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Abstract

The COronaVIrus Disease 19 (COVID-19) outbreak has resulted in a major worldwide economic depression. Governmental reactions to face the COVID-19 pandemic threat are varied and characterised by diverse intensity. Restrictive measure have been taken to control the pandemic, although the same actions have determined economic fallouts that need to be faced by additional measures of social welfare support.

The question concerning the type and the intensity of the governmental actions is still an open issue in the public debate.

The present contribution is aimed at offering evidence on the impact of anti-COVID government actions on the volume of trade. Using monthly Eurostat data on 29 European countries, it investigates the relationship between the turnover of volume of sales (the percentage change on previous period) and the adoption of governmental measures. Explanatory variables employed encompass the government response to COVID-19 pandemic as measured by the Oxford University team led by the Blavatnik School of Government, namely, a government response index, a stringency index, a containment and health index and an economic support index. Among control variables used, there is an indicator of consumer confidence.

It has been estimated a generalised least squares model, controlling for heteroskedasticity across panels and autocorrelation.

The results outlined a positive relationship between consumer confidence and the percentage change of the index of deflated turnover of retail sale of food, beverages and tobacco; a negative relation between restrictive governmental measures; a negative relation between consumer confidence and the percentage change of the index of deflated turnover of retail sale via mail order houses or Internet. Instead, it emerged a positive relation between governmental measures aimed at stringency and the percentage change on previous period of the index of deflated turnover of retail sale via internet.

The positive impact on internet retail outlines the growing importance of this channel for trade.

Keywords

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

JEL classification

E65; F01; H11; L81; C22

1. Introduction

The COronaVIrus Disease 19 (COVID-19) outbreak has resulted in a major worldwide economic depression (Tisdell, 2020). The World Bank forecasts for 2020 an average 5.2 percent reduction in the world GDP. 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, Global Economic Prospects, June, 2020)[1].

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

Governmental reactions to face 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 on public assembling, have been taken to control the pandemic, but the same actions have determined economic fallouts that have been faced by other governmental interventions, such as additional measures of social welfare support. The question concerning 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 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, for food, beverage and tobacco and for internet sector, the relationship between the volume of retail sales and governmental measures implemented.

Explanatory variables employed 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.,

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

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 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.

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

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 contribution.

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

2. Background

The economic literature has already examined, in previous historical moments, which socio-economic consequences due to economic crises or health emergencies may occur.

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

Economists agree on the circumstance that the crisis due to COVID-19 present aspects related both to demand and supply shocks (Baldwin and 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 occurred in 2008-2009, was driven mostly by a demand shock (Baldwin, 2020; Baldwin and Weder Di Mauro, 2020), whose effects were transmitted across different economic systems through trade channels.

Bems et al. (2013), in a work immediately following the 2008-2009 crisis and aimed at explaining such transmission mechanisms, outlined the relevance of trade channels. Further, the large magnitude of spillovers observed 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, reflecting in the collapse of world trade itself (Crowley and Luo, 2011). The attempt to identify characteristics, reasons and possible solutions has been performed by Carlsson-Szlezak et al. (2020) in a work focusing mainly on the impact of economic shocks on banking and financial sectors, whose insights may anyway be considered in explaining different patterns of crisis[2].

Another stream of literature concentrates on the economic effects of health shocks on families in low and middle-income countries. Following 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 works included in the review consider a period after 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 formal insurance programs, would seem preferable.

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

Furthermore, average income households, will 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 when a shock occurs (Elmassah and Hassanein, 2020).

The shock due to COVID-19 is related both to demand and supply and it is likely to 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 horizon, economic policies should be directed at boosting production and encouraging a positive climate both for consumers and firms.

With regard to supply, different scenarios have been considered, concerning supply chain and the impact of pandemic state, in other studies (for example, Guan et al., 2020). More than the reduced production capacity of the system, the authors focus on the decrease in the added value of production for the firms caused by an exogenous negative shock. The decrease in value added, which is a direct

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

effect of the pandemic, determines indirect consequences, by the 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, they aim at identifying, rather than the true cost of the COVID-19 pandemic, 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.

