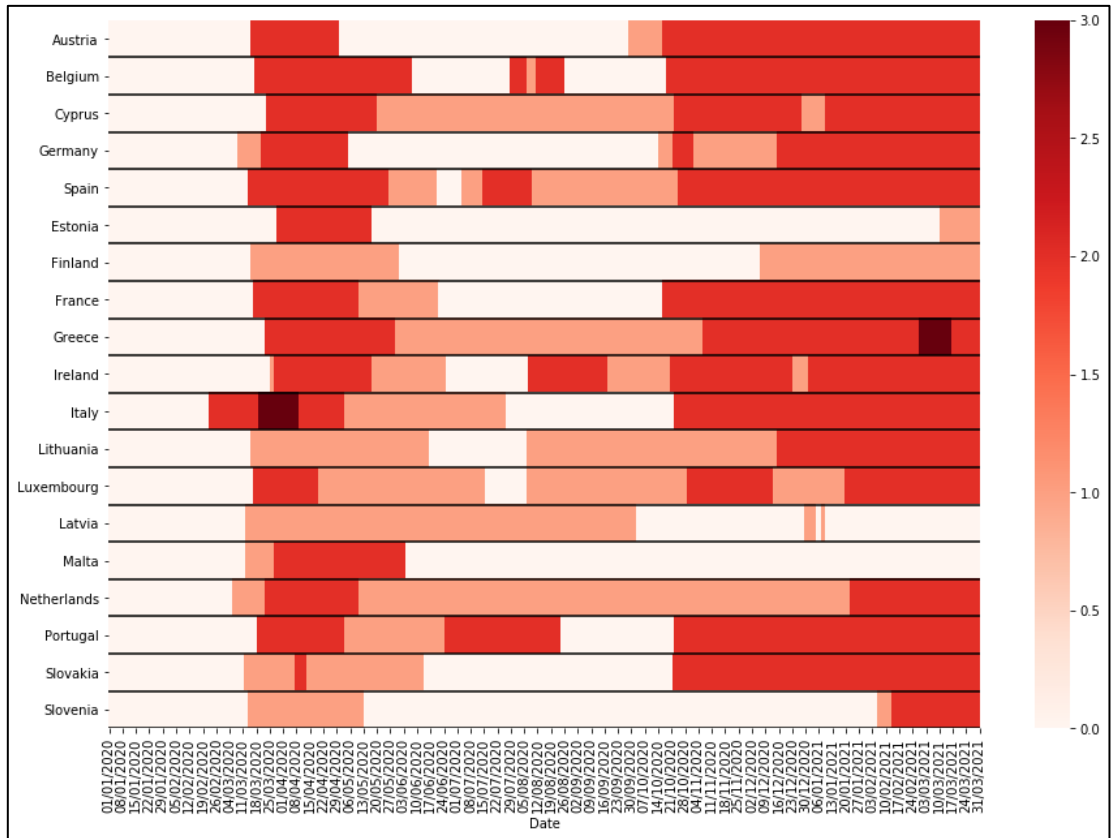
Source: Author's calculations based on OxCGRT

