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Maria Daniela GIAMMANCO,
Lara GITTO

GOVERNMENT MEASURES AND ECONOMIC ACTIVITY DURING THE COVID-19 OUTBREAK: SOME PRELIMINARY SHORT-TERM EVIDENCE FROM EUROPE

Abstract

The present contribution is aimed at offering evidence of the impact of anti-COVID government actions on trade. Using monthly Eurostat data, it investigates the relationship between the turnover of sales and the adoption of governmental measures. Explanatory variables encompass three indexes measuring the government response, namely, a stringency, a health containment and an economic support index. A consumer confidence index is used as control variable. It has been estimated through a generalised least squares model with heteroskedasticity and autocorrelation. The results outline that the percentage change of the index of deflated turnover of retail sale of food, beverages and tobacco is positively correlated with consumer confidence and negatively correlated with restrictive governmental measures. It is also determined that the percentage change of the

Giammanco, Maria Daniela, MA, Aggregate Professor of Applied Economics, University of Catania, Italy. ORCID: 0000-0001-8677-5314 Email: maria.giammanco@unict.it.
Gitto, Lara, PhD, MSc, Associate Professor of Political Economics, University of Messina, Italy. ORCID: 0000-0002-0510-9238 Email: lara.gitto@unime.it.

index of deflated turnover of retail sale via internet is positively correlated with stringency governmental measures, this confirms the growing importance of internet as channel for trade.

Key words:

COVID-19; European countries; governmental measures; turnover of sales; internet retail.

JEL: E65, F01, H11, L81, C22.

5 Tables, 57 References.

Introduction

The Corona Virus Disease 19 (COVID-19) outbreak has resulted in a major worldwide economic depression (Tisdell, 2020). The World Bank forecasts an average 5.2 percent reduction in the world GDP for 2020. Recession will be experienced by at least 90% of the 183 countries considered. Hence, the negative impact of COVID-19 on the global economy will be twice the downfall triggered by the global financial crisis of 2007-2008.

The World Bank also accounts for the major efforts made by the national governments to face the COVID-19 crisis and suggests that the necessary actions taken to check the spreading of the virus, such as the lockdowns, together with the voluntary curtailments of both demand and supply, have engendered a novel blend of negative shocks activating a profound and widespread recession (World Bank, 2020)[1].

[1] Within the strand of studies tackling the detrimental effects of rare macroeconomic disasters on economic activity, effects of Covid -19 pandemic have been compared to the early Spanish flu (Barro & Ursua, 2008**).**

However, not only are other future pandemics expected (see, among others, Fan et al., 2018) but also, since COVID-19 is not tamed yet, studying whether and how government measures affect economic activity may be helpful in suggesting appropriate policy actions.

Governmental reactions to the COVID-19 pandemic threat are varied and characterised by diverse intensity (Hale et al., 2020). Actions, such as school closings, travel limitations, prohibition of public assembling, have been taken to control the pandemic, but the same actions have determined economic fallouts that required other governmental interventions, such as additional measures of social welfare support. The type and the intensity of the governmental measures is still an open question in the public debate (about the diverse types of such measures see also Cheng et al., 2020).

The focus of the public attention on the impact of the aforementioned measures on the economic activity is paramount (Ashraf, 2020). In this perspective, the present contribution offers a preliminary reflection on the extent to which economic activity, measured by means of turnover in the retail sector, reacts to the crisis engendered by COVID-19 in 29 European countries. Using monthly Eurostat data it investigates the relationship between the volume of retail sales and governmental measures implemented for food, beverage and tobacco and for internet sector.

The chosen explanatory variables encompass the government response to COVID-19 pandemic as measured by the Oxford University team led by the Blavatnik School of Government (Hale et al., 2020), namely, a government response index, a stringency index, a containment and health index and an economic support index employed in their lagged values. The consumer confidence indicator (monthly Eurostat data) is used as the control variable.

The study is organized as follows: the next section illustrates the conclusions reached by the economic literature that examined the effects of a shock linked to economic crises or health emergencies together with the results reached in studies carried out in some countries, among those included in the observed sample.

Then, the hypotheses to be tested and the selection of crucial variables, relating to 29 countries of the European Union are described[2].

The results of the analysis, together with comments on the diverse responses to the government actions of the two retail sectors considered will highlight the innovative aspects of this article.

