Consumer Behavior in the Face of the Coronavirus Pandemic: An Analysis of Credit and Debit Card Spending in Brazilian States[*]

Comportamento do consumidor diante da pandemia do coronavírus: uma análise dos gastos com cartão de crédito e débito nos estados brasileiros

Andrea Felippe Cabello, Lorena Silva Brandão e Deise Maria Bourscheidt[**]

Resumo: o artigo analisa os gastos dos consumidores efetuados com o uso de seus cartões de crédito e débito e os correlaciona com as medidas de isolamento social decretadas em decorrência do combate à pandemia do coronavírus de 2020. Foram calculadas correlações entre a variação dos gastos com cartões nos diferentes setores econômicos e o Índice de Distanciamento Social (IDS) elaborado pelo IPEA. Os resultados mostram a importância de questões como a essencialidade dos bens, a mobilidade de consumidores durante a pandemia e sua quarentena e a forma como medidas de isolamento social incidem sobre cada setor de consumo. Setores essenciais, sem problemas claros de mobilidade, tiveram aumento de consumo e comportamento oscilatório de gastos de consumo durante o período. Setores de bens não essenciais tiveram forte redução nos gastos de consumo seguida de gradual recuperação. Setores associados à mobilidade (sejam essenciais ou não) tiveram forte redução e não tiveram recuperação clara no período. Além disso, há fortes indícios de que variações possivelmente institucionais entre os estados tenham efeitos relevantes.

Palavras-chave: Coronavírus. Covid-19. Gastos de consumo. Gastos em cartão. Medidas de isolamento social.

Abstract: the paper analyzes consumer spending with the use of their credit and debit card and correlates it with the social isolation measures enacted as a result of the 2020 coronavirus pandemic. Correlations were estimated between the variation in card spending in the different economic sectors and the Social Distancing Index (IDS) proposed by IPEA. The results show the importance of issues such asthe essentiality of goods, the mobility of consumers during the pandemic and quarantine, and how social isolation measures affect each consumer sector. Essential sectors without clear mobility problems, had an increase in consumption and oscillatory behavior of consumption spending during the period. Non-essential goods sectors had a strong reduction in consumption spending followed by a gradual recovery. Sectors associated with mobility

[*] Submissão: 09/09/2020 | Aprovação: 07/02/2021 | DOI: 10.5380/re.v43i81.76420

[**] Respectivamente: (1) Professora do Departamento de Economia da Universidade de Brasília (UnB), Brasil | ORCID: 0000-0003-1489-0676 | E-mail: andreafc@unb.br | (2) Departamento de Economia da Universidade de Brasília (UnB), Brasil | ORCID: 0000-0002-0797-2852 | E-mail: lo.lorenabrandao@gmail.com | (3) Departamento de Economia da Universidade Federal da Fronteira Sul (UFFS) | ORCID: 0000-0001-6782-8628 | E-mail: deise.bourscheidt@uffs.edu.br

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(whether essential or not) had a sharp reduction and did not have a clear recovery in the period. In addition, there are strong indications that possibly institutional variations between states have relevant effects.

Keywords: Coronavirus. Covid-19. Consumer spending. Credit/Debit Card spending. Social isolation measures.

JEL: E20.

1. Introduction

Epidemics have not been uncommon events throughout history. In the 20th century, besides the Spanish flu in 1918, the world was also affected by the Asian flu (H2N2) in 1957 and Hong Kong flu (H3N2) in 1968. Other diseases, with global economic and health consequences, also marked the 21st century. The first of these was the Severe Acute Respiratory Syndrome (SARS), which appeared in late 2002 and mainly affected China and Hong Kong. In 2009, the World Health Organization (WHO) announced avian influenza (H1N1) as a pandemic and, in 2012, the Middle East Respiratory Syndrome (MERS), the epidemic associated with the Ebola virus, which has two recent episodes between 2014 and 2016 and between 2018 and 2019.

As common features, these epidemics have an impact on the real economy. The magnitude of these impacts varies according to the capacity of spread of each disease and the health interventions carried out, such as, for example, measures of social distance to flatten its epidemiological curve (Chronopoulos; Lukas; Wilson, 2020). With a pandemic, the economic impacts are global and the first aspect observed are the shocks to supply chains and their commercial implications and world production.

From an economic perspective, the effects may differ between different countries, depending on their characteristics and the strategies adopted. In the case of the 2020 coronavirus pandemic, despite the relatively low lethality, the virus has a high degree of contagion and the need for social isolation is the main measure against the spread of the pandemic. Therefore, besides the consequences for the health system, the coronavirus crisis involves several economic aspects such as: consumption reduction, interruption of some supply chains, stock market crisis, company bankruptcy, unemployment, income reduction, among others. Fernandes (2020) suggests that the economic impacts are not determined by the mortality of the virus, because the strategies adopted by countries and their governments can be a source of shock.

As it occurs worldwide, the spread of the virus in Brazil also happens in a heterogeneous way, as well as its consequences for the health system, the political environment, and economic impacts. Thus, our goal is to investigate the consequences of the pandemic on consumer behavior, based on its relationship with legal measures of social distance, during the first twenty-four weeks of 2020.

As a proxy for family consumption, we use changes in the volume and spending categories of purchases made with debit and credit cards. The data covers ten types of merchants and the period from 01/06/2019 to 06/22/2019 and 05/01/2020 to 06/20/2020. Weekly spending for the 27 Brazilian states were analyzed. Legal measures of social distance were measured using the index of legal measures of social distance (IDS) proposed by IPEA (2020).

The analysis carried out in this article points to changes in consumer behavior, which vary regionally according to the essentiality of the goods, consumers mobility and the length of the period of social distance. In addition to this introduction, the article presents a brief literature review with a synthesis of some recent work. Then, the methodology highlights how the empirical analysis is developed in third section. The fourth section covers the results and discussions, ending with the considerations in the fifth section.

2. Consumer behavior and spending during the Covid-19 pandemic

Despite the short time since the start of the 2020 coronavirus pandemic, concern about the impacts of the pandemic on the economy have already led to a fruitful literature. Analyses have been carried out on the length of the isolation period, seeking to minimize adverse effects (Tellis *et al.*, 2020; Bjornskov, 2020; Acemoglu *et al.*, 2020; Crokidakis, 2020; Morato *et al.*, 2020), the effects on the global economy (Fernandes, 2020; Mckibbin; Fernando, 2020; Ozili; Arun, 2020; Baldwin; Mauro, 2020) or on the Brazilian economy (Dweck *et al.*, 2020; McKubbin; Fernando, 2020; World Bank, 2020; Cereda *et al.*, 2020).

In relation to the latter, some focus on the impact of the pandemic and the measures adopted to combat it on consumption. It is within this literature that this work is inserted. Several studies have been done in several countries around the world with congruent results.

The study developed by Binder (2020) in the USA shows that the main concerns facing a scenarioof coronavirus spread refer to the economic effects of the pandemic in the country on family health and personal finances. These concerns materialize in the expectations of a higher level of inflation and unemployment. Regarding consumption habits, it appears that concerned consumers have opted to cancel trips and buy more food.

Dietrich *et al.* (2020) seek to understand how the expectations of North American families adjust to the face of the pandemic. The results point to anticipated uncertainty and news shocks causing families to implement changes in financial planning, reduce spending and have more fear of unemployment. The uncertainty shock also correlates with more spending on food and medicine.

Baldwin and Mauro (2020) analyze how exposure to news about Covid-19 can impact individual consumption. According to the authors, two aspects influence demand shock: the practical and the psychological. Social isolation "makes it impossible" for consumers to go shopping (or use services) in physical establishments. That is, uncertainty and its psychological consequences make economic agents more likely to adopt a "wait and see" posture.

Some work has made use of financial data to analyze the impact of the pandemic on consumer spending habits in various countries. Chronopoulos, Lukas, and Wilson (2020) used current account transactions and the use of credit and debit cards to investigate the impact of the coronavirus on consumer spending in Great Britain. Their timeline comprises the initial and spread period of the pandemic, specifically from January 1 to April 7, 2020. The authors also divided the analysis into four periods, considering that the way people deal with the pandemic differed over time. Thus, the analysis is divided into four phases: incubation (January 1st to 17th), outbreak (January 20th to February 21st), fever (February 24th to March 22nd), and lockdown (March 23th to March 7th) April). The results point to a trend toward a continuous reduction in total spending in the phase called fever and an even greater decline in the first two weeks of lockdown. The effects vary according to demographic characteristics and location.

Grocery spending (the stocking up of food) increased at the beginning of the fever period and in the two weeks after the WHO characterized Covid-19 as a pandemic, but after the lockdown phase, grocery spending decreased considerably. Regarding the consumption of meals and beverages, there was an increase in spending until the second week of the fever period, then the numbers related to these items decreased by 47.1% over four weeks, with similarities across the surveyed locations.

