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US consumers' confidence and responses to COVID-19 shock

Suzanna Elmassah
Department of Economics, Faculty of Economics and Political Science, Cairo University, Giza, Egypt and Zayed University, Abu Dhabi, United Arab Emirates
Shereen Bacheer
Zayed University, Abu Dhabi, United Arab Emirates and Faculty of Economics and Political Science, Cairo University, Giza, Egypt, and
Eslam Hassanein
Beni Suef University, Beni Suef, Egypt

Abstract

Purpose – This research's main objective is to investigate the relationship between consumption expenditure and consumer confidence in the USA and to study their effects on US economic revivalism during and after the coronavirus disease 2019 (COVID-19) shock.

Design/methodology/approach – The authors use Michigan's monthly Consumer Sentiment Index and its five components from January 1978 to April 2020. The study is unique in quantifying the potential variations in US consumer confidence due to COVID-19 under different scenarios, by providing a projection until December 2021. It also estimates the time needed for recovery and offers guidance to policymakers on ways to contain the negative impacts of COVID-19 on the economy by restoring consumer confidence.

Findings – All scenarios show a gradual recovery of consumer confidence and consumption expenditure. This study recommends expansionary policies to encourage consumption expenditure to generate additional demand and boost economic growth and job creation.

Practical implications – Though this study is limited to the US consumer confidence index, it offers significant implications for marketers, customers and policymakers of other developed economies. The authors recommend expansionary economic policies to boost consumer confidence, raise economic growth and result in job creation.

Originality/value – The study is unique in quantifying the potential variations in US consumer confidence due to COVID-19 under different scenarios; by providing a projection until December 2021. It also estimates the time needed for recovery and guidance for policymakers on ways to contain the COVID-19 shock negative impacts on the economy by restoring consumer confidence.

Keywords Consumer confidence, COVID-19, Recovery, USA, Shocks, Pandemic

Paper type Research paper

1. Introduction

Consumer confidence is one of the foremost economic indicators that provide information on the current and future paths of the economy, stimulate economic activity and predict changes in macroeconomic variables, especially during times of economic and political uncertainties (Celik, 2010; Karagöz and Aktaş, 2015; Kellstedt *et al.*, 2015). Consumer confidence is defined as the degree of "optimism" about the economic situation that consumers are expressing via their savings and spending activities. Consumer confidence is usually measured using some

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indexes that are considered critical in providing policymakers and economic forecasters with necessary information on current and future economic circumstances. These indexes play a vital role in public policy formulation and business decision-making. Positive shifts in consumer confidence can boost economic growth, whereas negative changes can depress it (Islam and Mumtaz, 2016).

Personal consumption expenditure has long been a vital driver of economies in general, and the US economy in specific, especially during recessions (Emmons, 2012), where it accounts for roughly two-thirds of the US gross domestic product (GDP) (Toossi, 2002; Bureau of Economic Analysis, 2021). In 2019, when consumer confidence hit a 20-year high, consumer spending accounted for about 80% of real GDP growth (Council of Economic Advisers, 2020).Consumer confidence and personal consumption are strongly linked (Ludvigson, 2004) and are both affected by business cycles. Personal consumption usually falls during a recession (Reed and Crawford, 2014); therefore, consumer confidence can also be linked to recession. For instance, the financial crisis of 2008 was described as a "catastrophic collapse in confidence" (Stiglitz, 2008). Similarly, Carrol *et al.* (1994) highlighted consumer confidence as the leading cause of the US recession of 1990–91. However, it is difficult to determine whether the collapse in confidence was a cause or a consequence of the financial crisis.

Nevertheless, academics and policymakers agree that the erosion of confidence ensured the longevity and depth of crises (Valášková and Klieštik, 2015). Social scientists believe that a sufficient level of confidence is crucial for stabilizing and maintaining the social, political and economic systems (Roth, 2009). Periods of high political or economic instability are commonly related to significant consumer confidence fluctuations that result in high variations in consumption patterns. Moreover, consumers' willingness to consume and purchase is adversely affected by uncertainty (Acemoglu and Scott, 1994). Therefore, the negative impact of heightened uncertainty on consumption levels, even if the consumer's financial status is unchanged, can cause a decrease in consumption.

Since 1978, the US has faced numerous major crises and incidents that have broadly influenced the country's political and economic performance and worsened consumer confidence. For example, the US economy witnessed a severe recession in the early 1980s triggered by the Federal Reserve's disinflationary fiscal policy, followed by the impact of the Iraqi attack to Kuwait in 1990 (Garner, 1981), the terrorist attacks of September 11, 2001 (Witte, 2014), and the financial crisis emerging from the growth of high-risk loans between 2007 and 2010 which resulted in the worst economic crisis since the Great Depression (Ellis, 2009).

Recently, the coronavirus disease 2019 (COVID-19) pandemic is considered the latest and most widely spreading global shock. It started from China in the last quarter of 2019 and quickly spread worldwide. By September 2020, the number of confirmed cases worldwide was more than 34 m, with more than 984,000 confirmed deaths (WHO, 2020). Since there was no effective cure or vaccine available, many regions implemented partial or complete lockdown in the affected areas to minimize the spread of the virus, which have badly affected economies internationally. It is estimated that the pandemic reduced global economic growth in 2020 to an annualized rate of about −3.2%. The US economy has been adversely hit by this pandemic, with a 3.4% drop in its growth rate in 2020 compared to the previous year (Jackson *et al.*, 2021).