ANNEX 2 Figure 5: C5 – Close Public Transport



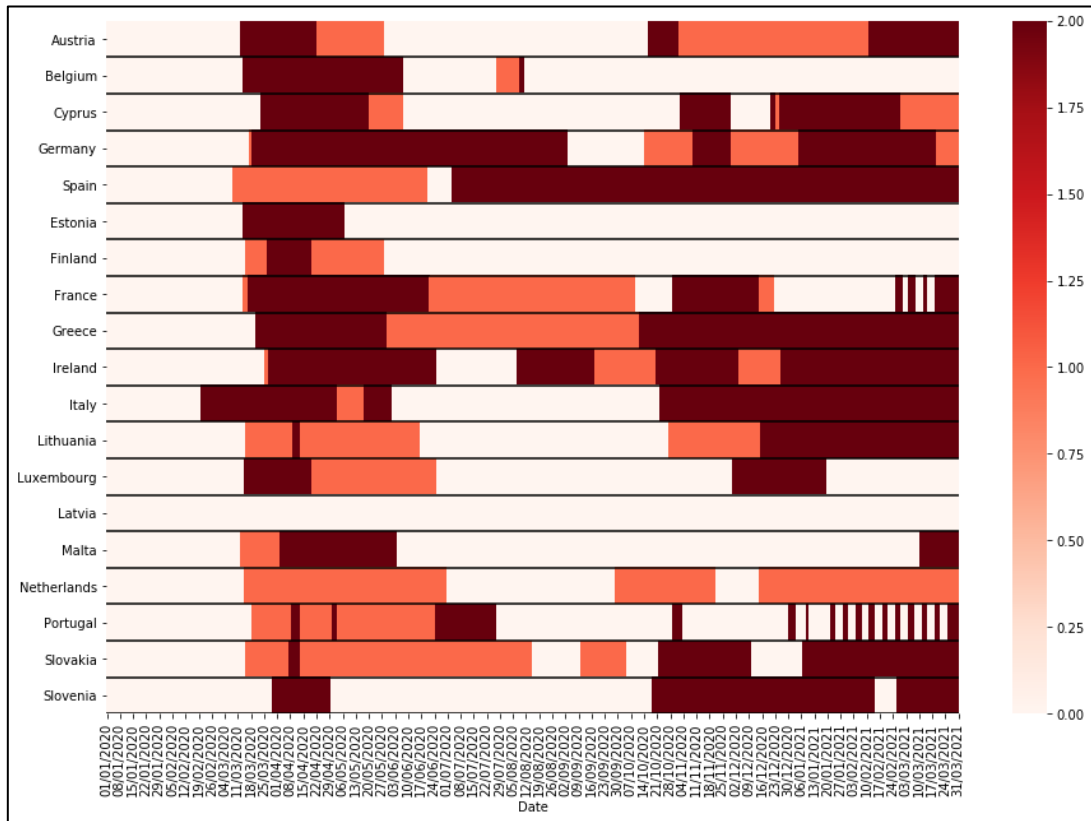
Source: Author's calculations based on OxCGRT

ANNEX 2 Figure 6: C6 – Stay-at-home Requirements



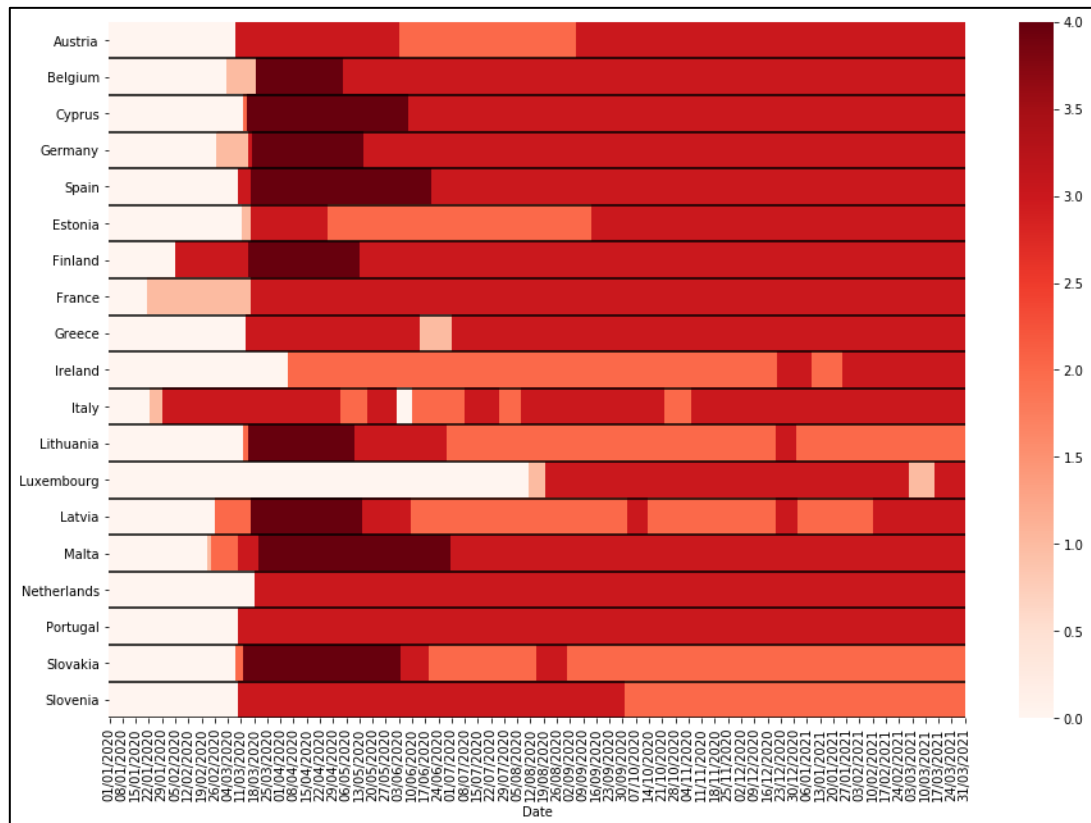
Source: Author's calculations based on OxCGRT