Joyce and Xu (2020), also in a study for the United Kingdom, consider that retail trade (non-food and non-pharmaceutical), passenger transport, accommodation, restaurants, tourism, arts, leisure, personal care and domestic

services are most impacted by social isolation measures, as a result of Chronopoulos, Lukas and Wilson (2020). The analysis concludes that the impacts are not uniform, with young people under 25 and low-income people more likely to work in these fields of activity, drawing attention to the effects on the falling incomes of those employed in these sectors.

The study by Chen, Qian, and Ven (2020), on the other hand, analyzes the impact of Covid-19 on consumption in China using data from banking transactions conducted with offline credit cards. Their database comprises the period between January 1 and April 14, 2020, and as a counterfactual period, they use the same days in the year 2019. The intention is to check the change in total spending and also in consumption by type, differentiating goods from services and separating categories, which are: daily necessities, durable goods, discretionary goods, restaurants, entertainment, and others. Among the key findings, the researchers show that the median city recorded a 33% drop, with more than 90% of the cities analyzed recording a drop in consumption of more than 20%. The study finds a 1.2% drop in GDP through offline consumption in the twelve weeks after the outbreak.

Carvalho *et al.* (2020) conducted a survey to check consumption patterns in Spain using 1.4 billion transactions with individual cards from Banco Bilbao Vizcaya Argentina, S.A (BBVA). Nominal spending, in the period immediately after the announcement of a national blockade by the Spanish government on March 14, is up to 49% lower than in the same period in 2019. On days prior to lockdown, there is an increase in purchases for stock, as well as a decrease in offline spending, in physical establishments, compared to online purchases, which also decreased. Furthermore, they observe a substantially heterogeneous behavior, when analyzing expenditures by category, during confinement. Spending on goods related to basic needs, or products with very low elasticity of demand (such as tobacco) more than doubles during the lockout period, compared to the same period last year. Spending on goods and services with higher elasticity of demand (related to food and out-of-home entertainment, fashion, or personal services) almost disappears.

A study by Alexander and Karger (2020) in the US assesses the heterogeneity of consumption spending in response to requests for isolation between March 1 and April 17, 2020. The financial data used to measure

consumption was small business revenue data from Womply and large business spending from Second Measure, which is complemented with information about the characteristics of different municipalities. Mobility data is extracted from cell data locations. The main results show, in addition to a significant reduction in mobility, a drop in revenue from restaurants and personal purchases.

In relation to studies that analyzed the Brazilian case, we can mention Bretas and Alon (2020), who used data from webinars to analyze the impact of the pandemic on the franchise sector in Brazil. Non-essential expenses have been cut, such as consulting services, communication and maintenance. The retail sector would have been more affected and there would be great concern with the post-pandemic return, especially with the adoption of new technologies to mitigate the effects on the business.

Thus, despite an incipient literature, there are already some stylized facts - a gradual change in behavior throughout the quarantine period possibly motivated by the public's reaction to news about the pandemic and the strategies adopted as the social isolation measures. In countries where studies have been carried out, there is an increase in the consumption of essential goods at the beginning of the pandemic and the duration of social isolation measures, followed by a reduction in this consumption as the pandemic and the isolation period lengthen. These findings, therefore, will guide our analysis.

3. Methodological aspects

The analysis of consumer behavior in the face of the coronavirus pandemic will be carried out based on the volume of credit and debit card spending by individual customers of a large Brazilian multiple bank1. The information is daily and detailed in ten categories of commercial activities (or services). The economic

[1] It is a financial institution with 5,316 service units distributed in 3,154 municipalities in the country. In 19 states, branches and/or advanced service posts (PAA) cover more than 50% of all municipalities. In Goiás, Minas Gerais and Maranhão, between 40 and 50% of the municipalities have a bank presence at this institution. In Paraíba, Amazonas, Rio Grande do Norte, Tocantins and in Piauí less than 40% of the municipalities have branches or PAA of this bank. Regarding the banking system of the Brazilian population aged 15 or over, according to information from the Central Bank and the IBGE in 2019, 89.3% of the Brazilian population has a banking relationship with a financial institution. In the South region this percentage is 95.1%, in the Southeast 94.1%, in the Midwest 86.5%, in the Northeast 83.7% and in the North 74.7%.

impact, in percentage, will be measured by the variation between purchases made in the first 24 weeks of 2020, compared to the same period in the previous year.

Expenses with debit and credit cards are generally considered to be variable expenses of individuals and, for this reason, capture more exogenous variations such as social isolation, since fixed expenses such as rent, taxes, etc. Are generally not paid with debit or credit cards and should not have such a strong impact, even in a situation of falling individual income. Furthermore, we draw attention to the fact that, in a country like Brazil, the use of debit and credit cards assumes that the individuals analyzed have a minimum level of income, thus excluding a significant portion of the population.

Ipea (2020) measures the IDS, which is correlated with the variation in consumption. Regarding the spread of the pandemic, the variables of interest in the study are the numbers of new cases (infected) and deaths per 100,000 inhabitants, also accumulated per week and per federation unit. Table 1 shows the description of the variables.

Table 1 – Description of the variables used:

Variable	Description
Credit card and debit card spending by individual consumers	Variation in credit card and debit card spending in the first 24 weeks of 2020 compared to the same period in the previous year (2019) in each state. The 2019 figures were deflated by the IPCA.
Legal Measures of Social Distancing Index (IDS)	Index weekly average (originally daily).
Number of Covid-19 Infected	Number of newly infected per week by Covid-19, per 100 thousand inhabitants, in each Brazilian state.
Number of Covid-19 Deaths	Number of deaths, in the reference week, by Covid-19, per 100 thousand inhabitants, in each Brazilian state.

According to Ipea (2020), the IDS measures the degree of rigidity of legal measures of social distancing adopted due to the Covid-19 pandemic, based on the policies adopted by state governments and city halls in the capitals of Brazil. The information used comes from news published by the press and legal documents from governments, such as decrees, ordinances, provisional measures, rules,

resolutions, etc. The study considers that, although all states have adopted measures to contain the epidemic, they took place in different periods and formats.

The IDS considers the following variables: i) whether the holding of events and the opening of cultural, sports or religious establishments was suspended; ii) whether the activities of bars, restaurants and similar establishments were suspended; iii) whether the activities of commercial establishments and services in general (except essential ones) were suspended; iv) whether the activities of industrial establishments (except essential ones) were suspended; v) whether classes were suspended and vi) whether there were restrictions on passenger transport.

According to the study carried out by Ipea (2020), each variable was assigned a value of 2, 1 or 0, indicating, respectively, total or partial suspension or restriction. The IDS is calculated by the adding these values, which can vary from 0 to 12, subsequently, the index was adjusted to be between 0 and 10, with 10 being the states and/or capitals with the greatest restrictions.

The Ipea study (2020) clarifies that, in general, the value 2 is attributed to the total suspension of activities considered non-essential, as well as operation through on-site delivery or removal. Value 1 applies to cases in which some establishments, in addition to the essential ones, can operate. Beside these, the value 1 also characterized activities conditioned to certain criteria or rules. In situations where there are no restrictions, the assigned value was 0.

We correlated the variation in spending with credit and debit cards and IDS, considering ten commercial categories in the 27 states. They are: supermarkets; drugstores and pharmacies; gas stations; furniture and department stores; Construction Materials; clothing and sporting goods; other durable goods sectors; tourism and transportation; other services; and bars and restaurants.

From March to April, according to the IPEA indicator, the weighted average IDS of the states was above 6.0. In May and June, this average was between 5.7 and 5.2. As of June 29, there was a reduction in the legal measures of social distance and, since then, the IDS has remained below 5.0. As of the second week of September, the IDS is below 4.0. These indicators suggest a greater flexibility in social isolation starting in June, which justifies the timing of this research.

According to the Ministry of Health (2020), in Brazil, the first record of the disease occurred on February 26, the number of confirmed cases until June 20 was

1.1 million and deaths totaled 50.0 thousand. The Northeast region has the highest number of cases, but from a relative perspective, the number of cases and deaths per 100,000 inhabitants in the North is more than double the Brazilian average. Thus, and following Chronopoulos, Lukas and Wilson (2020), three time frames were considered, according to table 2:

Table 2 – Description of the time frame considered:

Period	Description
01/05/2020 to 06/20/2020	Period corresponding to the first 24 weeks of the year 2020. The variation in expenses was compared with the period from 01/06/2019 to 06/22/2019.
02/23/2020 to 06/20/2020	The analysis is made from the eighth week of the year, when the first case of coronavirus in Brazil was reported. The variation in expenses was compared with the period from 02/24/2019 to 06/22/2019.
03/15/2020 to 06/20/2020	The analysis is made from the eleventh week of the year, when the first death from coronavirus occurred and the first legal measures of social isolation were implemented in Brazil. The variation in expenses was compared with the period from 03/17/2019 to 06/22/2019.