In 2020, the number of COVID-19 cases in the US increased sharply from mid-March and then started to decline at the beginning of April as a result of the impact of strict public health measures such as stay-at-home and social distancing restrictions. Yet, as the strict public health measures were gradually lifted on a state-by-state basis, cases began to rise, reaching a countrywide high in July 2020 and then started to gradually decrease. The number of infections started to rise again in October and reached its highest peak in mid-December 2020 (Figure 1). Although it is difficult to explain the main reason of rising cases, one contributing factor has been the return to school for US students. At the time of writing, the US has over 6.8 m confirmed COVID-19 cases, with over 200,000 deaths by the same period (WHO, 2020).

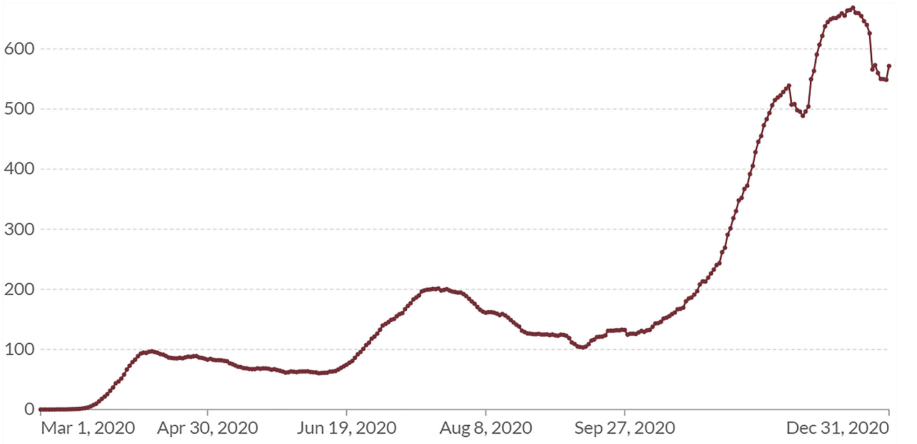

Figure 1.
Daily confirmed COVID-19 cases in the US per million people, January 2020–December 2020*

Note(s): *The chart shows 7-day rolling average
Source(s): Johns Hopkins University CSSE COVID-19 data

The lockdown measures have negatively affected the US economy where millions of Americans lost their jobs and incomes. The Pew Research Center survey conducted in August 2020 found that Americans who have experienced job or wage loss (either personally or in their household) due to COVID-19 had difficulties to pay their bills, rent or mortgage, used money from their savings or borrowed money from family or friends (Parker *et al.*, 2020). Accordingly, personal consumption expenditure has been affected by this lockdown and partial business closures, in addition to the spread of the COVID-19. The pandemic has in fact provoked a dramatic shift in consumer confidence and behaviors. Overall, US consumers seemed to have adjusted to pandemic restrictions by relying on unemployment benefits, personal savings and credit to sustain their consumption activities (Kobayashi *et al.*, 2020; WHO, 2020). The recovery from COVID-19 crisis will happen when consumers regain sufficient confidence to increase their effective demand significantly. The present erosion of consumer confidence may make trust more critical than ever before, necessitating effective policies targeting confidence-building through different channels.

The fluctuation of consumption expenditure during crises highlights the importance of exploring the US consumers' behavior during COVID-19 period, especially that the impact of this pandemic on consumer confidence and the potential recovery pattern have not yet been clarified. Accordingly, the current study aims to investigate the impact of the US consumers' confidence on consumption expenditure during the period of COVID-19 pandemic, besides projecting the potential recovery of consumption expenditure within seven different scenarios. The size of the US economy as a portion of the global economy, the importance of consumers in the US economy and the global recession's current context make this analysis of prime importance.

The current study is an addition to the existing literature from at least two perspectives. First, most of the existing literature discusses the relationship between consumer confidence and personal expenditure in the context of historical economic shocks, while this study investigates the US consumers' response to the current COVID-19 crisis. Second, this study provides a unique quantification of the potential variations in US consumer confidence and hence consumer spending during the pandemic projects the recovery pattern under seven different possible scenarios, ranging from the most pessimistic to the most optimistic. This indeed opens a new and interesting research venue in the field of consumer behavior.

Moreover, the study uses historical time-series data on US consumption spending and consumer confidence from 1978 until 2020 to provide a long-ranged empirical investigation through a comprehensive literature review and consumer confidence trend analysis covering major epidemics or shocks that faced the US economy, including recession periods of the 1980s, Gulf War of 1990, Afghan and Iraq War, and the recessionary period from 2007 to 2010. Therefore, the study offers a significant addition to the available literature about shocks and pandemics.

The current study is also useful for policymakers in several ways. First, it quantifies the impact of consumer confidence on private consumption spending during COVID-19 and shows a projection of the potential recovery pattern of consumption spending towards the pre-pandemic levels. This will in turn provide some insights regarding the suitable policies that can minimize the adverse economic impacts of the pandemic or expedite the recovery process. Policymakers can target required measures that build consumer confidence and motivate spending, hence taming the pandemic's impact on effective demand and thus reducing the depth and longevity of recession.

The rest of the study is structured as follows. Section 2 is a review of the relevant literature. Section 3 presents a discussion on the link between US consumer confidence and consumption expenditure while considering COVID-19. Section 4 discusses data and its sources, along with the theoretical and econometric model used in the study. Section 5 presents the stationarity analysis for selecting appropriate econometric estimations, followed by the quantitative analysis of consumer expenditure and confidence during COVID-19, including prediction for the future period. This is followed by an estimation of the US economy's economic trends and the building of various scenarios within which consumption expenditure and confidence are projected for the post-COVID-19 period. Finally, the results for all scenarios are presented. Section 6 concludes the study with a summary of its key messages and policy implications.