[2] The countries included in the sample are, in alphabetical order: Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Poland, Portugal, Romania, Serbia, Slovak Republic, Slovenia, Spain, Sweden, Turkey, and the United Kingdom.

This project constitutes a preliminary analysis, likely to be replicated periodically, to verify the hypotheses formulated.

Background and Literature Review

In previous historic moments, the economic literature has already examined which socio-economic consequences may occur due to economic crises or health emergencies.

Some recent works (as, for example, Baldwin, 2020) look at the series of papers that were developed following the financial crisis of 2008-2009. These contributions were aimed at providing, together with comments on the evidence offered from statistical data, suggestions on countering any other upheavals in the socio-economic framework.

Economists agree that the crisis due to COVID-19 contains aspects related both to demand and supply shocks (Baldwin & Weder di Mauro, 2020; Brinca et al., 2020). While a supply shock reduces the economy's ability to *produce* goods and services at given prices, a demand shock, on the other hand, reduces consumers' ability and willingness to *purchase* goods and services.

The economic crisis of 2008-2009 was driven mostly by a demand shock (Baldwin, 2020; Baldwin & Weder Di Mauro, 2020) whose effects were transmitted across different economic systems through trade channels. Bems et al. (2013) outlined the relevance of trade channels in a work aimed at explaining such transmission mechanisms immediately following the 2008-2009 crisis. Further, the large magnitude of observed spillovers hinged on the fact that demand changes were concentrated on the durables sector, hence on goods traded both as final goods or integrated into global supply chains.

Variations in demand have been examined across countries simultaneously, outlining how demand changes alone can account for a large portion of the fall in the ratio of world trade to GDP, resulting in the collapse of world trade itself (Crowley & Luo, 2011). The attempt to identify characteristics, reasons and possible solutions has been made by Carlsson-Szlezak et al. (2020) in a work focusing mainly on the impact of economic shocks on banking and financial sectors; their insights may be considered in explaining different patterns of crisis[3].

Past studies of another strand of literature concentrated on the economic effects of health shocks on families in low and middle-income countries. Following the 2008 financial crisis, out of pocket expenses were significantly affected by the shocks, as confirmed by a review carried out by Alam and Mahal (2014). The

[3] Economic crisis has been observed assuming a V-shape, U-shape or L-shape, depending on reference context and the characteristics of capital markets.

works included in the review consider a period after the year 2000, and relate to the impact on the losses in households' income. Among the corrective measures proposed to overcome the crisis, the available evidence rejects the hypothesis of full consumption insurance to contrast major health shocks; rather, non-health system interventions that include access to credit and disability insurance in addition to support of formal insurance programs would seem preferable.

Wagstaff (2005) has examined the impact on consumption and the likely consequences across different groups of consumers in a study carried out before the 2008 crisis and related to the Vietnamese situation: through a fixed effects regression, he found that households with insurance do not smooth nonmedical consumption comparing to uninsured households.

Furthermore, average income households may be impacted more than very poor families, since they will be forced to increase their savings in order to buy food or medical products, whereas the levels of food and nonfood consumption of the poorest in the society are too low relative to basic needs to enable them to cut back when a shock occurs (Elmassah & Hassanein, 2020).

The shock caused by COVID-19 is related both to demand and supply and should be examined both in the short run and on a longer time span to understand the pattern of response (Malgarini, 2011). Since, in the short run, demand is impacted significantly and it is likely to exert its negative effects in a longer, unpredictable term, economic policies should be directed at boosting production and encouraging a positive climate both for consumers and for firms.

With regard to supply, different scenarios have been considered concerning the impact of pandemic on the supply chain. For example, Guan et al. (2020) focus on the decrease in the value added of production for the firms caused by an exogenous negative shock, rather than on the reduced production capacity of the system. The decrease in value added, which is a direct effect of the pandemic, determines indirect consequences by spreading to more countries through the supply chain. The authors apply a CGE (computable general equilibrium) model specifically designed to assess economic impacts in response to disasters. The latter requires production structures and trade networks to be adjusted to new production patterns along a time span extending usually over weeks or months. Further, instead of focusing on the true cost of the COVID-19 pandemic, they aim at identifying the most significant aspects of disease control adopted by the governments, such as stringency, duration and recurrence of lockdowns. The work underlines that if the virus had been confined only to China, the country from which it began to spread, the consequences would have been less disastrous globally. Instead, the width of supply chain determined the post relevant losses: countries such as Vietnam, Malaysia and Nigeria, which are closely linked to China's supply chains, are estimated to experience decreases of 5.2%, 3.6% and 3.1% in their GDP, respectively. Specialized economies, such as Kazakhstan (in the sector of energy), Mongolia (livestock) and Jamaica (tourism), have experienced even larger losses, with 6.1%, 4.2% and 11.4% decreases in their annual GDP, respectively.