Regarding social distancing, two ambiguous effects should be considered. On the one hand, it is also the result of a possible effect of expectations associated with pandemic-related fear, i.e., as much as the focus is not on the number of infected and deaths due to Covid-19, they also have an influence on the volume of expenses analyzed. On the other hand, as this pandemic and the isolation itself continue, population adherence no longer occurs rigidly, either because of economic or other issues, including tolerance to the isolation itself. This, in fact, reinforces the limit of the analysis used here, as this is not a causality analysis, only a correlation analysis.

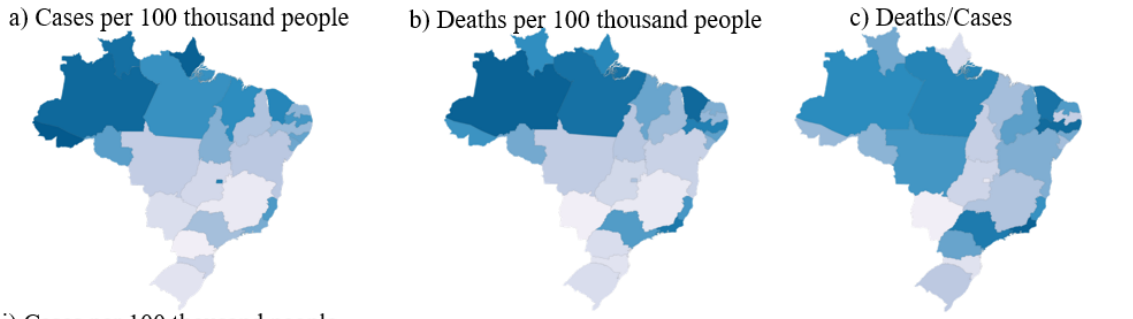
As for the results, as mentioned in the previous section and in line with the conclusions of the international literature already developed on the topic, it is expected that essential goods will not have their consumption reduced, even under strong isolation measures - that is, the expected correlation for these types of goods should be weak or even positive, except for those goods that require displacement of residence. Assets that are both superfluous and require a commute should show strong drops in the volume of resources - therefore, stronger levels of negative correlation with the distance index. Other goods with intermediate situations, both

from the point of view of essentiality and travel restriction can fall in intermediate situations.

4. Results

Considering the information until June 20, 2020, there are two major "corridors" of infection in Brazil: in the North, Northeast and Southeast regions of the country and locations with a relatively smaller number of cases in the interior and south of the country (Figure 1)[2].

Figure 1 – Covid-19 cases and deaths (per 100 thousand people) and deaths and cases ratio



i) Cases per 100 thousand people

PR	MG	RS	MS	GO	SC	MT	BA	PI	SP	PE	RN	TO	RJ	SE	AL	RO	ES	PB	PA	MA	CE	DF	AC	RR	AM	AP
121	129	168	188	220	239	266	305	436	470	535	550	552	553	805	830	841	852	909	984	985	1.012	1.069	1.277	1.340	1.518	2.553

ii) Deaths per 100 thousand people

MS	MG	SC	RS	PR	GO	BA	MT	TO	DF	PI	PB	SE	RN	RO	MA	AL	SP	ES	AC	RR	AP	PE	RJ	PA	CE	AM
1,6	3,0	3,3	3,8	3,8	4,2	9,1	9,8	11,3	13,4	14,8	18,5	19,5	19,9	23,0	23,8	25,9	27,2	32,3	33,8	41,4	41,9	43,4	51,1	53,3	60,4	63,9

iii) Deaths/Cases

MS	DF	SC	AP	GO	PB	TO	RS	MG	MA	SE	AC	RO	BA	RR	AL	PR	PI	RN	MT	ES	AM	PA	SP	CE	PE	RJ
0,9%	1,3%	1,4%	1,6%	1,9%	2,0%	2,0%	2,2%	2,3%	2,4%	2,4%	2,6%	2,7%	3,0%	3,1%	3,1%	3,2%	3,4%	3,6%	3,7%	3,8%	4,2%	5,4%	5,8%	6,0%	8,1%	9,2%

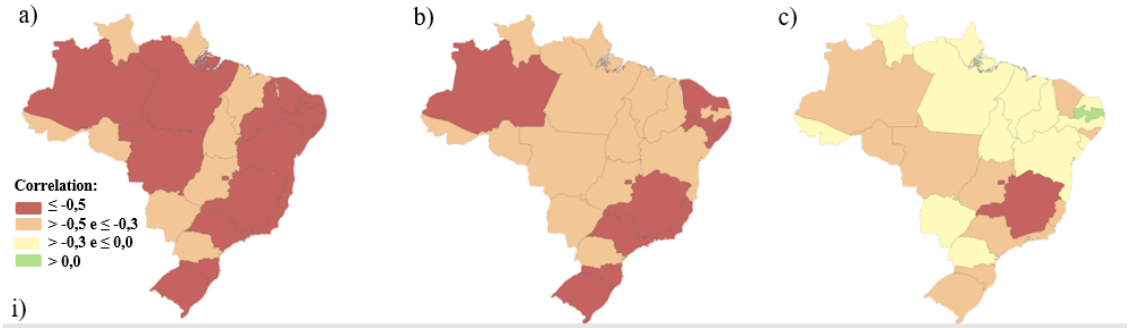
Amapá, Amazonas, Roraima and Acre are the four states with the highest number of cases per 100 thousand people. The state of Amazonas has the highest number of deaths per 100,000 people in the country (63.9), followed by Ceará and Pará. The ratio between the number of deaths and those contaminated is higher in the state of Rio de Janeiro and Pernambuco. Regarding household spending, the analysis is separated into three periods and represented in Figures 2 to 12. Table 4 shows the representation of the periods used in the analysis.

[2] The three-corridor pattern does seem to, in general, replicate in some the spending patterns as well, that is, one in the North/Northeast of the country, one in the Southeast and a third in the interior.

Table 4 – Representation of the periods analyzed in the figures

Period	Weeks	Figures 1 to 12
01/05/2020 to 06/20/2020	1 to 24	Map “a” e table “i”
02/23/2020 to 06/20/2020	8 to 24	Map “b” e table “ii”
03/15/2020 to 06/20/2020	11 to 24	Map “c” e table “iiii”

Figure 2 – Correlation between the total spending variation and IDS



i)

RR	TO	MS	RO	GO	MA	PR	AC	AP	PA	PB	MT	RS	AM	SC	BA	PI	SP	CE	MG	RJ	DF	RN	AL	SE	ES	PE
-0,34	-0,35	-0,41	-0,44	-0,45	-0,46	-0,47	-0,48	-0,49	-0,52	-0,54	-0,54	-0,56	-0,57	-0,58	-0,58	-0,58	-0,58	-0,60	-0,61	-0,62	-0,63	-0,64	-0,65	-0,65	-0,66	-0,66

ii)

TO	RR	MS	MA	AC	PB	PR	AP	GO	RO	BA	PI	PA	MT	RS	SE	SC	AM	RN	MG	CE	ES	SP	PE	DF	RJ	AL
-0,31	-0,33	-0,35	-0,39	-0,39	-0,42	-0,43	-0,43	-0,45	-0,45	-0,47	-0,47	-0,47	-0,48	-0,51	-0,52	-0,53	-0,53	-0,53	-0,55	-0,56	-0,57	-0,57	-0,59	-0,60	-0,60	-0,61

iii)

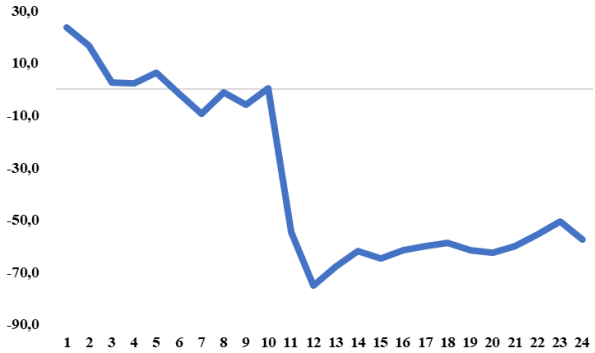
PB	BA	AP	MS	RR	MA	TO	AC	PR	PI	PA	PE	SE	RN	RJ	RO	CE	MT	SC	AM	GO	SP	ES	RS	AL	DF	MG
0,01	0,00	-0,03	-0,07	-0,11	-0,13	-0,14	-0,17	-0,18	-0,20	-0,28	-0,28	-0,28	-0,29	-0,35	-0,36	-0,37	-0,38	-0,40	-0,42	-0,43	-0,43	-0,43	-0,45	-0,49	-0,54	-0,57

In terms of time, there is an apparent weakening of the effect of the isolation measures, something that may be associated with the loss of effectiveness of the measures, as they extend over long periods of time. The first correlation (in this case, 2a and 2i), covers the first few weeks of the year, when there are no cases of Covid-19 in Brazil, nor any legal social distancing measures. In contrast, in the third correlation (2c and 2iii), the series starts in the eleventh week, when social distancing begins. Thus, the series is more static, and the correlation tends to be smoothed out.