2. Literature review

The objective of this study is to investigate the impact of US consumer confidence on personal consumption spending during the time of COVID-19 pandemic and, subsequently, showing when the economy may recover from this shock. In this context, the scholarly literature has studied consumer confidence, its link with consumer expenditure and business cycles.

2.1 Consumer confidence and consumption expenditure

Consumer confidence is a subjective assessment of an economy's recent direction combined with perceptions of its possible prospects. A sufficient level of confidence and trust is crucial for stabilizing and maintaining the social, political and economic systems (Roth, 2009; Giraud-Héraud *et al.*, 2006).

The US has confronted successive crises and significant events since 1978, each of which has broadly affected its economic and political performance (Dees and Brinca, 2013). Over the time, consumer sentiment has become a key ingredient in predicting the future of the economy and the futures of the politicians in the US. The consumer confidence index in fact influences evaluations of politicians, public liberalism, as well as trust in government (Durr, 1993).

Generally, a period of high economic (or political) uncertainty is associated with high fluctuations in consumer confidence and consumption. Furthermore, households' willingness to consume (or buy) is negatively affected by uncertainty (Acemoglu and Scott, 1994). Uncertainty about, for instance, future job security and income, forces households to save as a precautionary reaction (Giavazzi and McMahon, 2012). Thus, even if the consumers' financial

position is unchanged, the negative effect of higher uncertainty on the marginal propensity to consume can lead to a drop-in consumption (Desroches and Gosselin, 2002) and hence worsen a recession's depth and longevity.

The consumer confidence has been widely applied as an important indicator to predict consumer spending. The idea of using consumer confidence for consumption prediction goes back to 1963 (Croushore, 2004). Mueller (1963) applied ten years of data from the Michigan survey of consumers' confidence to test the predictive success of the survey in conjunction with a number of financial variables. She confirmed that consumer confidence was a good explanatory variable for consumer spending. The predictive power of the consumer confidence index was highlighted by various studies. Carroll *et al.* (1994) concluded that consumer confidence has some explanatory power for current changes in household consumption. They found that consumer confidence predicts current consumption growth mainly because it predicts current income growth. Moreover, Howrey (2001) examined the statistical significance of the Index of Consumer Sentiment (ICS) for predicting personal consumption expenditure. He found that the index, either alone or in conjunction with other economic indicators, is statistically significant and helps to predict personal consumption expenditure. Similarly, Uchitelle (2002) concluded that consumer confidence, when combined with other data, provide additional information in forecasting consumption.

Among US consumer confidence indexes, the MCSI (Consumer Sentiment Index issued by the University of Michigan) was proved to help forecast consumption expenditure changes independent from other indicators (Juster and Wachtel, 1972; Garner, 1981). Bram and Ludvigson (1998) reported a significant incremental predictive power of the MCSI for forecasting consumption growth, with some questions having more predictive power than others. Carroll *et al.* (1994) claimed that lags of US MCSI have explanatory power for household spending changes. In the same vein, Wilcox (2007) showed that MCSI sub-indices significantly improve consumption forecasting compared to the aggregated index. Furthermore, Howrey (2001) reported the usefulness of the high-frequency MCSI information since the monthly MCSI information helped improve quarterly forecasts.

2.2 Consumer confidence and business cycles

Beveridge (1909) stated that consumer expectation is a "single underlying" factor that can play a vital role in the effectiveness of economic policies and control business cycles. This is because positive consumer expectations can lead to higher expected demand, which in turn leads firms to higher production (Banerjee and Sarvary, 2009). Pigou (1927) said that psychological factors (i.e. waves of optimism and pessimism) lead entrepreneurs to make errors when forming their expectations about future profits. These errors generate cycles through rise and fall in investment. Similarly, Keynes, in his macroeconomics theory (1936), argued that these waves of optimism and pessimism could be major drivers of business cycles.

Among others, Taylor and Mcnabb (2007) demonstrated the pro-cyclicality of consumer confidence and its significant role in predicting downturns. Nofsinger (2012) demonstrated household behavior in boom-and-bust economic cycles, focusing on the 2007–2008 financial crisis. He reported more consumption and fewer savings in boom times and the opposite in busts, which eventually drags down an already sinking economy. Santero and Westerlund (1996) concluded that fluctuations in GDP often follow substantial variations in confidence. Dees and Brinca (2013) claimed that longevity of both the Great Depression and the 2007–08 financial crisis resulted from consumer confidence collapse.

Christiansen *et al.* (2014) stated that consumer sentiment holds greater predictive power for US recessions than the classical recession predictors and factors. Additionally, it is argued that this sentiment provides useful information about future consumer expenditure in uncertain times (Throop, 1992; Desroches and Gosselin, 2002). Dees (2017) used survey data on consumer

sentiment to identify the causal effects of confidence shocks on real economic activity in a group of advanced economies. He found that confidence shocks significantly affect consumption and real GDP, where they explain a considerable variation in total economic activity and are partially responsible for business cycle fluctuations. Also, unemployment levels are subject to a rise in times of recession, leading to a deterioration in consumer confidence and a significant aggregate demand reduction. If consumer confidence remains at the lowest level for a long time, it will be difficult for the government to re-boost aggregate demand.