In Europe, different works have been carried out to investigate changes in demand, the effects on the productive sector, or both. The study by Leka (2020) related to Albania, formulates hypotheses about macroeconomic consequences that might be observed in the majority of countries, such as a possible increase in public debt and the 'establishment' of a recession phase.

The environment and geographical areas have influenced the motivation underlying some analyses. A study carried out in a small Mediterranean country like Cyprus reflects the country's economy and the consequences on fishing activities (Giannakis et al., 2020). Fisheries are among the sectors hit the hardest by the coronavirus crisis due to the sudden decrease in the demand for seafood. The contraction in the economic output of the fisheries sector does not have any significant impact on the wider economy due to the small size of the sector. However, the COVID-19 crisis has major negative effects on fishermen's income and the livelihoods of fishers' households. In Malta, instead, the focus has been on the impact on the sustainable economy (Grima et al., 2020). The impact on small and medium-size enterprises has been investigated by Beraha and Đuričin (2020), who compare different sectors of activity in Serbia with other countries.

Other issues tackled by the literature concern changes in lifestyles, especially for young people, who see the freedom to carry out physical activity compromised due to the obligation to respect social distancing (Sekulic et al., 2020). Other analyses have dealt with eating habits (Papandreou et al., 2020) or the attendance of beauty salons (Biskanaki et al., 2020). Several analyses, especially in the Mediterranean where tourism is a weighty resource, have concentrated on this economic sector (for example, Kovacevic (2020) for Croatia; Papanikos (2020) for Greece).

About this last issue, other studies investigated specific questions about the perception of risk and the propensity to travel once the state of emergency has been lifted (see Turnšek et al. (2020) for an analysis relating to Slovenia, where the characteristics of the population are also considered, and the work of Terziyska and Dogramadjieva (2021) for Bulgaria).

Yet before COVID-19 emergency, other studies had focused on the analysis of consequences of (natural) disasters. Xia et al. (2019) have studied the 2015 Christmas flood occurred in York (UK): on that event, little infrastructure was lost or damaged, while a single industry (IT services) was completely knocked out for a limited time. Hence, the services sector (especially the business support industry, which was predominantly hit) sustained the greatest loss.

When studying the economic impacts of disasters, there is often a differentiation between two types of losses: stock and flow losses. Stock losses can be defined as damage that arises from destruction of physical and human capital. Tangible stock losses, for example, result from asset damage. Flow or production losses can also be used to address damage on productive capital although flow losses refer more frequently to business interruption and interference in up- and downstream supply chains (Hallegatte, 2008; Rose & Wei, 2013; Okuyama, 2014).

The conclusions reached by the economic literature that has dealt with crisis situations, both on the demand side and on the supply side, highlight the difficulty in identifying appropriate intervention measures, and the need to wait for a suitable period of time before the effectiveness of such measures becomes apparent.

As suggested by Karabag (2020), the present crisis is not only characterized as a disruptive period of instability, uncertainty, and danger, but it can be also perceived as a period of accelerated diffusion of digital technologies and micro-level initiatives, and a consideration of established resource-intensive forms of communication and globalized supply and outsourcing chains.

Hence, the future will have to find European countries prepared to manage the state of crisis from a digital point of view.

The present study takes into account the conclusions already reached by the relevant academic literature and discussed by the media and the press, and considers the need for the public sector intervention to support economic activity. In the quest for a European response to the challenge of the COVID-19 pandemic, it does not focus on a single country, but tackles 29 countries, among which the public intervention during the pandemic has been characterized by different intensity (from less stringent measures, to wider government interventions).

As we will see examining the results of the estimations carried out, it is possible to distinguish positive or negative effects of such governmental measures on different aspects of economic activity.

Data and Methods

Indicators of Economic Activity

As it has been mentioned above, both production and consumption are being affected by the current crisis. From this viewpoint, the impact of COVID pandemic on the retail sector activity may be seen as relevant for both the demand and the supply side.