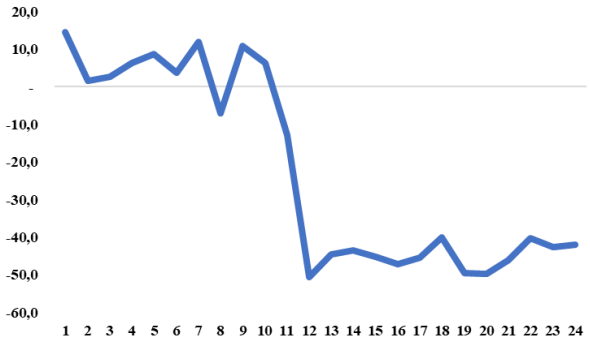
The first sectors to be analyzed will be those most impacted by legal measures of social isolation, that is, bars and restaurants, gas stations and tourism

and transportation. These sectors are linked to a degree of mobility, which, in a pandemic moment, explains the strong reduction in spending they had, as shown in graphs 1, 2 and 3.

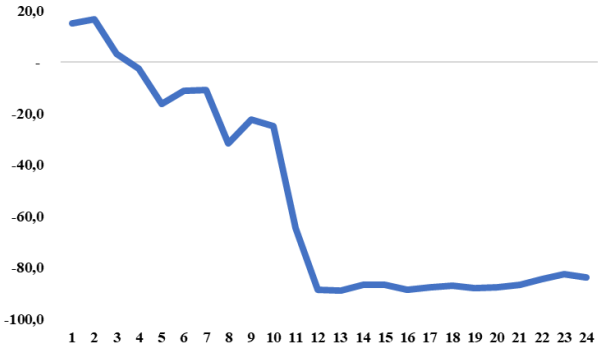
Graph 1 – Consumer spending behavior in the Bars and Restaurants sector during the first 24 weeks of 2020



Graph 2 – Consumer spending behavior in the Gas Station sector during the first 24 weeks of 2020



Graph 3 – Consumer spending behavior in the Tourism and Transport sector during the first 24 weeks of 2020



The three sectors show similar behavior, with a sharp drop in consumer spending as of the eleventh week, when the first social isolation measures were enacted without a recovery since then. Figures 3, 4 and 5 show the correlation between the variation in spending in the bars and restaurants, gas stations and tourism and transport sectors, respectively:

Figure 3 – Correlation between the total spending on bars and restaurants and IDS

i)

PB	AP	MS	TO	PA	MA	MG	PI	CE	RO	BA	MT	ES	RR	AM	SP	PR	PE	SC	SE	AC	AL	RN	GO	RS	RJ	DF
-0,81	-0,86	-0,87	-0,89	-0,91	-0,91	-0,92	-0,92	-0,92	-0,92	-0,93	-0,93	-0,93	-0,93	-0,93	-0,93	-0,94	-0,94	-0,94	-0,94	-0,94	-0,95	-0,95	-0,95	-0,95	-0,97	-0,97

ii)

PB	MS	AP	TO	BA	CE	PI	PA	MG	ES	PR	MA	SP	PE	RO	MT	AL	AM	RN	AC	SE	RR	SC	RS	GO	RJ	DF
-0,68	-0,79	-0,82	-0,87	-0,87	-0,88	-0,88	-0,89	-0,89	-0,89	-0,89	-0,90	-0,90	-0,91	-0,91	-0,91	-0,91	-0,91	-0,92	-0,92	-0,92	-0,92	-0,92	-0,93	-0,95	-0,96	-0,97

iii)

PB	AP	MS	PR	PI	BA	PA	TO	CE	RJ	PE	RR	MA	MT	RN	GO	RS	SP	RO	AM	AC	SE	ES	MG	AL	DF	SC
0,15	0,09	0,05	-0,11	-0,13	-0,29	-0,35	-0,37	-0,38	-0,41	-0,44	-0,45	-0,48	-0,50	-0,50	-0,51	-0,51	-0,55	-0,57	-0,60	-0,63	-0,64	-0,66	-0,70	-0,76	-0,80	-0,90

Spending in bars and restaurants proved to be highly correlated with IDS. In most large cities, decrees were issued prohibiting the opening of these establishments, or restricting operation to the delivery format, reinforcing the

importance of the mobility issue for the impact of the isolation measures on consumption. In the week following the first measures to close these establishments, the average reduction in spending in Brazil was more than 70%. In April and May, the drop in consumption remained around 60% and in June, 53%. Figure 3c shows a change in behavior, especially in some states of the Northeast and North, as well as in Santa Catarina, in line with the behavior observed in figure 1, which shows a timid recovery in spending in the sector at the end of the period considered, related to a process of easing of social isolation measures.

Figure 4 – Correlation between the variation of expenses at gas stations and IDS

i)

PB	SC	TO	RO	MA	RR	GO	MG	AC	MT	BA	PA	MS	AL	AM	PI	SE	ES	AP	DF	PE	CE	RN	RJ	SP	RS	PR
-0,87	-0,87	-0,88	-0,89	-0,91	-0,92	-0,93	-0,94	-0,94	-0,95	-0,95	-0,95	-0,95	-0,95	-0,95	-0,95	-0,95	-0,96	-0,96	-0,97	-0,97	-0,97	-0,97	-0,97	-0,98	-0,98	-0,98

ii)

PB	SC	RO	MA	TO	GO	RR	MG	BA	PI	AC	AL	MT	AP	MS	SE	ES	DF	PE	CE	AM	RJ	SP	RS	RN	PA	PR
-0,78	-0,78	-0,81	-0,83	-0,83	-0,86	-0,88	-0,89	-0,90	-0,91	-0,92	-0,93	-0,93	-0,93	-0,93	-0,94	-0,94	-0,94	-0,94	-0,95	-0,96	-0,96	-0,96	-0,96	-0,97	-0,97	-0,98

iii)

GO	MA	RO	SC	PB	TO	RR	AC	BA	DF	PI	MG	AP	SE	MS	AL	ES	MT	RJ	PE	AM	RS	CE	SP	RN	PA	PR
-0,33	-0,37	-0,40	-0,43	-0,49	-0,54	-0,59	-0,60	-0,60	-0,63	-0,65	-0,67	-0,71	-0,75	-0,79	-0,80	-0,82	-0,82	-0,83	-0,87	-0,87	-0,89	-0,91	-0,92	-0,92	-0,94	-0,95

As for gas stations, it can be said that the legal measures of social distance had a more intense effect, since the correlation was high in all regions in the first two periods, showing a certain reduction only in the third period and in the states of São Paulo. Goiás, Maranhão, Roraima, Santa Catarina and Paraíba. This shows that the essentiality associated with the mobility issue enhances the negative effects on consumption.

Figure 5 – Correlation between the variation in spending on tourism and transport and the IDS

i)

PB	SC	MG	TO	RO	MS	ES	BA	AP	AM	SP	MA	RR	CE	MT	DF	GO	PA	PE	RS	PI	PR	AC	AL	SE	RJ	RN
-0,82	-0,85	-0,90	-0,90	-0,92	-0,92	-0,93	-0,93	-0,93	-0,93	-0,93	-0,94	-0,94	-0,94	-0,94	-0,94	-0,94	-0,95	-0,95	-0,95	-0,95	-0,95	-0,95	-0,96	-0,96	-0,96	-0,97

ii)

PB	SC	RO	MG	BA	ES	AP	TO	MA	DF	AL	AM	SP	PE	CE	GO	SE	MS	PA	RN	PI	MT	RR	RS	PR	AC	RJ
-0,75	-0,78	-0,89	-0,89	-0,91	-0,91	-0,92	-0,92	-0,93	-0,93	-0,94	-0,94	-0,95	-0,95	-0,95	-0,95	-0,96	-0,96	-0,96	-0,96	-0,96	-0,97	-0,97	-0,97	-0,98	-0,98	-1,00