ANNEX 2 Figure 7: C7 – Restrictions on Internal Movement



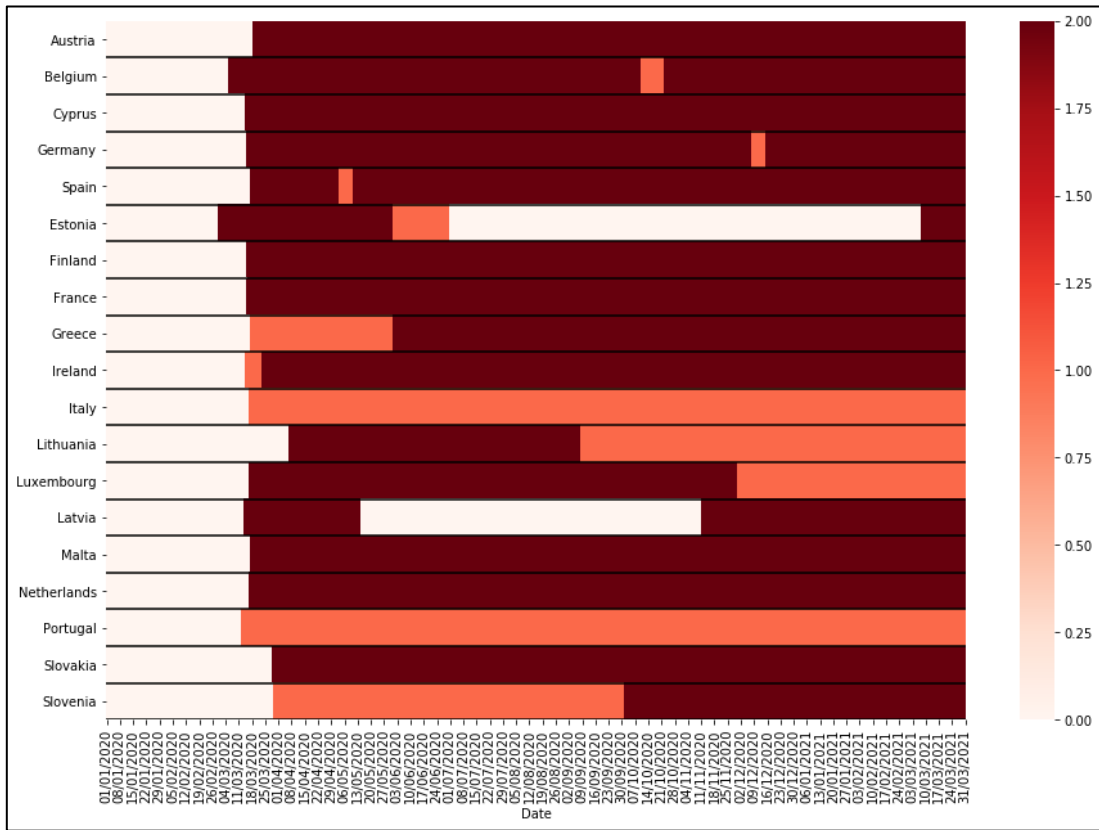
Source: Author's calculations based on OxCGRT