As some EU stressed, retail turnover expresses the relevance of the retail sector for the entire EU economy: «A dynamic and competitive retail sector is important for consumers, businesses and hence the whole EU economy. The sheer magnitude of companies and jobs involved as well as the contribution to the EU value added make retail key for boosting long-term economic growth» (see European Commission, n.d.).

The retail sector is the largest non-financial business sector in Europe: it accounts for 3.6 million businesses, generating a turnover of 2.88 trillion, contributing 4.5% to EU gross value added (as of 2015), and recruiting 8.6% of the total EU workers (as of 2015). The majority of retail enterprises are small businesses, employing around 70% of the personnel and contributing 66% of the value added produced in the retail sector (Eurostat, n.d.). The relevance of retail trade for households is of major importance, as around 30% of the family spending is ascribed to commodities acquired in the retail market; more than half of these expenses (about 16% of the family budget[4]) are devoted to acquiring foods and non-alcoholic drinks.

The relevance of the e-commerce in the retail sector is not paramount but is ever growing, rising from 121 billion euro in 2012 to 224 billion euro in 2017. In 2018, the percentages of the retailer companies that own a website and sell online are, respectively, 63% and 22% (Eurostat, n.d.). In 2019, online commerce exceeded 15% of the global sales all over the world and its magnitude is still growing through the pandemic (Pourhejazy, 2020).

In order to isolate the impact of the government action on trade/consumption of necessary goods, we consider a model in which the dependent variable is the percentage change over the previous period of the index of deflated turnover (base year 2015) of sales of food, beverages and tobacco. Then, we compare it to a second model in which the dependent variable is the percentage change over the previous period of the index of deflated turnover (base year 2015) of retail sales via mail orders or via Internet out of trade volume of all types of retail trade.

Both tested models share the same set of independent variables referring to the government actions, plus a control variable related to consumers' confidence. The rationale behind the choice of the hypotheses set is explained in the next section.

The Impact of Government Action on Economic Activity

Correia et al. (2020), comparing COVID-19 with the Spanish flu of one century ago, hypothesise that policy actions such as social distancing (school, theatres and places of worship shutting down; prohibition of public meetings; reduction of working time), may positively impact economic activity in the long-run.

[4] While 16% of the budget of families is spent on food and non-alcoholic beverages, 5% concerns clothing and footwear, and over 2% is spent on furniture and household appliances.

Nevertheless, as Barrot et al. (2020) suggest, it is necessary to be cautions in extending these results to the actual pandemic scenario. In fact, the social restrictions implemented to contrast the spread of the Spanish flu did not impose mandatory business shutting down: their long run positive effect on the economic activity may, therefore, be explained by the population health gains they engendered.

Concerning the current pandemic, Barrot et al. (2020) offer evidence of a short-run negative impact of stringency measures on economic activity[5]. Ashraf (2020) shows that social distancing aimed at curbing COVID-19 pandemic directly affects economic activity in a negative way, depressing stock market activity. This result is in line with the evidence offered by the recent literature on the subject (see, among others, Al-Awadhi et al., 2020; Baker et al., 2020; Zhang et al., 2020).

There is evidence of the upsurge in internet retail trade related to the pandemic (Dannenberg et al., 2020; Kim, 2020; Yabe, 2020): consumers shifted toward online shopping after the outbreak of the COVID-19 pandemic. One of the consumers' two major incentives for buying in physical shops, namely, the possibility of social contacts and the instantaneous acquisition of the goods purchased (Kim, 2020) wanes. On the contrary, the inexistent or reduced (because there is still the moment of home delivery) presence of physical interactions connected to online shopping becomes, under stringency measures due to the COVID-19, an appealing feature; moreover, as suggested by Yabe (2020), online shopping may be considered a substitute not only to physical errands but also to outdoors strolls.

Hypotheses and Choice of Control Variables

Based on the above considerations, we formulate the following hypotheses:

1) Government stringency measures have:

H1.a) a negative impact on the turnover of retail sales of food, beverages and tobacco;

H1.b) a positive impact on the turnover of retail sales via mail orders or via Internet.

With regard to the containment measures, a strand of literature offers evidence on the effectiveness of government's efforts in taming the spread of the virus (see, among others, Fang et al., 2020; Sebastiani et al., 2020). Ashraf (2020)

[5] The authors show that in the time span of a just a month, an increase of 10% in stringency measures concerning business closures, entails a 1.87% and 3% reduction of, respectively, firm market value and employment.

suggests that the government's efforts generate positive expectations and trust in policy makers in managing the virus spread, resulting in a positive effect on economic activity.