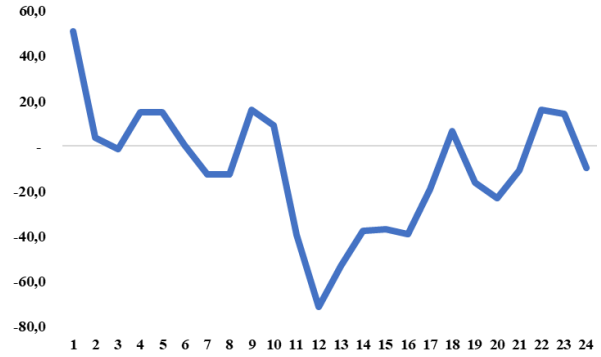
iii)

PB	DF	SC	BA	RO	GO	MA	AP	MG	TO	ES	PI	PA	AC	PE	PR	MS	SE	AL	RR	RS	RN	RJ	CE	SP	MT	AM
-0,39	-0,43	-0,44	-0,52	-0,53	-0,64	-0,66	-0,67	-0,69	-0,71	-0,78	-0,87	-0,88	-0,88	-0,92	-0,93	-0,93	-0,95	-0,95	-0,95	-0,95	-0,95	-0,96	-0,97	-0,97	-0,98	-0,99

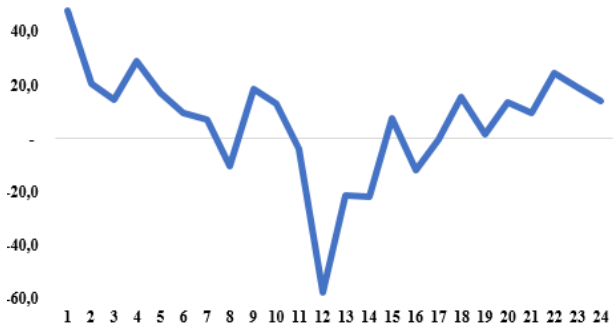
A similar case is the tourism and transportation sector. Both the first and the second periods analyzed, the negative correlations are greater than 0.7 in all locations. With the recommendation of social isolation, spending on tourism, including business, hotels, airline tickets, and car rentals, became lower. The reduction in spending in this category was more than 85% from the 12th week of the year.

The furniture and department stores; construction materials; clothing and sporting goods; other durable goods sectors; and other service sectors are also hard hit after the social isolation measures begin to be experienced. However, in several locations such measures have been attenuated over time in various ways, and therefore, their effects are gradually mitigated after the sharp drop around the twelfth week. Graphs 4, 5, 6, 7 and 8 show the variation in consumer spending that occurred in the furniture and department stores; construction materials; clothing and sporting goods; other durable goods sectors; and other sectors in services.

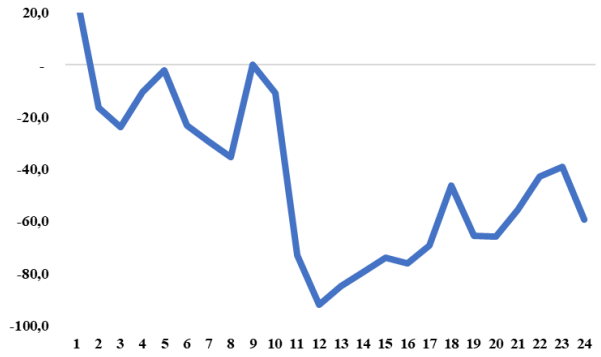
Graph 4 – Consumer spending behavior in the Furniture and Department Stores sector during the first 24 weeks of 2020



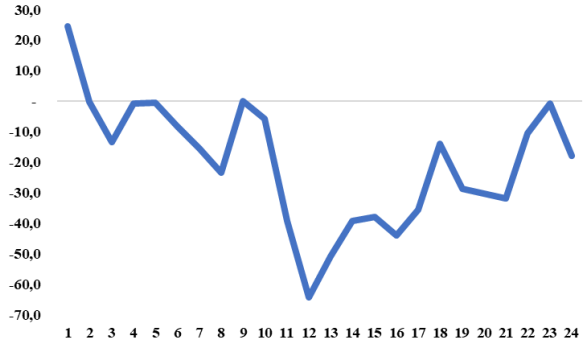
Graph 5 – Consumer spending behavior in the Construction Material sector during the first 24 weeks of 2020



Graph 6 – Consumer spending behavior in the Clothing and Sporting Goods sector during the first 24 weeks of 2020



Graph 7 – Consumer spending behavior in the sector of other sectors of durable goods during the first 24 weeks of 2020



Graph 8 – Consumer spending behavior in the other Sectors in Services sector during the first 24 weeks of 2020

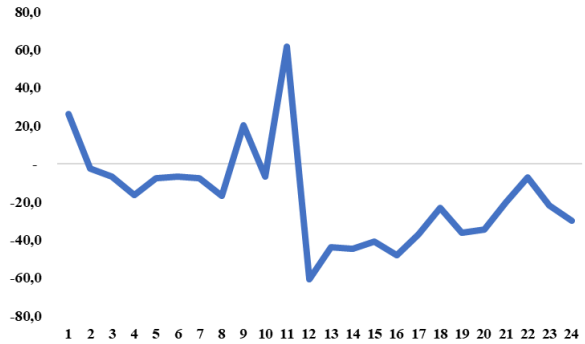
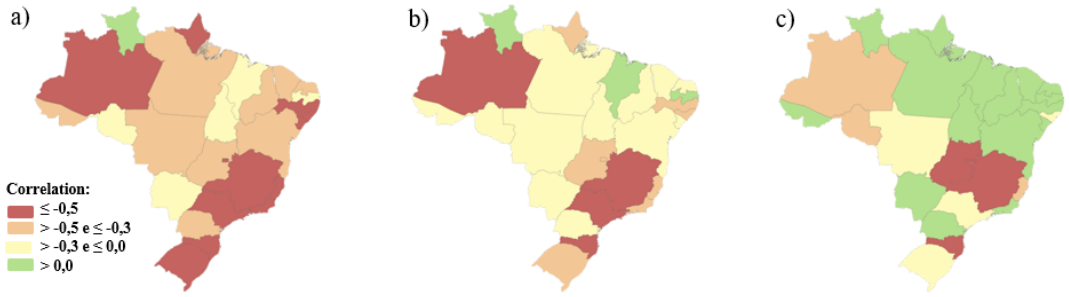


Figure 6 shows the correlation between the variation in spending in the furniture and department store sector and the IDS.

Figure 6 – Correlation between the variation in spending on furniture and department stores and the IDS



i)

RR	MA	TO	RO	MS	PB	CE	AC	PR	BA	PA	MT	RN	GO	PI	RS	DF	SE	PE	AL	MG	ES	AP	AM	RJ	SC	SP
0,08	-0,04	-0,18	-0,21	-0,25	-0,25	-0,30	-0,33	-0,35	-0,36	-0,41	-0,44	-0,47	-0,47	-0,48	-0,51	-0,52	-0,52	-0,60	-0,61	-0,62	-0,63	-0,64	-0,64	-0,68	-0,69	-0,72

ii)

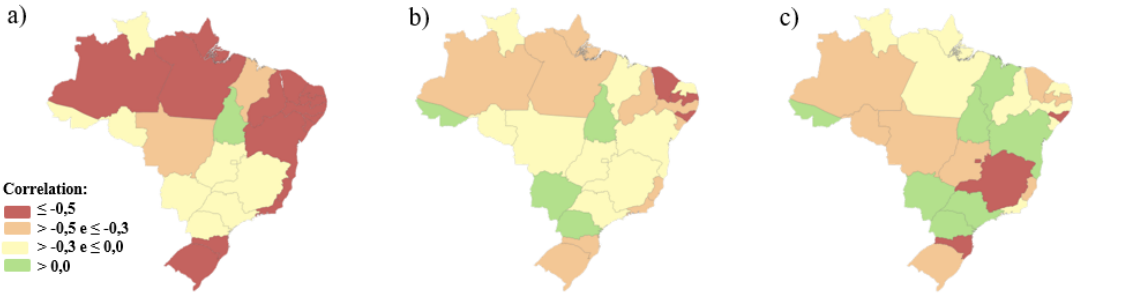
RR	PB	MA	MS	BA	TO	AC	CE	PI	SE	RO	PR	RN	PA	MT	DF	PE	GO	RS	AL	ES	AP	RJ	MG	AM	SP	SC
0,14	0,11	0,06	-0,05	-0,09	-0,11	-0,11	-0,15	-0,15	-0,17	-0,19	-0,20	-0,23	-0,24	-0,29	-0,34	-0,34	-0,37	-0,39	-0,48	-0,48	-0,48	-0,49	-0,51	-0,58	-0,64	-0,70

iii)

BA	PB	RR	SE	RN	AP	MS	PI	PR	AC	PE	TO	MA	PA	CE	RJ	AL	MT	SP	RS	AM	ES	RO	GO	MG	DF	SC
0,58	0,57	0,38	0,31	0,31	0,29	0,29	0,28	0,24	0,18	0,18	0,15	0,13	0,03	0,03	0,01	-0,11	-0,15	-0,19	-0,27	-0,32	-0,33	-0,34	-0,51	-0,55	-0,60	-0,69

Figure 6 shows a negative correlation in the first period, but which eased more quickly when analyzing the correlation between spending on furniture purchases and in department stores and IDS. Anyway, it is clear that a negative correlation equal to or greater than 0.30 (6a and 6i) prevailed. Figure 7 shows the correlation between the variation in spending in the construction materials sector and the IDS.