Other studies focused on the analysis of consequences due to natural disaster. The 2015 Christmas flood occurred in York (UK) is studied by Xia et al. (2019): on that event, little infrastructures were 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.

As far as the methodology of analysis is considered, usually, in analyzing the impact of a pandemic in various production sectors, the selected methodology is the input-output analysis (Okuyama and Santos, 2014), which is added to CGE to estimate the economic losses in situations likely to affect various production sectors (Koks et al., 2016).

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 and 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.

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. The public intervention is 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 depending on the sector impacted.

In this perspective, the choice of the dependent variables is not casual: the choice of retail concerning basic necessities, that are prevailingly sold in traditional retail, allows to focus on the impact of government policies in sustaining/curtailing the basic needs of the population. On the other hand, the consideration of retail trade through internet, *i.e.* a virtual market, opens to possible suggestions concerning the resilience to disasters backed by the new communication technologies.

About explanatory variable, consumers' confidence should be considered, together with the active role of the state. Although the latter might be accepted with difficulty by the population that sees its limiting and restrictive nature, it is the key element that can favor recovery.

3. Data and methods

3.1 Measures of economic activity

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

As it has been stressed in some EU documents, 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 https://eur-lex.europa.eu/legal-content/EN/TXT/DOC/?uri=CELEX:52018DC0219&from=EN).

The retail sector is the largest non-financial business sector in Europe: it contributes for 3.6 million business, generating a turnover of 2.88 trillion, and contributing to 4.5% of EU gross value added (gross value added, 2015) and recruiting 8.6% of the total EU workers (last data update, 2015). The majority of retail enterprises are small business, employing around 70% of the personnel and contributing to the 66% of the value added produced in the retail sector (European Commission,

2018). 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[3]) are devoted to acquire 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 web-site and sell on line are, respectively, 63% and 22% (European Commission, 2018) and, in 2019, online commerce exceeds 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 the volume 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 sale via mail order houses or via Internet trade volume of sales of all the retail trade.
Both models tested share the same set of independent variables referring to the government actions, plus a control variable related to consumers' confidence.
In what follows, the rationale at the basis of the choice of the hypotheses set is explained.

3.2 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 meeting; reduction of working time), may positively impact economic activity in the long-run.
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 in the short-run of a negative impact of stringency measures on economic activity[4]. Ashraf (2020) shows that social distancing to face COVID-19 pandemic directly affects economic activity in a negative way, depressing stock

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

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 of internet retail trade related to the pandemic (Dannenberg et al., 2020; Kim, 2020; Yabe, 2020): consumers shift 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 null 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.

3.3 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 the volume of retail sales of food, beverages and tobacco;

H1.b) a positive impact on the turnover of volume of sales of retail sale via mail order houses or via Internet trade.

With regard to the containment measures, a strand of literature offers evidence on the effectiveness of government's efforts in taming the virus spreading (see, among others, Fang et al., 2020; Sebastiani et al., 2020). Ashraf (2020) suggests that the government's efforts generate positive expectations and trust in policy makers in managing the virus spread having a positive effect on economic activity.

2) We formulate the following hypotheses concerning health containment:

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

H2. b) a positive impact on the turnover of the volume of sales of retail sale via mail order houses or via Internet trade.

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[5].

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

[5] Support to this contention is offered by Ashraf (2020) with respect to the stock market.

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 the volume of retail sales of food, beverages and tobacco;

H3. b) a negative impact on the turnover of the volume of sales of retail sale via mail order houses or via Internet trade.

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, short-term interest rate (Throop, 1992).

Although there is no consensus concerning the direction of the path existing 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.

3.4. Measures and time of observation

The dependent variables used in the two estimated models are the Eurostat measures 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 within 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. It also offer an aggregate index encompassing the overall government response: the government response index.

The stringency index records information on social distancing measures and is coded from 8 indicators including school closing, workplace closing, cancel public events, restrictions on gathering size, close 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 households 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. The government response index adds to the previous indexes.

All the indexes measuring government actions are delivered 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 used is the consumer confidence index proposed by Eurostat: it is a one-dimensional index, that the Directorate General for Economic and Financial Affairs of the European Commission monthly lays out to allow comparison among European countries on the consumers' perception of the economic situation

(https://ec.europa.eu/eurostat/cache/metadata/en/ei_bcs_esms.htm).