2) We formulate the following hypotheses concerning health containment:

H2. a) a positive impact on the turnover of retail sales of food, beverages and tobacco;

H2. b) a positive impact on the turnover of retail sales via mail orders or via Internet.

Governmental actions concerning extension to welfare measures are expected to counterbalance the negative effect of the restrictive measures on economic activity by supporting families in responding to their fundamental needs, sustaining their purchasing power that could undermined by both the stringency measures and by health problems[6].

On the basis of the above considerations, it is possible to expect a positive effect of economic support programs on the volume of retail trade of foods, beverages and tobacco. Nevertheless, if, as Kim (2020) suggests, one of the major reasons for online shopping is the possibility of obtaining lower prices, economic support could have a negative impact on online shopping due to an income effect.

3) Hence, we purport the hypotheses that government economic support programs have:

H3. a) a positive impact on the turnover of retail sales of food, beverages and tobacco;

H3. b) a negative impact on the turnover of retail sales via mail orders or via Internet.

In order to limit the use of independent variables, we have chosen to only control for the consumer confidence index because of its stable relation with relevant macroeconomic variables, i.e. inflation, unemployment, and short-term interest rate (Throop, 1992).

Although there is no consensus concerning the direction of the relationship between confidence index and economic performance, the relevant literature considers consumer confidence as a barometer of the economic cycle (Kim 2016). Golinelli and Parigi (2004) find that consumer confidence index can be considered as a coincidental indicator of the economic cycle in period of endogenously generated economic crises.

[6] Support to this evidence is offered by Ashraf (2020), with respect to the stock market.

Indicators and Time of Observation

The dependent variables used in the two estimated models are the Eurostat indicators of the percentage change on previous period of the index of deflated turnover of retail sales of food, beverages and tobacco and the Internet retail sales.

The explanatory variables used to measure the impact of government actions and to quantify governments' response to COVID-19-led crisis have been selected from the Oxford COVID-19 Government Response Tracker (Ox-CGRT) database (Hale et al., 2020b). Ox-CGRT offers three main indexes to measure governments' responses to the COVID-19 pandemic: a stringency index, a containment and health index and an economic support index.

The stringency index records information on social distancing measures and is coded from 8 indicators including school closing, workplace closing, cancelled public events, restrictions on gathering size, closed public transport, stay-at-home requirements, restrictions on internal movement and restrictions on international travel.

The health containment index is coded from the stringency index plus three indicators representing public awareness campaigns, testing policy and contact tracing. This index represents government emergency policies regarding health system.

The economic support index results from two indicators and includes the government income support and debt/contract relief for household programs. This index represents government policies regarding income support to citizens amid crisis.

Each of the three indexes is a simple additive score of the underlying indicators, and is rescaled to vary from 0 to 100. All the indexes measuring government actions are calculated on a daily base; for the purpose of the present analysis, monthly averages have been calculated and have been lagged for one period.

The control variable is the consumer confidence index proposed by Eurostat: it is a one-dimensional index, which the Directorate General for Economic and Financial Affairs of the European Commission lays out monthly to allow comparison among European countries on the consumers' perception of the economic situation (Eurostat, n.d.).

The period considered in the analysis encompasses the first nine months of 2020 for 29 European countries in the first model (where the dependent variable is the retail sales of food, beverages and tobacco) and for 22 European countries in the second model (where the dependent variable is the retail via mail orders or via Internet)[7].

[7] No data are available for Cyprus, Ireland, Latvia, Luxembourg, Serbia, Slovakia, and Slovenia.

Estimation Strategy

Two model sets have been estimated, using a generalised least squares approach and controlling for heteroskedasticity across panels and autocorrelation (Beck & Katz, 1995). Table 1 summarises the models tested.

Table 1

Overview of the estimated models

		Models set 1				Models set 2				
		M1.a	M1.b	M1.c	M1.d		M2.a	M2.b	M2c	M2d
		Control var. check	H1.a	H1.a H3.a	H2.a H3.a		Control var. check	H1.b	H2.b H3.b	H2.b H3.b
Dependent variable	Percentage change, over the previous period, of the turnover of retail sales of food, beverages and tobacco	X	X			Percentage change of the turnover of retail sales via mail orders or via Internet	X	X		
Control variable	Consumer confidence index	X	X	X	X		X	X	X	X
Explanatory variables	Lag_stringency index		X	X				X	X	
	Lag_economic support_index			X	X				X	X
	Lag health containment index				X					X

While models M1.a and M2.a consider the time span of January 2019 – October 2020, all the other estimated models use data referring to the period of January 2020 – October 2020, because governments enacted policies to react to the COVID-19 pandemic only from January 2020 onwards. The estimations have been carried out using Stata 16 (StataCorp., 2019).