Figure 7 – Correlation between the variation in spending on construction materials and the IDS



i)

TO	GO	PR	MS	RR	AC	SP	MG	RO	DF	MA	MT	SC	PA	ES	RS	RJ	BA	RN	AP	AM	PI	PE	SE	AL	CE	PB
0,06	-0,10	-0,10	-0,12	-0,19	-0,21	-0,23	-0,26	-0,26	-0,27	-0,43	-0,45	-0,51	-0,53	-0,53	-0,56	-0,57	-0,58	-0,59	-0,62	-0,66	-0,66	-0,71	-0,72	-0,73	-0,77	-0,79

ii)

TO	AC	PR	MS	SP	RR	RO	GO	MA	DF	MG	BA	RN	MT	RJ	ES	SE	AP	PA	AM	RS	PI	PE	SC	CE	AL	PB
0,10	0,09	0,04	0,03	-0,06	-0,07	-0,09	-0,11	-0,13	-0,16	-0,18	-0,19	-0,19	-0,21	-0,30	-0,30	-0,32	-0,34	-0,35	-0,44	-0,44	-0,45	-0,45	-0,48	-0,60	-0,60	-0,65

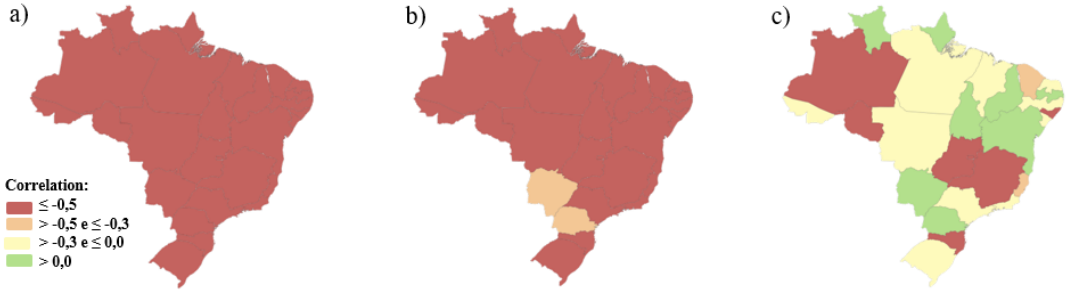
iii)

MS	BA	TO	AC	MA	PR	SP	SE	PI	RN	AP	RJ	RR	PE	PA	PB	ES	MT	RS	RO	GO	CE	AM	SC	MG	AL	DF
0,49	0,33	0,13	0,10	0,10	0,07	0,01	0,00	-0,01	-0,05	-0,06	-0,16	-0,18	-0,22	-0,24	-0,33	-0,34	-0,36	-0,39	-0,45	-0,45	-0,45	-0,48	-0,55	-0,56	-0,56	-0,72

Like supermarkets, pharmacies, and gas stations, building material stores are part of the segment that was considered an essential service and remained open even after the trade decrees were closed. Although there was a drop in consumer spending immediately after the enactment of the social isolation measures, compared to the other categories, the building materials segment is among those that showed the least retraction, indicating that, from the consumer's point of view, its essentiality was different, not always of an urgent nature. Once pandemic and isolation measures were in place, the impact on this sector was greater, possibly due to uncertainty about the duration of the crisis.

In the eighth week and in the five weeks following the implementation of the first social distance measures (12th to 16th), there was a reduction in the consumption of these items, a standard behavior among the federation units. Once it was realized that it would be a long period, the consumer's view of this sector changed, and the data suggest that work and reforms gradually resumed. Figure 8 shows the correlation between the variation in spending in the clothing and sports equipment sector and the IDS.

Figure 8 – Correlation between the variation in spending on clothing and sports equipment and the IDS



i)

MS	TO	PR	RS	MT	PB	GO	RO	RR	SC	AC	MA	PA	BA	SP	MG	PI	ES	CE	AP	PE	DF	AM	RN	SE	RJ	AL
-0,53	-0,62	-0,63	-0,66	-0,68	-0,74	-0,79	-0,79	-0,81	-0,81	-0,82	-0,82	-0,82	-0,82	-0,83	-0,84	-0,84	-0,86	-0,86	-0,87	-0,88	-0,88	-0,89	-0,89	-0,89	-0,90	-0,90

ii)

MS	PR	TO	RS	MT	PB	BA	GO	MA	PI	RR	AC	MG	ES	SP	SC	PA	CE	AP	PE	RO	RN	SE	AM	RJ	AL	DF
-0,36	-0,45	-0,54	-0,55	-0,56	-0,60	-0,71	-0,72	-0,74	-0,75	-0,75	-0,76	-0,77	-0,77	-0,77	-0,79	-0,80	-0,80	-0,80	-0,82	-0,83	-0,85	-0,85	-0,86	-0,86	-0,87	-0,88

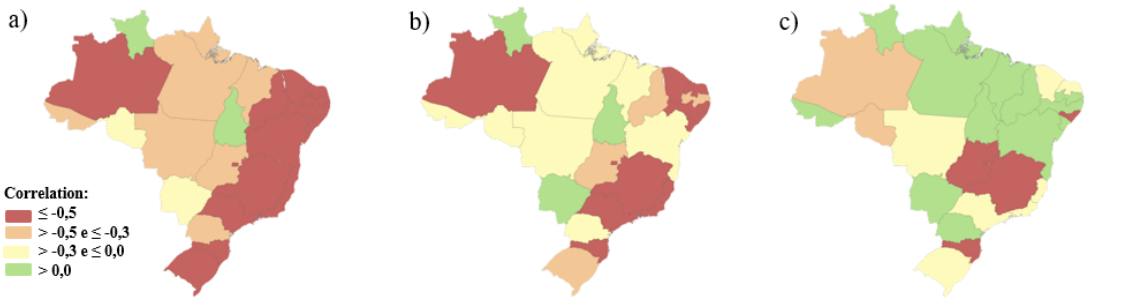
iii)

BA	PB	MS	PR	AP	RR	PI	TO	AC	PE	SE	MA	MT	RJ	SP	RN	RS	PA	CE	ES	GO	RO	AM	AL	MG	SC	DF
0,40	0,34	0,29	0,24	0,10	0,04	0,03	0,01	-0,07	-0,10	-0,11	-0,11	-0,12	-0,17	-0,19	-0,21	-0,24	-0,28	-0,33	-0,35	-0,50	-0,51	-0,54	-0,58	-0,62	-0,74	-0,77

Regarding the expenses with clothing and sports equipment related to the IDS, they show a negative correlation greater than 0.5 in all states and in the DF, in the period covering the 24 weeks (8th and 8th). In the period between the 8th and 24th week, Mato Grosso do Sul and Paraná, showed a different behavior (8b

and 8ii), and between 11th and 24th week there was a reduction in the correlation in most states (8c and 8iii). Figure 9 shows the correlation between the variation in spending in the other durable goods sectors and the IDS.

Figure 9 – Correlation between variation in spending in other durable goods sectors and IDS



i)

RR	TO	MS	RO	AP	GO	PR	AC	PA	MA	MT	BA	PB	PI	AM	RS	ES	MG	SP	SC	PE	CE	RN	DF	AL	SE	RJ
0,19	0,02	-0,24	-0,26	-0,33	-0,37	-0,40	-0,41	-0,42	-0,43	-0,48	-0,58	-0,62	-0,63	-0,65	-0,67	-0,68	-0,69	-0,71	-0,73	-0,75	-0,76	-0,79	-0,80	-0,80	-0,83	-0,83

ii)