ANNEX 2 Figure 8: C8 – International Travel Controls



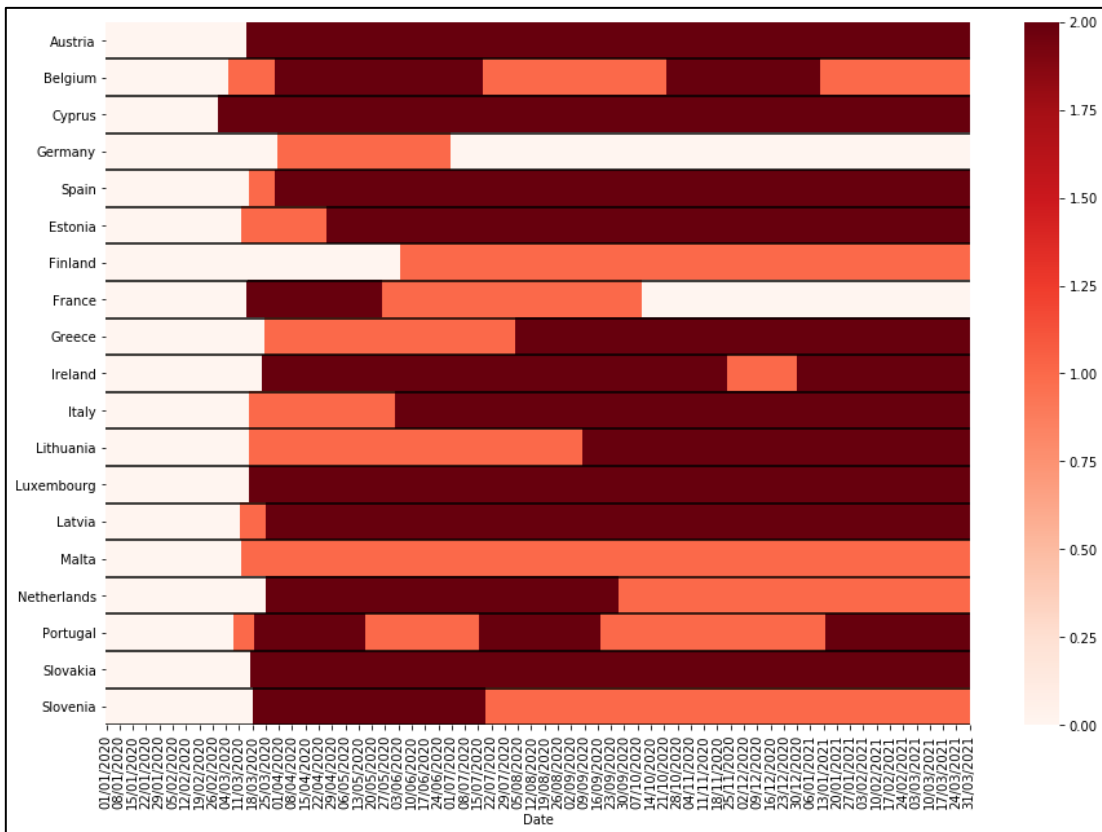
Source: Author's calculations based on OxCGRT

ANNEX 2 Figure 9: E1 – Income Support



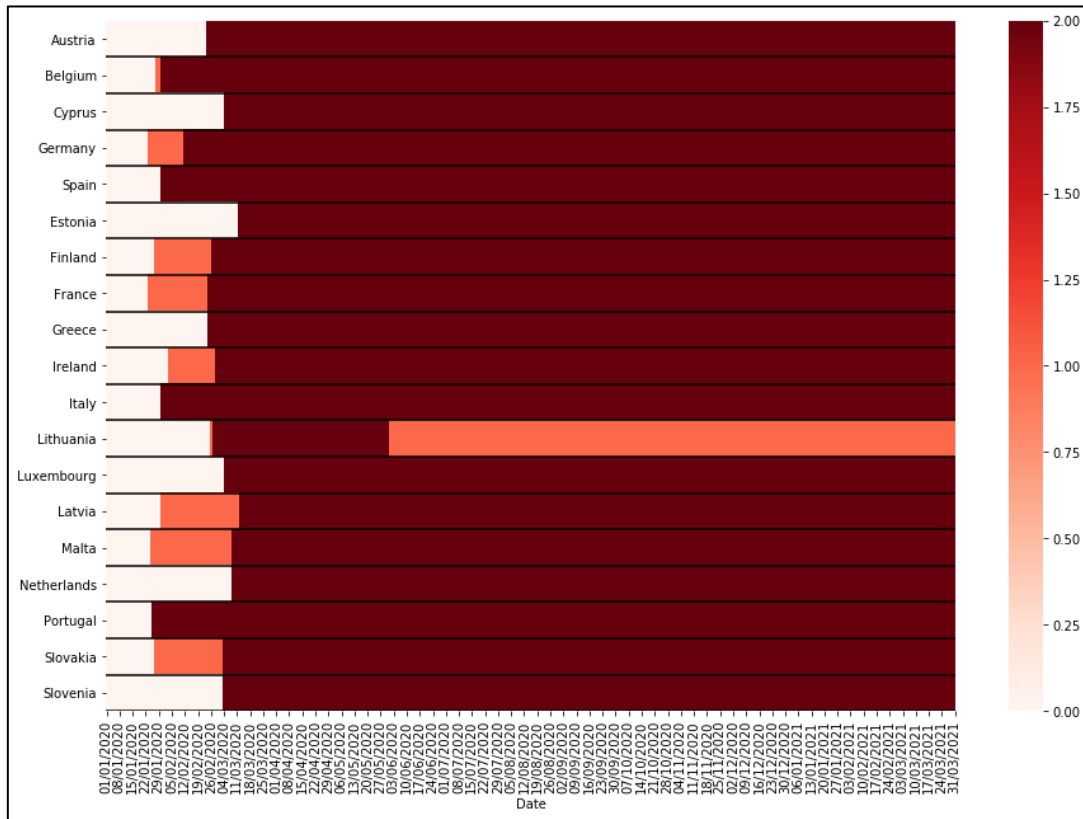
Source: Author's calculations based on OxCGRT