Results

The results of the econometric analysis are presented in Tables 2–5.

Table 2

Models M1a and M2a

Cross-sectional time-series FGLS regression **Panels: heteroskedastic Correlation: panel-specific AR(1)**					
Model: M1.a **Control variable check**	Estimated covariances = 29 Number of obs = 601 Estimated autocorrelations = 29 Number of groups = 29 Estimated coefficients = 2 Obs per group: min = 16 avg = 20. 72414 max = 21				
Dependent Variable: % Change turn_retail_food_bev_tob	**Coeffi-cient**	**Std. Err.**	**z**	**[95% Conf.**	**Interval]**
Explanatory vari-ables					
ci_adj	0.0319***	0.008	3.82	0.155	0.048
Constant	0.464***	0.957	4.85	0.276	0.651
Wald chi2(1) = 14.56	Prob > chi2 = 0.001				
*** significant at 99%					
Model: M2.a **Control variable check**	Estimated covariances = 22 Number of obs = 453 Estimated autocorrelations = 22 Number of groups = 22 Estimated coefficients = 2 Obs. per group: min = 16; avg. = 20.59091; max = 21				
Dependent Variable % Change turn_retail_internet	**Coeffi-cient**	**Std. Err.**	**z**	**[95% Conf.**	**Interval]**
Explanatory vari-ables					
ci_adj	-0.146***	0.037	-3.96	-0.219	-0.074
Constant	0.655	0.438	1.50	-0.202	1.513

Table 3

Models M1b and M2b

Cross-sectional time-series FGLS regression **Panels: heteroskedastic Correlation: panel-specific AR(1)**					
Model: M1.b **(H1.a)**	Estimated covariances = 22 Number of obs = 253 Estimated autocorrelations = 29 Number of groups = 29 Estimated coefficients = 3 Obs. per group: min = 4; avg. = 8.724138; max = 9				
Dependent Variable: %Change turn_retail_food_bev_tob	**Coeffi-cient**	**Std. Err.**	**z**	**[95% Conf.**	**Inter-val]**
Explanatory variables					
ci_adj	0.053**	0.018	3.00	0.019	0.088
Lag_Stringency	-0.028***	0.004	-6.16	-0.037	-0.019
Constant	2.304***	0.235	9.81	1.844	2.764
Wald chi2(1) = 82.96 Prob > chi2 = 0.000 *** significant at 99%; ** significant at 95%					
Model: M2.b **(H1.b)**	Estimated covariances = 22 Number of obs =189 Estimated autocorrelations = 22 Number of groups = 22 Estimated coefficients = 3 Obs. per group: min = 4; avg. = 8.590909; max = 9				
Dependent Variable: %Change turn_retail_food_bev_tob	**Coeffi-cient**	**Std. Err.**	**z**	**[95% Conf.**	**Inter-val]**
Explanatory variables					
ci_adj	-0.087	0.063	-1.38	-0.210	0.037
Lag_Stringency	0.121***	0.021	5.68	0.079	0.163
Constant	-3.901***	1.119	-3.49	-6.094	-1.708
Wald chi2(1) = 52.99 Prob > chi2 = 0.000 *** significant at 99%; ** significant at 95%					