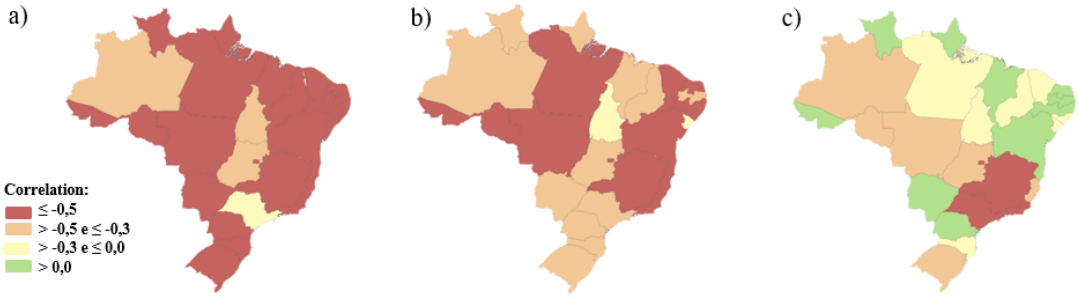
RR	TO	MS	AP	MA	AC	PA	MT	PR	RO	BA	PI	PB	GO	RS	ES	MG	SP	PE	AM	CE	RN	SC	DF	RJ	AL	SE
0,17	0,15	0,02	-0,09	-0,11	-0,17	-0,22	-0,22	-0,24	-0,25	-0,28	-0,34	-0,36	-0,42	-0,47	-0,51	-0,52	-0,54	-0,57	-0,59	-0,62	-0,64	-0,66	-0,70	-0,71	-0,72	-0,73

iii)

BA	PB	AP	RR	MS	MA	PR	TO	PI	AC	PE	PA	SE	RN	MT	SP	RJ	ES	CE	RS	RO	AM	AL	MG	GO	SC	DF
0,54	0,47	0,42	0,39	0,36	0,27	0,21	0,21	0,18	0,11	0,08	0,07	0,03	-0,03	-0,03	-0,11	-0,17	-0,19	-0,27	-0,28	-0,32	-0,37	-0,50	-0,57	-0,69	-0,70	-0,74

Even if not uniform, Figure 9 shows a significant negative correlation between social distance and spending on other durable goods. In Distrito Federal, Santa Catarina, Alagoas and Minas Gerais, the correlation remained negative and high in the three periods analyzed. In other locations, there was variation over the periods, despite the data showing that there was a retraction in sales of these categories from the 11th week on, in all states. As of the 16th week, Mato Grosso do Sul, Roraima and Tocantins show predominantly positive variations in the expenditure with this type of asset. Moreover, in these states, in the three periods, the correlations with the IDS are positive and/or weaker (Figure 9i, 9ii and 9iii). Figure 10 shows the correlation between the variation in spending in the other service sectors and the IDS.

Figure 10 – Correlation between the variation in spending in other service sectors and the IDS



i)

SP	GO	AM	TO	RJ	RR	MS	AP	RO	RS	SC	PB	SE	AC	PR	MA	PA	BA	RN	PI	CE	PE	MT	AL	ES	MG	DF
-0,29	-0,37	-0,44	-0,45	-0,52	-0,57	-0,58	-0,59	-0,62	-0,63	-0,64	-0,64	-0,65	-0,66	-0,68	-0,70	-0,71	-0,72	-0,73	-0,74	-0,77	-0,77	-0,79	-0,79	-0,80	-0,87	-0,90

ii)

TO	SE	AM	GO	AP	RR	PB	RS	SP	SC	MA	PI	PR	MS	BA	AC	RN	PA	RO	PE	ES	CE	AL	MT	MG	DF	RJ
-0,19	-0,23	-0,32	-0,36	-0,39	-0,39	-0,43	-0,44	-0,44	-0,46	-0,46	-0,47	-0,48	-0,49	-0,51	-0,52	-0,53	-0,58	-0,59	-0,63	-0,63	-0,64	-0,69	-0,70	-0,81	-0,84	-0,87

iii)

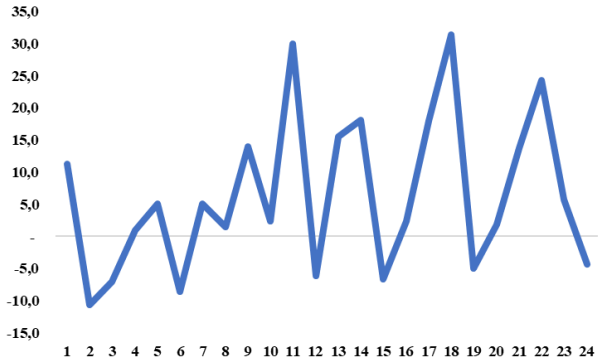
AP	BA	RR	PB	AC	PR	MA	PE	RN	MS	TO	PI	PA	SE	CE	SC	AL	RS	ES	RO	AM	GO	MT	DF	MG	RJ	SP
0,38	0,32	0,22	0,19	0,13	0,09	0,07	0,03	0,02	0,02	-0,01	-0,04	-0,10	-0,12	-0,17	-0,18	-0,26	-0,33	-0,35	-0,38	-0,40	-0,43	-0,45	-0,68	-0,76	-0,92	-0,93

The services that were not included in the above sectors were aggregated as other sectors and showed a relatively different behavior from those previously addressed with respect to the correlation with the social isolation measures, as shown in Figure 10. The lack of uniformity can also be attributed to the variety activities included in this category, such as essential services like hospitals, clinics and transportation, and others that are non-essential and difficult to maintain even partially with social distance, such as the beauty and aesthetics segment.

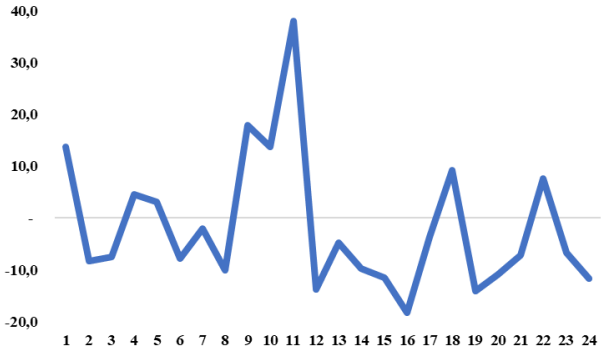
Unlike the sectors associated with mobility issues, it is observed that these intermediate sectors, besides enjoying a recovery in consumer spending over the period, also register a more heterogeneous behavior regarding the correlation with social isolation measures - although with negative values and tending to decrease when considering only the narrower period when the measures were already underway, but with large differences between the states .

Finally, the sectors related to essential goods and not associated with mobility issues, that is, those related to food (supermarkets) and medicines (drugstores). Graphs 9 and 10 show the variation in consumer spending for these two sectors over the period considered.

Graph 9 – Consumer spending behavior in the Supermarket sector during the first 24 weeks of 2020



Graph 10: Behavior of consumer spending in the Drugstores and Pharmacies sector during the first 24 weeks of 2020:

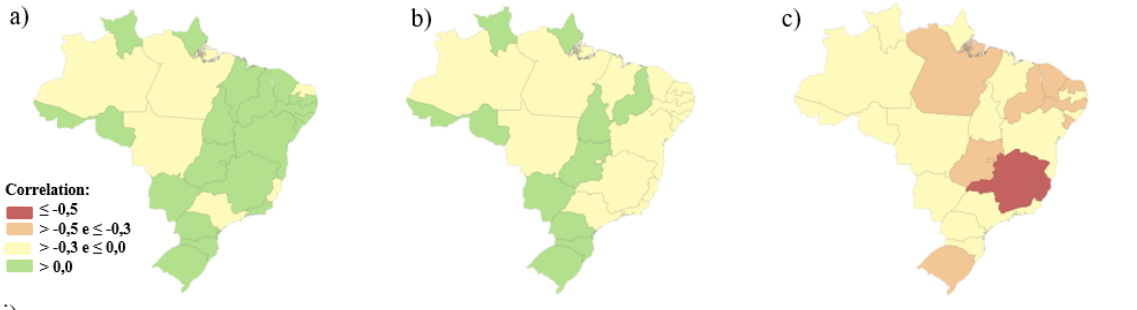


In essential sectors, differently from others, there is an increase in consumption spending in line with the stylized facts determined by the literature, around the eleventh week. This may be associated with a stockpiling behavior of food and medicine. After this period, the behavior across sectors is different. The medication sector has seen a strong reduction in spending, returning to its level prior to social isolation measures, probably due to the population's recognition that Covid-19's treatment was more complex than simply going to the pharmacy.

Spending in the supermarket sector, however, are quite oscillating in the period, suggesting that isolation may have distanced trips to these establishments, as people sought to avoid contamination. When the correlation of spending in sectors considered essential with the IDS was evaluated, according to the forecast, goods with a higher degree of essentiality, such as food (supermarket segment) and

medicines (drugstore segment) showed weaker correlations. These results are shown in Figures 11 and 12.