3. US economy and consumer confidence

3.1 Background

Consumer confidence is a major indicator for analysts and policymakers, especially in times of disturbances (Fuhrer, 1993). There are two approaches to looking at the role of consumer confidence. First, an approach based on "animal spirits" considers the psychological factors that influence consumer's decisions as exogenous variables (Desroches and Gosselin, 2002). The second approach considers all news and information that deal with confidence and reflect macroeconomic conditions as endogenous variables. This approach suggests a connection between the development of consumer confidence and subsequent macroeconomic activity (Lachowska, 2013). Barsky and Sims (2012) found that confidence reflects news that provides essential information about current and future economic situations. Likewise, Cochrane (1994) reported that consumption shocks are proxies for news that consumers receive about future productivity that does not otherwise appear in econometricians' information sets. Blanchard (1993) reported that the exogenous movements in consumption caused the US recession in 1990–1991.

In this study, we consider that consumer confidence is formed from a blend of psychological factors and information about macroeconomic conditions, where the latter heavily affects the former. Consumer confidence reflects specific attitudes related to particular events and to the economic situation. Consumers' spending is affected by their confidence as well as their current income and wealth. Both willingness to buy and affordability create the consumer's effective demand. Willingness to buy is partially derived from consumer confidence.

3.2 The consumer confidence measurements in the US

There are two widely followed measures of consumer confidence in the US. The Consumer Sentiment Index issued by the University of Michigan (MCSI) and the Consumer Confidence Index (CCI) published by the Conference Board. Both indices are based on responses to five survey questions; two questions ask respondents to assess their present economic conditions, these receive 40% of the index's weight. The other three tackle consumers' expectations (Dion, 2006). This particular study uses the MCSI.

The MCSI started annually in the 1940s as the first US survey to measure, understand, and analyze the impact of changes in consumer attitudes and expectations (Dion, 2006). The MCSI became a quarterly index in the 1950s and has been available every month since 1978 (Howrey, 2001). The index contains 50 core questions covering different aspects of consumer attitudes and expectations. The survey polls a sample of 500 people by telephone and asks questions focusing on their present and future financial conditions, spending intent and business conditions (Michigan University, 2020). The MCSI reflects recent changes in the economy rather than the level of economic activity (Bram and Ludvigson, 1998). A higher value of the MCSI indicates greater optimism among private households.

3.3 COVID-19 and US consumers' confidence

The novel coronavirus emerged in Wuhan, China, in mid-December 2019 and rapidly spread globally. Since the emergence of the virus, the research investigating the pandemic's impact

on the economy is ongoing. For example, Fornaro and Wolf (2020) showed that the COVID-19 outbreak might lead to a demand-driven downturn, followed by a supply-demand doom loop and potential stagnation traps brought about by pessimistic animal spirits. Ikram *et al.* (2021) found that the pandemic has adversely affected the economic growth, logistics performance, environmental performance, as well as quality production processes of the top affected Asian countries. Similarly, Wren-Lewis (2020) argued that reduction in economic growth attributable to COVID-19 result from higher production costs, reduced labor supply, higher temporary inflation and reduced social consumption.

Verschuur *et al.* (2021) believe that understanding the propagation of the economic shock as a result of the COVID-19 crisis, which can be informed by real-time observations and model predictions, would assist to better allocate international aid and economic stimulus, as well as could provide policymakers with more decision-relevant information on the prioritization of post-COVID-19 recovery needs. To investigate the pandemic's likely macroeconomic impacts, Barua (2020) utilized a standard macroeconomic AD-AS model to understand COVID-19's impact on economic areas or activities, including supply, demand, supply chains, trade, investment, price levels, exchange rates, financial stability and risk, economic growth and international cooperation. The study advised governments and international institutions to design shock mitigation policies that are comprehensive, innovative and coordinated, with extra support for developing economies, including debt reductions.

There is abundant scholarly literature studies (as discussed earlier) that analyze the relationship between consumer confidence and various economic variables. These studies do focus on consumer confidence indexes and their predictive powers. However, they pay little attention to the effect of shocks and unique events on consumers' attitudes and confidence, and how this eventually impacts their consumption expenditure.

This particular study is unique in quantifying US consumer confidence's potential variations due to COVID-19 under seven possible scenarios; by providing a projection until December 2021. The findings will guide policymakers on rebuilding consumer confidence during and after the pandemic to tame its impact on effective demand/consumption levels. Furthermore, specifying the time needed for recovery from COVID-19 may help the government determine the period it needs to support the economy and adopt consistent and timely policies. US policymakers can help businesses stay afloat, supporting households and helping preserve employment. The readiness to act helps in the containment and mitigation of negative impacts on confidence, which affects households' propensity to consume and business investment. The findings may also benefit other countries with evidence on the international transmission of shock through the consumer confidence channel.

4. Data and research methodology

4.1 Data

The primary source of our data is the MCSI and its various components. The use of MCSI in this study is motivated by the substantial application of this indicator in the literature (Howrey, 2001; Ludvigson, 2004). Indeed, many studies consider the MCSI as a leading indicator of real economic conditions. Additionally, the study only applied the MCSI and its components to predict the consumer spending, as results from previous studies show that the index on its own has a predictive power for future changes in consumption spending (Carroll *et al.*, 1994; Howrey, 2001). The study used 510 monthly values for the analysis from 1978 (prior to the 1980s recession) till June 2020 (at which time this study was conducted) for two main variables, namely the US consumer expenditure (measured in US$) and US MCSI Index. This study was conducted at the beginning of the second peak of the pandemic, allowing data to be collected in real time and recording the actual consumers' behavior. Data for consumer spending has been taken from the US Bureau of Economic Affairs

(BEA). The MCSI index data were obtained from surveys of consumers performed by the Survey Research Center of Michigan University. The detailed composition of the MCSI and its components are presented in Table 1. The descriptive analysis of the MCSI index is given in Table 2. Furthermore, since the study aims to investigate the impact of COVID-19 as a shock on consumer spending and consumer sentiments, we use a dummy variable to represent the event in our model.