Table 4

Models M1c and M2c

Cross-sectional time-series FGLS regression **Panels: heteroskedastic Correlation: panel-specific AR(1)**					
Model: M1.c **(H1.1.a; H3.a)**	Estimated covariances = 29 Number of obs = 253 Estimated autocorrelations = 29 Number of groups = 29 Estimated coefficients = 4 Obs. per group: min = 4; avg. = 8.724138; max = 9				
Dependent Variable: % Change turn_retail_food_bev_tob	**Coeffi-cient**	**Std. Err.**	**z**	**[95% Conf.**	**Inter-val]**
ci_adj	0.057**	0.018	3.17	0.022	0.092
Lag_Stringency	-0.037***	0.009	-4.11	-0.054	-0.019
Lag_Econ. Support	0.008	0.006	1.36	-0.004	-0.021
Constant	2.289***	0.244	9.38	1.811	2.767
Wald chi2(1) = 78.43 Prob > chi2 = 0.000 *** significant at 99%; ** significant at 95%					
Model: M1.c **(H1.b; H3.b)**	Estimated covariances = 22 Number of obs =189 Estimated autocorrelations = 22 Number of groups = 22 Estimated coefficients = 4 Obs. per group: min = 4; avg. = 8.590909; max = 9				
Dependent Variable: % Change turn_retail_food_bev_tob	**Coeffi-cient**	**Std. Err.**	**z**	**[95% Conf.**	**Inter-val]**
ci_adj	-0.215***	0.067	-3.24	-0.345	-0.086
Lag_Stringency	0.058*	0.032	1.81	-0.005	0.120
Lag_Econ. Support	-0.101***	0.022	-4.56	-0.144	-0.056
Constant	3.203**	1.080	2.97	1.086	5.532
Wald chi2(1) =47.46 Prob > chi2 = 0.000 *** significant at 99%; ** significant at 95%; significant at 90%					

Table 5

Models M1d and M2d

Cross-sectional time-series FGLS regression **Panels: heteroskedastic Correlation: panel-specific AR(1)**					
Model: M1.d **(H2.a; H3.a)**	Estimated covariances = 29 Number of obs = 253 Estimated autocorrelations = 29 Number of groups = 29 Estimated coefficients = 4 Obs. per group: min = 4; avg. = 8.724138; max = 9				
Dependent Variable: % Change turn_retail_food_bev_tob	**Coefficient**	**Std. Error**	**z**	**[95% Confidence Interval]**	
ci_adj	0.062**	0.018	3.45	0.027	0.097
Lag_Econ. Support	0.011***	0.007	1.45	-0.004	-0.025
Lag_Health C	-0.039***	0.011	-3.56	-0.016	-0.018
Constant	2.312***	0.290	7.97	1.743	2.881
Wald chi2(1) = 58.07 Prob > chi2 = 0.000 *** significant at 99%; ** significant at 95%					
Model: M2.d **(H2.b; H3.b)**	Estimated covariances = 22 Number of obs =189 Estimated autocorrelations = 22 Number of groups = 22 Estimated coefficients = 4 Obs. per group: min = 4; avg. = 8.590909; max = 9				
Dependent Variable: %Change turn_retail_food_bev_tob	**Coefficient**	**Std. Error**	**z**	**[95% Confidence Interval]**	
ci_adj	-0.241***	0.067	-3.60	-0.371	-0.110
Lag_Econ. Support	-0.092***	0.027	-3.40	-0.145	-0.039
Lag_Health C	0.038	0.040	0.95	-0.040	0.117
Constant	3.283**	1.132	2.90	1.064	5.503
Wald chi2(1) =42.20 Prob > chi2 = 0.000 *** significant at 99%; ** significant at 95%					

Models M1.a and M2.a have been used in order to test the appropriateness of the control variable employed in the study. In model M1.a, the dependent variable is the percentage change over the previous period of the index of deflated turnover of retail sales of food, beverages and tobacco and, in model M2.a,

the percentage change of the index of deflated turnover of retail sales via mail orders or via Internet.

In both models, the explanatory variables include the consumer confidence index.

We find a positive relationship between the dependent and the independent variable in the first model, suggesting that the consumer confidence index is a good proxy of the system's economic performance. On the other hand, the results of second model suggest a negative relationship between the dependent and the explanatory variable, confirming the countercyclical behaviour of the internet trade of the last period (see, among others, Dannenberg et al., 2020; Kim, 2020).

Models M1.b and M2.b have been used in order to test, respectively, H1.a and H.1.b., i.e. the negative impact of stringency measures on the retail sales of food, beverages and tobacco and the positive impact of the same measures on online retail sales. Results of the two models support both hypotheses.

Model M.1c and M2.c have been built by adding an additional explanatory variable indicating the effort spent by government in economic support programs in M.1.b and M.2.b.

M.1c and M.2c allow to seek for further support of H1.a and H1.b and test H3.a and H3.b, i.e. 1) positive impact of government economic support programs on retail sales of food, beverages and tobacco and 2) negative impact of government economic support programs on the retail sales via mail orders or via Internet. H1.a and H1.b are confirmed by M1.c and M2.c, though the positive relationship between stringency measures and internet retail trade becomes weak.