ANNEX 2 Figure 10: E2 – Debt/Contract Relief



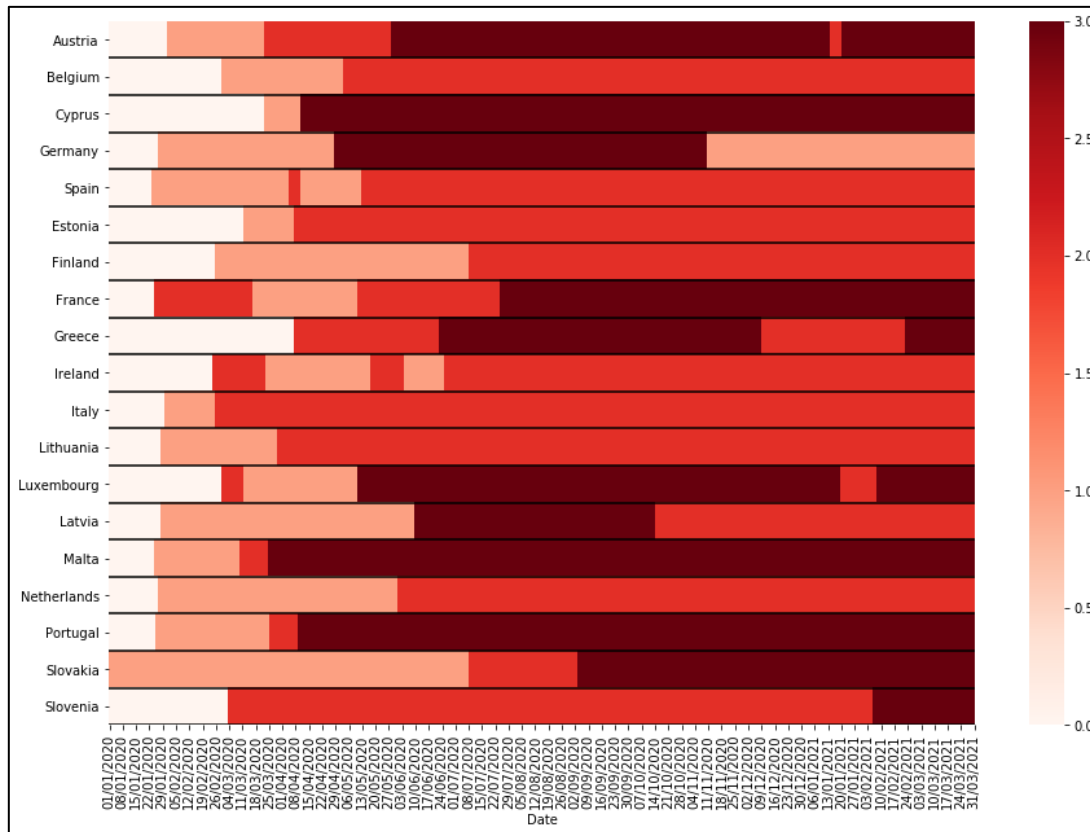
Source: Author's calculations based on OxCGRT