The mean value of the MCSI is around 86, whereas its various components' mean values vary between 91.15 and 146.35. The standard deviation shows higher variations in X_3 compared to other components of MCSI. It is also evident that the MCSI and its various components had negative skewness and kurtosis values (except for X_5). The negative skewness values imply that these variables' distribution is negatively skewed (with a longer left tail). Whereas negative kurtosis indicates that their distributions are flatter than the normal distribution.

4.2 Research methodology

The study focuses on the impact of the MCSI on US personal consumption expenditure using monthly data since 1978 until June 2020. Afterward, the study will estimate the predicted values of personal consumption during and after the COVID-19 shock to project the potential recovery pattern of the shock. Considering the study objectives, we propose the following hypothesis:

H1. MCSI has no effect on personal consumption expenditure

Components	*Details**
X_1	We are interested in how people are getting along financially these days. Would you say that you (and your family living there) are better off or worse off financially than you were a year ago?
X_2	Now looking ahead — do you think that a year from now you (and your family living there) will be better off financially, or worse off, or just about the same as now?
X_3	Now turning to business conditions in the country as a whole — do you think that during the next twelve months we'll have good times financially, or bad times, or what?
X_4	Looking ahead, which would you say is more likely—that in the country as a whole we'll have continuous good times during the next five years or so, or that we will have periods of widespread unemployment or depression, or what?
X_5	About the big things, people buy for their homes — such as furniture, a refrigerator, stove, television and things like that. Generally speaking, do you think now is a good or bad time for people to buy major household items?

Note(s): *These are the questions being asked for the respondents while constructing the MCSI index

Table 1. Components of the MCSI

	MCSI	X_1	X_2	X_3	X_4	X_5
Mean	86.37	108.32	122.13	101.75	91.15	146.35
S.D	12.633	17.219	10.577	28.52	17.898	19.187
Minimum	52	58	90	31	40	77
Maximum	112	142	145	165	136	182
Range	60	84	55	134	96	105
Skewness	−0.50	−0.59	−0.65	−0.35	−0.21	−0.94
Kurtosis	−0.48	−0.14	−0.14	−0.45	−0.03	0.22

Table 2. Descriptive statistics of MCSI and its components

Against the null hypothesis.

H0. MCSI affects personal consumption expenditure

To test the above hypothesis, we have developed the following econometric models:

4.3 Consumer expenditure model

In an economy, consumer expenditure is the total money expended on final goods and services by persons and families for individual use and gratification. Existing measures of consumer expenditure consist of all private procurements of durable and nondurable goods, or services (Fernández-Villaverde and Krueger, 2007). The econometric model to measure personal consumption expenditure is given as below:

$$CONS_{US} = \alpha_0 + \beta_1 MCSI_{US} + \mu_t \tag{1}$$

with

$$\mu_t = \rho\mu_{t-1} + \varepsilon_t \tag{2}$$

where $CONS_{us}$ is personal consumption expenditure (measured in trillion US$), and $MCSI_{us}$ is the University of Michigan's Consumer Sentiment Index. α_0 is the intercept, β_1 is associated coefficient to MCSI and ε_t is the error term. Equation (2) shows the first-order autoregressive formation for the error term, a traditional way of solving the problem of autocorrelation in a time series model (Gujarati, 2011).

4.4 Consumer confidence model

We predict MCSI with its trend as the GARCH (*p, q*) model because of the ARCH effect in our time series data, and we also indicate MCSI components as ARIMA *(m, D, n)* model. Accordingly, our analysis is through two predictive consumer confidence models. The *first model for consumer confidence* is given in Equation (3):

$$\sigma_t = Z_t\theta_t \tag{3}$$

with

$$\theta_t{}^2 = \mu + \sum_{j=1}^{p} \beta_j \sigma_{t-j}^2 + V_t \tag{4}$$

where σ_t is GARCH model of order (p, q), Z_t is normally distributed, i.e. $Z_t N(0, 1)$ and θ^2 is the equation for the conditional variance of σ_t with $AR(1)$ process for the squared innovations.

The *second model for consumer confidence* is presented in Equation (5).

$$MCSI = \alpha + \beta_1 X_{1t} + \beta_2 X_{2t} + X_{3t}\beta_3 + \beta_4 X_{4t} + \beta_5 X_{5t} + u_t \tag{5}$$

where $X_1, X_2, \ldots..X_5$ are the components of MCSI as shown in Table 1, $\beta_1, \beta_2 \ldots\ldots \beta_5$ are the corresponding coefficients to these components of MCSI. Table 1 presents five components of the MCSI index. The three main consumer perception factors that are measured through these five variables are: personal finances (X_1 and X_2), economic conditions (X_3 and X_4) and household goods buying conditions (X_5) as described in detail in Table 1. Furthermore, it is assumed that, like the consumer expenditure model Equation (1), this model also follows $AR(1)$ process of the type given in Equation (2).

5. Estimation and discussion of results

This section is divided into five sub-sections. First, the stationarity analysis is undertaken. Second, the study models are estimated, including the consumers' expenditure and MCSI

relationship, the forecasting of the personal consumption expenditure in the future, and linking the MCSI with its subcomponents. The results of these estimations are also discussed.