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 for food, beverages and tobacco) and 22 European countries in the second model (where the dependent variable is the retail *via* mail order houses or *via* Internet trade).

3.5 Estimation strategy

Two model sets have been estimated, using a generalised least squares approach and controlling for heteroskedasticity across panels and autocorrelation (Beck and Katz, 1995)

Table 1 summarises the models tested.

While models M1.a and M2.a consider the time span January 2019 - October 2020, all the other models estimated use data referring to the period January 2020 - October 2020, because only from January 2020 onwards governments enacted policies to react to the COVID 19 pandemic.

The estimations have been carried out by using Stata 11 (StataCorp., 2009).

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 the volume of retail sales of food, beverages and tobacco	X	X			Percentage change of the turnover in the turnover of volume of sales of retail sale via mail order houses or via Internet trade	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

4. Results

The results of the econometric analysis are presented in Tables 2a-2d.

Table 2.a.

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	**Coefficient**	**Std. Err.**	**z**	**[95% Conf.**	**Interval]**
Explanatory variables					
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	**Coefficient**	**Std. Err.**	**z**	**[95% Conf.**	**Interval]**
Explanatory variables					
ci_adj	-0.146***	0.037	-3.96	-0.219	-0.074
Constant	0.655	0.438	1.50	-0.202	1.513

Table 2.b.

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	**Coefficient**	**Std. Err.**	**z**	**[95% Conf.**	**Interval]**
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	**Coefficient**	**Std. Err.**	**z**	**[95% Conf.**	**Interval]**
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 2.c.

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	**Coefficient**	**Std. Err.**	**z**	**[95% Conf.**	**Interval]**
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	**Coefficient**	**Std. Err.**	**z**	**[95% Conf.**	**Interval]**
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 2.d.					
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_Healthc	-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_Healthc	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. The dependent variable is, in model M1.a, 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 sales of retail sale via mail order houses or via Internet trade.

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

We find a positive relation 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 second model result suggests a negative relation 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 in M.1.b and M.2.b an additional explanatory variable indicating the effort spent by government in economic support programs.

M.1c and M.2c allow to seek for further support to H1.a and H1.b and test H3.a and H3.b, *i.e.* 1) a positive impact of government economic support programs on retail sales of food, beverages and tobacco and 2) its negative impact of government economic support programs on the retail sale via mail order houses or via Internet trade. H1.a and H1.b are confirmed by M1.c and M2.c, though the positive relation with stringency measures and internet retail trade becomes weakly significant.

As far as H3.a is concerned, we observe how there is no evidence supporting 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 an unlashing budget constraint 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 effort in terms of public awareness promotion; testing and virus exposition mapping on both the dependent variables at study) 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 relation, but the sign is negative, suggesting that the stringency side of the coin has a stronger effect on economic activity than the reassurance offered by the effort of governments in managing the virus spreading. H2.b is not supported as the coefficient is not significant.

5. Discussion and conclusions

The analysis carried out 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. Instead, government economic support interventions have a positive effect and help the individuals belonging to the more fragile part of population in sustaining their basic consumption favouring the economic recovery.

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

The results of the analysis also confirm the countercyclical pattern of the retail trade on internet and suggest that among the major drivers of online shopping there is the search of cheaper prices (the negative relation with the economic support supports this interpretation).

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 smart working, online teaching and social activities, and to guarantee the essential administrative activity provided by the public sector. Hence, an improvement in digital infrastructures should be encouraged together with a process of conversion towards an increasingly important "virtual economy".

Does it mean that the countries that are more ICTs developed may respond better to global crises? Doesn't this conclusion 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 play 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 said 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 that represents the core activities of these sectors, and that are suffering the most significant effects.

Further developments of the present contribution could tackle the medium/long-run effects of the pandemic. As the World Bank report 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"* (World Bank, June 2020).

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

Another possible extension of the present work could be the investigation of the impact of public investments in the health sector. In the light of the second pandemic wave that diverse 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 terms of economic effects on the supply and demand side is crucial in guiding effective policy actions.

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