Figure 11 – Correlation between the variation in spending in supermarkets and the IDS



i)

PR	GO	RS	MS	RR	TO	AP	SC	DF	CE	MA	PI	BA	AC	RO	SE	RJ	AL	MG	PB	PE	SP	MT	AM	PA	ES	RN
0,60	0,52	0,49	0,39	0,30	0,30	0,27	0,25	0,22	0,20	0,18	0,16	0,14	0,14	0,12	0,11	0,06	0,04	0,03	0,03	0,01	-0,04	-0,05	-0,06	-0,11	-0,15	-0,15

ii)

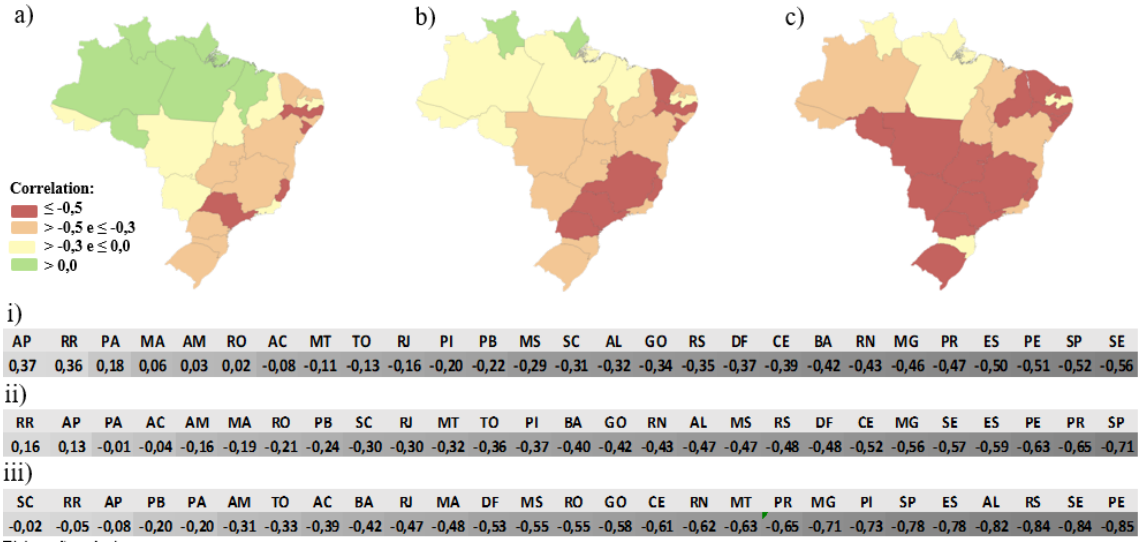
PR	RS	GO	SC	RR	TO	MS	AP	AC	PI	RO	MA	CE	RJ	BA	DF	SE	PB	MG	AM	PE	ES	AL	RN	MT	SP	PA
0,31	0,20	0,15	0,13	0,11	0,09	0,08	0,06	0,06	0,03	0,02	-0,02	-0,04	-0,05	-0,08	-0,09	-0,11	-0,13	-0,14	-0,15	-0,17	-0,17	-0,18	-0,20	-0,21	-0,24	-0,27

iii)

SC	RR	RJ	RO	TO	AC	AP	AM	PB	MA	BA	PR	SP	MS	MT	AL	PE	CE	DF	RN	SE	PI	RS	PA	GO	ES	MG
0,00	-0,04	-0,08	-0,10	-0,15	-0,15	-0,17	-0,17	-0,20	-0,20	-0,23	-0,25	-0,28	-0,28	-0,29	-0,29	-0,30	-0,30	-0,31	-0,35	-0,41	-0,44	-0,45	-0,47	-0,48	-0,50	-0,60

Figure 11, unlike what happened in the previous sectors, shows positive correlations, consistent with this increase in expenses related to a possible stockpiling effect previously described here and in the literature. Thus, the smoothing process that occurred in the previous sectors here implies a change in the correlation, that is, a negative correlation in spending on supermarkets / IDS, possibly associated with the relaxation of social isolation measures. Figure 12 shows the correlation between the variation in spending in the drugstore and pharmacy sector and the IDS.

Figure 12 – Correlation between variation in spending on drugstores/pharmacies and IDS



i)

AP	RR	PA	MA	AM	RO	AC	MT	TO	RJ	PI	PB	MS	SC	AL	GO	RS	DF	CE	BA	RN	MG	PR	ES	PE	SP	SE
0,37	0,36	0,18	0,06	0,03	0,02	-0,08	-0,11	-0,13	-0,16	-0,20	-0,22	-0,29	-0,31	-0,32	-0,34	-0,35	-0,37	-0,39	-0,42	-0,43	-0,46	-0,47	-0,50	-0,51	-0,52	-0,56

ii)

RR	AP	PA	AC	AM	MA	RO	PB	SC	RJ	MT	TO	PI	BA	GO	RN	AL	MS	RS	DF	CE	MG	SE	ES	PE	PR	SP
0,16	0,13	-0,01	-0,04	-0,16	-0,19	-0,21	-0,24	-0,30	-0,30	-0,32	-0,36	-0,37	-0,40	-0,42	-0,43	-0,47	-0,47	-0,48	-0,48	-0,52	-0,56	-0,57	-0,59	-0,63	-0,65	-0,71

iii)

SC	RR	AP	PB	PA	AM	TO	AC	BA	RJ	MA	DF	MS	RO	GO	CE	RN	MT	PR	MG	PI	SP	ES	AL	RS	SE	PE
-0,02	-0,05	-0,08	-0,20	-0,20	-0,31	-0,33	-0,39	-0,42	-0,47	-0,48	-0,53	-0,55	-0,55	-0,58	-0,61	-0,62	-0,63	-0,65	-0,71	-0,73	-0,78	-0,78	-0,82	-0,84	-0,84	-0,85

Figures 12a and 12b, particularly in the North, point to a positive correlation in spending on medicines/IDS. The correlation becomes negative between spending on drugstores and the IDS over the weeks, with emphasis on the third period of the analysis (12c and 12iii), in which 16 states have a correlation greater than -0.5. Most of the states that exhibited this behavior were those that took a little longer to register a greater number of infected people, located in the Midwest and South of the country (Figure 12c).

Summarizing the analysis, it is observed that, as noted in the literature, the degree of essentiality has been an important factor in maintaining "normal" levels (at least on average terms) of consumption expenditures during the 2020 coronavirus pandemic.

However, issues such as mobility associated with the consumption sector and how social isolation measures affect the sector are also important, such that three primary types of behavior were observed: (i) sectors that experienced an abrupt negative shock and did not recover, associated with mobility issues; (ii) sectors that experienced a negative shock and recovered gradually, generally of non-essential goods and more sensitive to social isolation measures; (iii) finally, sectors that experienced a sudden positive shock and have since had a more erratic behavior, although they did not actually show such a considerable drop in the level of consumer spending. These are goods characterized by their essentiality .

It is also observed that the heterogeneity of social isolation measures (both in the form in which they were adopted, the timing of adoption, and the population's adherence to these measures) differs between states, which possibly explains the different correlations observed in this study.

5. Final considerations

This paper aimed to correlate the social isolation measures adopted as a result of the coronavirus pandemic with variations in consumption spending in the various Brazilian UFs. Following stylized facts from an incipient literature, there was a greater inertia in consumption expenditure in essential goods.

However, the article contributes to the literature by observing that this inertia is more complex, at least in the Brazilian case, than is suggested at the outset. Issues such as consumer mobility during the pandemic and its quarantine and how social isolation measures affect each consumer sector are relevant.

Thus, three types of primary behavior were classified among consumer expenditures in the various sectors considered: i) spending in sectors that were sharply reduced and did not recover, associated with consumer mobility problems during quarantine; ii) expenditures in sectors that declined sharply and that gradually increased, generally, on non-essential goods and more sensitive to social isolation measures; iii) finally, spending in sectors that increased when social isolation measures were enacted, probably associated with a stock effect, and since then have been more erratic, although they did not, in fact, fall during the period, even as they were considered essential goods.

As expected, the first correlations present the full shock of the social distance measures and family expenses, that is, the beginning of the series contemplates weeks when there were no impacts of the pandemic. The second and third correlations, which started in the eighth and 11th week, are calculated from more static series, that is, with negative variations in consumption and with non-zero IDS. Thus, as expected, the correlation tends to be less negative or smooth.

In addition, heterogeneity was also observed in how the social isolation measures were adopted may have had different effects on the different measures in each UF. The moment of adoption and flexibility and the population's adherence to these measures also seems to be relevant. As a future study, it is suggested to

analyze the influence of institutional differences in the form and timing of the measures on their compliance and their economic and demographic consequences.

Furthermore, it should be noted that the loosening of legal social distance measures are not necessarily related to controlling the pandemic and reducing the fear of infection or the collapse of the health care system. The weakening of the severity of isolation is also a political and economic decision, both in terms of public finances and personal / family finances.

As mentioned before, according to information from the Central Bank of Brazil (BCB) and the IBGE in 2019, 89.3% of the Brazilian population has a banking relationship with a financial institution, and while credit/debit card data may be income biased, we believe it sheds light on consumer behavior during the isolation period for the 2020 covid pandemic.

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