As far as H3.a is concerned, we observe no evidence to support it: the sign of the coefficient related to government economic support is positive as expected, but it is not significant. On the other hand, H3.b is verified, since the sign of the coefficient related to government economic support is negative and significant, suggesting that unleashing budget constraints makes online shopping less appealing.

Models M1.d and M2.d have been used in order to test H2.a and H2.b (positive impact due to stringency measures accompanied by the government's efforts in terms of public awareness promotion; testing and virus exposition mapping on both studied dependent variables) and to find additional evidence to H3.a and H3.b that are confirmed.

As far as H2.a is concerned, model M1.b suggests a significant relationship, but the sign is negative, suggesting that the stringency side has a stronger effect on economic activity than the reassurance offered by the effort of governments in managing the virus spread. H2.b is not supported, as the coefficient is not significant.

Discussion and Conclusions

The conducted analysis has stressed how, overall, the containment measures have limited the turnover of retail trade in basic goods (foods, beverages and tobacco) and, consequently, exerted a depressing effect on the economy. Conversely, government economic support interventions have a positive effect and help the individuals belonging to the more vulnerable part of population in sustaining their basic consumption, thus promoting economic recovery.

Results of model M1.d, suggest that governments should make greater efforts to increase the awareness of the necessity of the containment measures that, although undesirable by the population, are showing their effectiveness in limiting the spread of COVID-19.

The results of the analysis also confirm the countercyclical pattern of the retail trade on internet and suggest that the major drivers of online shopping include the search for cheaper prices (in this interpretation the relationship with the economic support programs is negative).

The countercyclical behavior of online exchanges also suggests the relevance of the «virtual» dimension connected to the capability of reaction to the COVID-19 pandemic. It is thanks to the information and communication technologies (ICTs) that, in case of «lockdown», it is possible not only to continue shopping in virtual markets, but also to carry out remote work, online teaching and social activities, and to guarantee the essential administrative activities provided by the public sector. Hence, an improvement in digital infrastructure should be encouraged, together with a process of conversion towards an increasingly important «virtual economy».

Does this mean that the countries that have more developed ICTs respond better to global crises? Does this conclusion not imply the risk that countries where the access and development of ICTs is slower will be left behind, thereby increasing inequality at a global level? Governments must take a pro-active role in order to avoid the risk of social instability, implement social policies for cohesion aimed at reducing disparities across regions and encourage digitalization.

The analysis cannot be considered exhaustive, but it should be widened and include other productive sectors in which both demand and supply are particularly affected by the current crisis. For example, the tourism, travel and entertainment markets, characterized by a high presence of small and medium sized enterprises and that are suffering the most significant effects. The study could be enriched by considering not only diverse productive sectors, but also diverse European regions (distinguishing, for example, among Northern Europe, Mediterranean Europe and Continental Europe). In fact, as suggested by Karabag (2020), the COVID-19 crisis converges and interacts with other debated issues in

Europe, such as political governance, economics, and migration. In addition, the economic effects of the containment strategy also depend on social behavior, demographics and structural features of the economy, such as the degree of export orientation, reliance on global supply chains, and malleability to remote working. Such a combination of critical factors complicates the analysis and suggests that considering the reaction of diverse European regions could be a necessary and promising step to undertake in future research.

Moreover, the investigation of the possible connection between the export performance and the public policies adopted by each of the 29 European countries considered by the present study could be a further extension of this paper, made relevant in a global context of all major economies, except China, having suffered from reductions in both imports and exports of goods due to the COVID-19 pandemic.

Further developments of this research could tackle the medium/long-run effects of the pandemic. As the World Bank report (2020) suggests: «Beyond its short-term impact, deep recessions triggered by the pandemic are likely to leave lasting scars through multiple channels, including lower investment; erosion of the human capital of the unemployed; and a retreat from global trade and supply linkage».

Another line of enquiry that could enrich the findings offered by the present work might envision the comparison with the evidence observed during other global crises previously experienced.

Last but not least, a possible extension of the present contribution could entail an investigation on the impact of public investments in the health sector. In the light of the second pandemic wave that many countries are currently experiencing, it is self-evident that a full recovery from the present depression will require large government investments in the health sector. Hence, a measure of the efficacy of governmental effort in health spending not only in terms of health outcomes but also in terms of economic effects on the supply and demand is crucial in guiding effective policy actions. From this standpoint, it might be of great relevance to investigate the health public policies across Europe concerning the efficacy of the vaccination campaigns.

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