5.1 Stationarity analysis

The study is using time series data, therefore, we performed the stationary analysis for our variables using Augmented Dickey–Fuller (ADF) (Dickey and Fuller, 1979) and Phillips–Perron (PP) (Phillips and Perron, 1988) tests. The results of these tests are presented in Table 3. The results show that the MCSI (the primary variable used in this study) is stationary at the level because the ADF and PP test statistic values are significant, and it rejects the null hypothesis of this series having unit root. The same conclusion can be drawn for all the components of the MCSI, as evident from the results of the two tests. Finally, the consumer spending is not stationary at level; however, it is stationary at first difference.

5.2 Consumer expenditure

Since MCSI is stationary at level (i.e. it is $I(0)$), consumer personal expenditure is static at the first difference (i.e. it is $I(1)$); therefore, Equation (1) needs to be estimated via autoregressive integrated moving average (ARIMA) using EViews default lag selection option. We prefer ARIMA over other advanced econometric techniques due to its simplicity and ability to perform better forecasting time series (Hanke and Wichern, 2014). The ideal model suggested by EViews was ARIMA $(1, 0, 0)$, and its results are presented in Table 4. The MCSI has a significant effect on consumption expenditure. When consumer confidence increases by 1%, consumer spending increases by 3.87%. The first-order autocorrelation point estimator (AR 1) 0.99 is highly significant as well. Furthermore, the post-fit diagnostic tests (as presented in

	Augmented Dickey–Fuller (ADF)		Phillips–Perron (PP)		
	Constant only	Constant with trend	Constant only	Constant with trend	Stationary
MCSI	−3.51***	−3.55**	−3.30**	−3.25*	$I(0)$
X_1	−2.25	−2.30	−3.22**	−3.27*	$I(0)$
X_2	−2.30	−2.28	−4.92***	−4.89***	$I(0)$
X_3	−4.28***	−4.27***	−4.03***	−4.02***	$I(0)$
X_4	−4.03***	−4.26***	−4.16***	−4.44***	$I(0)$
X_5	−3.12**	−3.18*	−3.83**	−3.93**	$I(0)$
Consumer expenditure (at level)	1.62	−2.06	1.59	−2.07	–
Consumer expenditure (1st difference)	−10.85***	−10.92***	−11.95***	−11.28***	$I(1)$

Note(s): *$p < 0.10$, **$p < 0.50$, ***$p < 0.01$. For all variables 18 lags were used as default

Table 3. Results of unit root test in level and 1st difference

Variables	*Coefficients (S.E.)*	
MCSI	3.87*** (1.132)	$R^2 = 0.99$
AR (1)	0.99*** (0.0001)	Adjusted $R^2 = 0.99$
SIGMASQ	12728.39*** (259.506)	

Consumer expenditure = *3.87 MCSI + [AR (1) = 0.99, UNCOND]*

Note(s): ***$p < 0.01$

Table 4. Results of consumer expenditure ARIMA model

Table 5) to check autocorrelation in residuals (Correlogram *Q*-statistic), the heteroscedasticity (Breusch–Pagan–Godfrey test), and normality (Jarque–Bera test) tests confirm an excellent fit for our estimated ARIMA model. Hence, we reject our null hypothesis that MCSI has no effect on personal consumption expenditure against the alternative hypothesis that MCSI impacts personal consumption expenditure. These results are consistent with previous studies showing the positive and significant relationship between consumer confidence and consumer spending in the US (Ludvigson, 2004; Dees and Brinca, 2013).

The consumer expenditure values from July 2020 until April 2021 as a function of MCSI are forecasted, with 1.93% mean absolute percentage error (MAPE). These values were used for the scenario analysis. Figure 2 shows a graph of both forecasted and observed values from January 2018 to April 2021. It is evident that consumer spending went down sharply during the period March–April 2020 [1] (the time during which COVID-19 was at its peak in the US with over 50,000 daily cases).

	Correlogram Q-statistic	*BPG test*	*Jb test*
H0	No autocorrelation in residuals	No heteroscedastic residuals	Residuals are normally distributed
H1	There is autocorrelation in residuals	Residuals are heteroscedastic	Residuals are not normally distributed
Test statistics, distribution, and probability	For the lags 1, 2, 3 and 4 the AC values were 0.11, 0.21, 0.10, 0.09, PAC values were 0.11, 0.206, −0.035, −0.14 and Q-statistics values 0.29, 0.39, 0.39 and 1.62, respectively. However, none of these were statistically significant at 5%	$BPG = 1.23F(1, 506)$ with $P = 0.26$ $N \times R^2 = 1.24\chi^2(1)$ with $P = 0.26$	$JB = 0.347$ with $P = 0.84$
Decision	No autocorrelation	No heteroscedasticity	Residuals are normally distributed