ANNEX 2 Figure 11: H1 – Public Information Campaigns



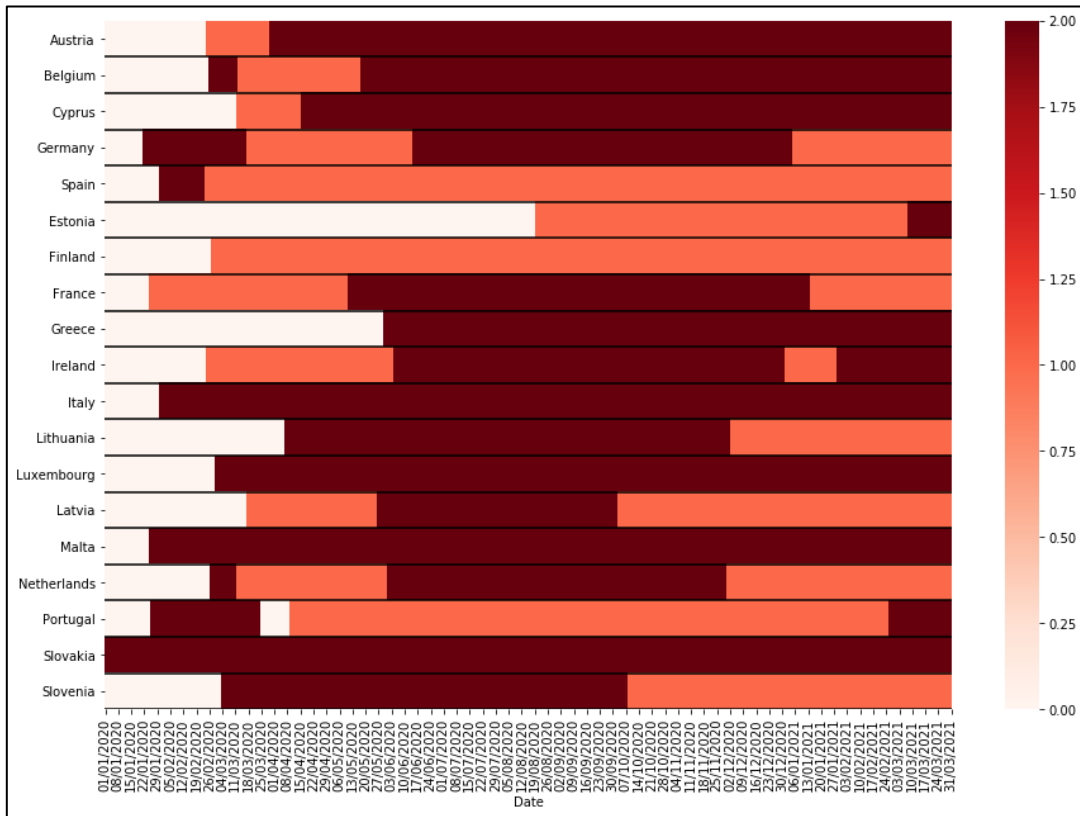
Source: Author's calculations based on OxCGRT