Table 5.
Consumer expenditure model diagnostic tests

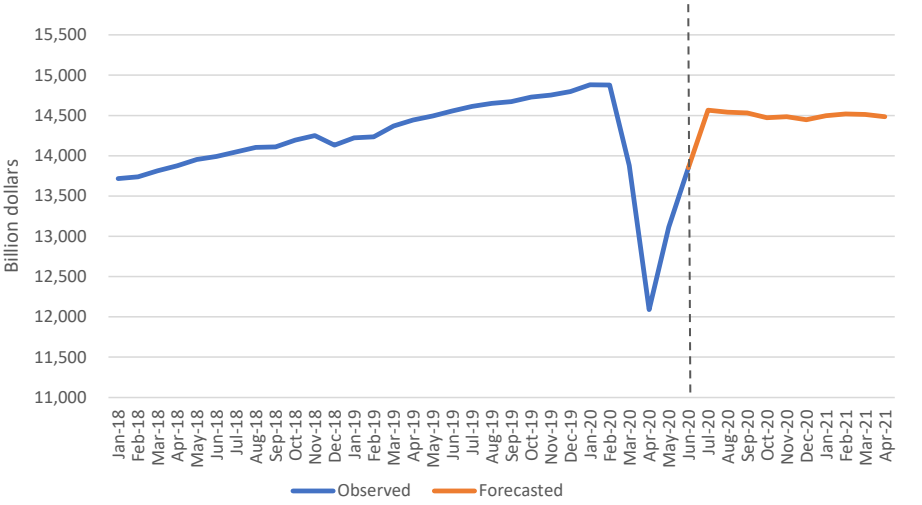

Figure 2.
Consumer spending observed and forecasted values (Jan 2018–April 2021)

5.3 Consumer confidence

The trends of the US consumer confidence index (MCSI) and personal consumption expenditure from 1978 to April 2021 indicate an autoregressive conditional heteroscedasticity (ARCH) effect in the data. Because it is evident that periods of low volatility are followed by further periods of low volatility, and periods of high volatility are followed by further prolonged periods of high volatility.

Two models for consumer confidence, represented by Equations (3) and (5), are estimated, and their results are presented in Tables 6 and 7, respectively. Table 6 presents the results for the GARCH model. The variance result indicates a simple linear regression. Table 7 presents the diagnostic results that show a good fit for the model. Consumption expenditure is significantly affected by the MCSI and the indicator AR (1), based on the *Z*-statistical probability of less than 5%. Finally, Table 8 shows the AR additive MCSI growth model (consumer confidence model 2). Accordingly, all components of MCSI (X_1, X_2, X_3, X_4, X_5) have a significant impact on the MCSI value. The growth rate of MCSI concerning all components ranges between 0.148 (for X_3) and 0.15 (for X_2). The first-order autocorrelation point estimator (AR 1) 0.98 is highly significant as well. Hence, we can confirm a sound impact of X_1, X_2, X_3, X_4 and X_5 on consumer confidence (MCSI).

These results also provide a mechanical way to describe the conditional variance's behavior. We use it to forecast consumption expenditure in the subsequent section that we will use in the scenario analysis.

Results of the GARCH model, as shown in Table 6, show the proportion of the variance that reveals a significant linear regression. The value of R^2 and adjusted R^2 (0.87) explains approximately 90% of the observed variation in the model's inputs.

Variables	*Coefficient (S. E)*	
MCSI (−1)	0.95*** (0.01)	$R^2 = 0.87$
AR (1)	−0.14*** (0.03)	Adjusted $R^2 = 0.87$
C	3.92*** (1.11)	
Variance Equations		
GARCH (−1)	1.09*** (0.003)	
GARCH (−2)	−1.01*** (0.006)	
C	16.99*** (0.793)	
Mean Equation MCSI = 3.92 + 0.95MCSI (−1) + [AR(1) = −0.140]		
Variance Equation GARCH = 16.99 + 1.09GARCH (−1) – 1.01 GARCH (−2)		

Table 6.
Results of consumer confidence model with GARCH (0, 2) and ARIMA (1, 0, 0)

	Correlogram Q-statistic	*ARCH effect test*
H0	No autocorrelation in residuals	No ARCH effect
H1	There is autocorrelation in residuals	There are ARCH effects
Test statistics, distribution, and probability	For the lags 1, 2, 3 and 4 the AC values were −0.02, −0.07, −0.06, −0.02, PAC values were −0.02, −0.07, −0.06, −0.03 and *Q*-statistics values 0.19, 3.03, 4.69 and 4.90, respectively. However, none of these were statistically significant at 5%	$F = 0.005$ $F(1, 505)$ with $P = 0.05$ $N \times R^2 = 1.24\chi^2(1)$ with $P = 0.94$
Decision	No autocorrelation	No ARCH effects

Table 7.
Consumer confidence model (model 1) diagnostic tests

Results of Engle's (1982) ARCH test, as shown in Table 7 indicates no autoregressive conditional heteroscedasticity, which confirms good model fit, and consequently the null hypothesis that there is no autocorrelation among residuals is accepted.

In order to forecast future impact based on past effects, autoregressive (AR) model of MCSI growth was tested and the results are shown in Table 8. The results reveal that there is a significant effect of all MCSI components on MCSI value. The values for estimate of the residual variance "SIGMAQ" and the values for first-order autocorrelation point estimator (AR1) are both significant demonstrating significant prediction of MCSI from all MCSI components (X_1, X_2, X_3, X_4, X_5).

5.4 US economic trends during shock periods

It is also vital to establish a link between US economic trends, MCSI and consumer expenditure during the shock periods. It will help to show the different scenarios through which this study aims to investigate the impact of COVID-19 on US consumers. For this purpose, we combined both MCSI and private consumption expenditure and run AR additive consumption growth ARMA (1, 0) model for the entire sample data (monthly data from 1978 till June 2020). We used a dummy variable for measuring the eleven economic shocks the US economy faced during this period (see Appendix: Table A1). Accordingly, the results are presented in Table 9. There is a significant negative growth rate of consumer spending concerning unique events (dummy variable coefficient = −50.78).

Furthermore, if we use one specific shock at a time (rather than using all eleven shocks in a single model), we notice a negative impact of each particular shock on the MCSI index.