ANNEX 2 Figure 12: H2 – Testing Policy



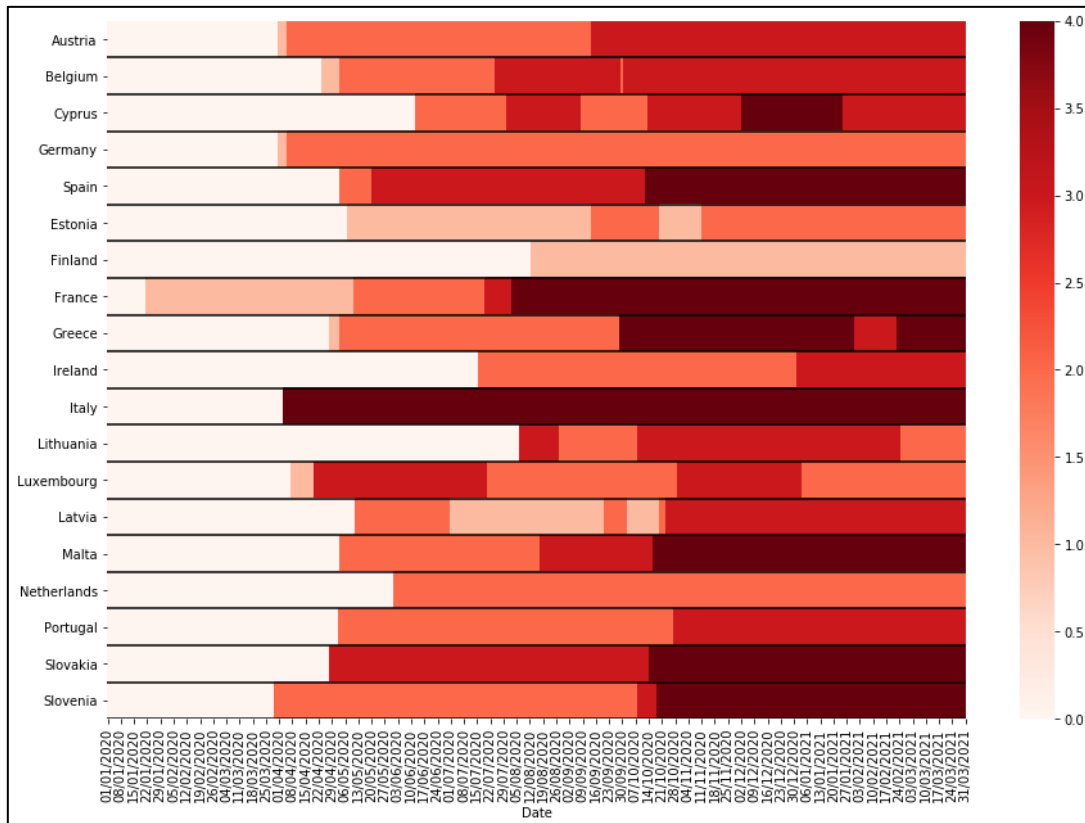
Source: Author's calculations based on OxCGRT

ANNEX 2 Figure 13: H3 – Contact Tracing



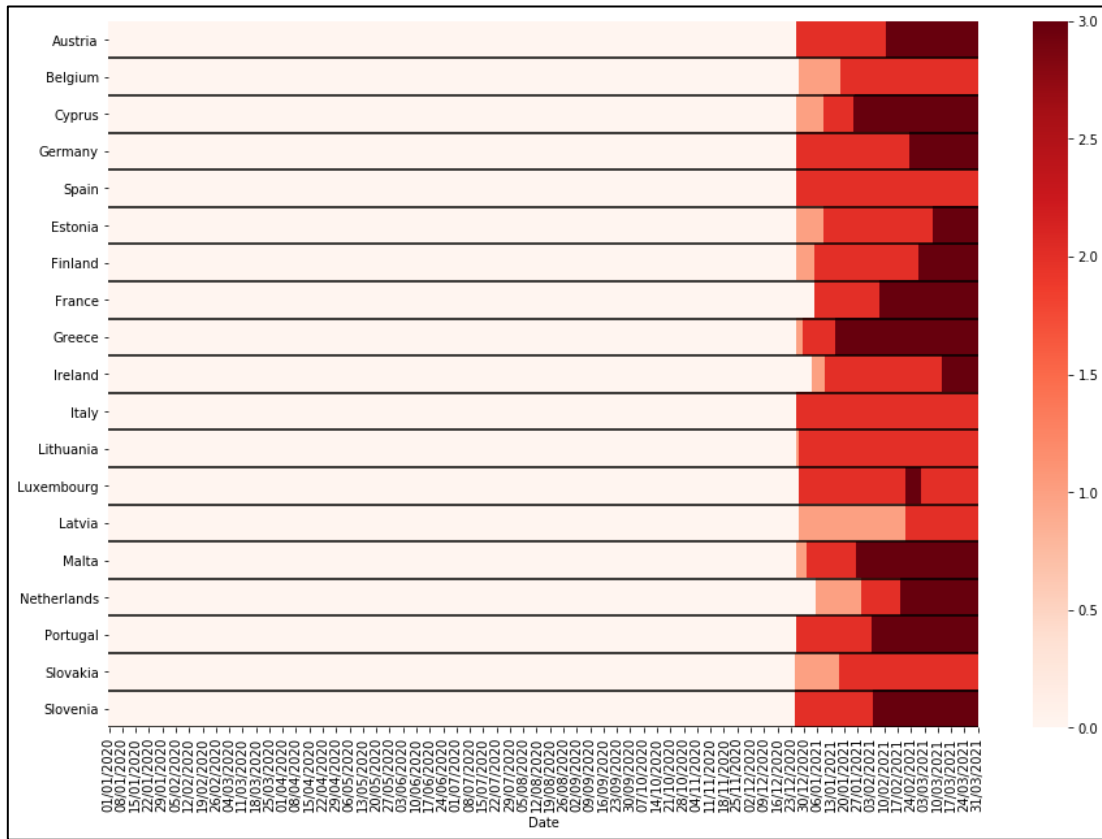
Source: Author's calculations based on OxCGRT

ANNEX 2 Figure 14: H6 – Facial Coverings



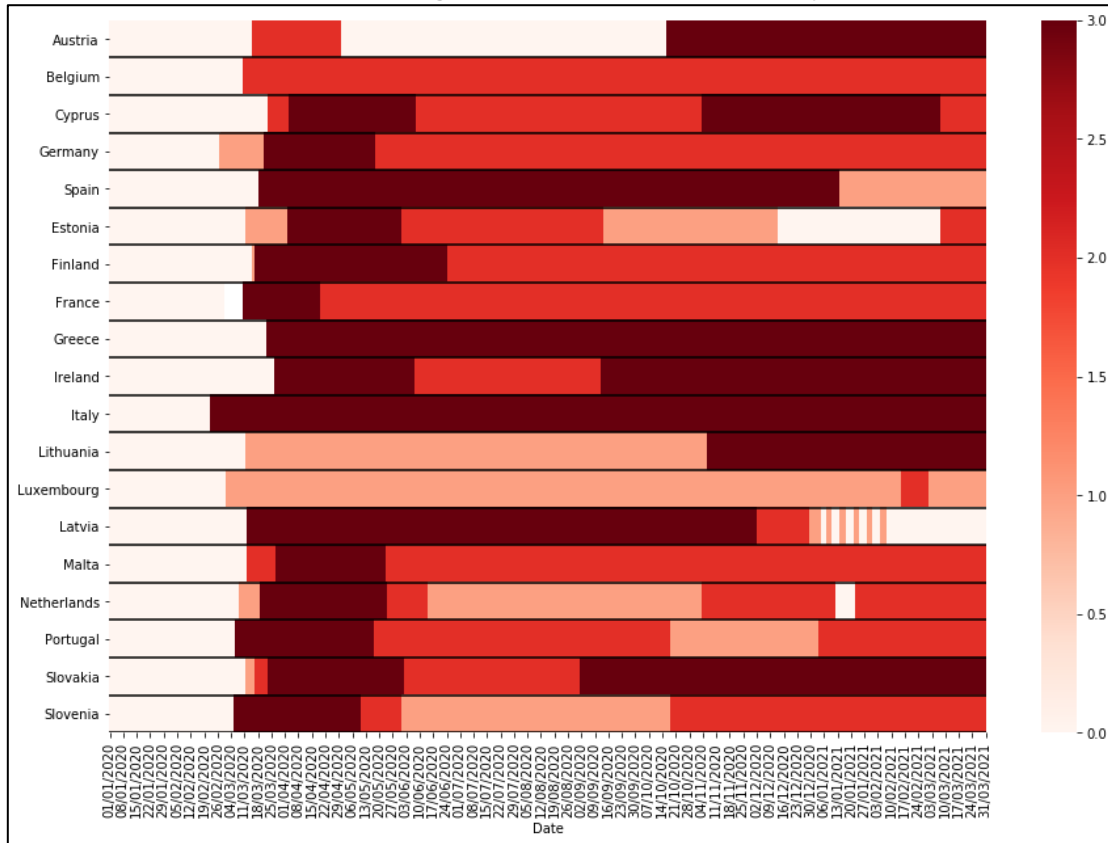
Source: Author's calculations based on OxCGRT

ANNEX 2 Figure 15: H7 – Vaccination Policy



Source: Author's calculations based on OxCGRT

ANNEX 2 Figure 16: H8 – Protection of Elderly



Source: Author's calculations based on OxCGRT