Variables	*Coefficient (S.E.)*	
X_1	0.148*** (0.007)	$R^2 = 0.99$
X_2	0.150*** (0.007)	Adjusted $R^2 = 0.99$
X_3	0.147*** (0.004)	
X_4	0.148*** (0.006)	
X_5	0.149*** (0.006)	
AR(1)	0.985*** (0.027)	
Sigma Q	0.124*** (0.002)	

$MCSI = 0.148X_1 + 0.150X_2 + 1.47X_3 + 1.48X_4 + 0.149X_5 + [AR(1) = 0.985, UNCOND]$

Note(s): ***$p < 0.01$. These results were also free from autocorrelation, heteroscedasticity, and the residuals were normally distributed

Table 8. Consumer confidence model (model 2)

Variables	*Coefficient (S. E)*	
MCSI	3.77*** (3.53)	
Dummy	−50.78*** (17.94)	
AR (1)	0.99*** (0.001)	$R^2 = 0.99$
SIGMASQ	12637.38*** (378.54)	Adjusted $R^2 = 0.99$
C	3.92*** (1.11)	
Variance Equations		
GARCH (−1)	1.09*** (0.003)	
GARCH (−2)	−1.01*** (0.006)	
C	16.99*** (0.793)	

Model: AR additive consumption expenditure growth ARMA (1, 0)

Table 9. Consumption responses to the shock periods

Because a model with MCSI as a dependent variable and all its components and a dummy variable (representing one shock from each of the eleven specific shocks considered) resulted in a negative and statistically significant coefficient for the dummy variable, this confirms the negative impact of the economic shock on the MCSI and consumer confidence. This result is consistent with the findings of Dees and Brinca (2013), who also concluded that recessions and financial crises (like in 1992–93 or 2008–09) negatively impact the consumer confidence in the US and the Euro area.

5.5 Scenario analysis for COVID-19

To generate different scenarios for studying the impacts of COVID-19 on consumer confidence and consumer personal expenditure, the study used Machine Learning Language S-Plus (R platform) to predict the GARCH (0, 2) ARIMA (1, 0, 0) equation for ten periods (months) ahead from July 2020 to April 2021, that is, $t + 1$ = July 2020, $t + 6$ = Dec 2020, $t + 10$ = April 2021 and so on. The different predictions generated are given in Table 10.

Table 10 shows that MCSI will reach its minimum in December 2020, and then it starts a recovery path in February 2021. Furthermore, the values for MCSI are used through the relationship being established between MCSI and personal consumption expenditure to predict the personal consumption expenditure values for these scenarios to study economic recovery from COVID-19.

To investigate the impacts of COVID-19 on consumer expenditure and confidence, the predicted values in Table 10 are used to generate pessimistic and optimistic scenarios by calculating the percentage change of MCSI maximum and minimum values from its mean. These values are respectively given in the last two columns of Table 10. The second to last column shows the range of deviation from mean value to minimum from the lowest of 22% to the highest of 48%. The halfway between the minimum and mean values are 11–24%. Whereas the last column in Table 10 shows the range of deviation from mean value to maximum from the lowest to the highest values, 14–32%. The halfway between the maximum and mean values are 7–16%. The seven scenarios used in this study are formed using percentage changes in MCSI between these values. The seven applied scenarios from our forecasted values are as follows: the minimum (most pessimistic scenario), two scenarios of 20 and 15% deviation of MCSI from the mean to the minimum, one scenario of mean value of MCSI, and two scenarios of 20 and 15% deviation from the mean to the maximum values of MCSI, and one scenario of the maximum (most optimistic scenario) values of MCSI. The consumption model in Equation (1) is used to study consumer consumption in each of these scenarios.

The results of all scenarios are presented in Table 11. The first part shows the consumption expenditure and the MCSI values for July 2020 to April 2021. To get a better understanding, we used regression for consumption based on the quadratic trend. We extended the consumption to the future months until December 2021, as shown in the lower portion of Table 11. This process was repeated for all seven considered scenarios. The results were consistent while performing the diagnostic tests (test for normality, heteroscedasticity and autocorrelation).

The consumption expenditure, under all scenarios, is rebounding after the initial fall due to COVID-19 shock. The impact of the shock varies under different scenarios, and consumption recovers with varying durations. However, the increase in consumption after COVID-19 started is not significant in all scenarios. For instance, the consumption expenditure remains in the range of US$11.95tn (most pessimistic scenario) to US$14.85tn (under the most optimistic scenario) by April 2021 (compared to a level of US$14.8tn prior to the pandemic). In April 2021, the consumption expenditure does not show full recovery – except for the most optimistic scenario – although increasing consumption expenditure is

Table 10.
MCSI predicted values

t			Minimum	1st quartile	Mean	3rd quartile	Maximum	Forecast [analytic]	% Minimum	% Maximum
$t+1$	2020	July	61.38	76.74	78.71	81.02	90.07	78.53	−22	14
$t+2$		August	57.54	75.48	78.84	82.56	101.16	78.94	−27	28
$t+3$		September	56.15	75.05	79.33	83.87	104.73	79.32	−29	32
$t+4$		October	46.04	75.06	79.84	84.59	104.80	79.69	−42	31
$t+5$		November	48.30	74.76	80.03	85.14	105.56	80.04	−40	32
$t+6$		December	42.30	75.38	80.62	85.91	106.63	80.62	−48	32
$t+7$	2021	January	50.91	75.55	80.99	86.32	104.07	80.67	−37	28
$t+8$		February	54.70	75.16	81.14	87.16	110.96	80.97	−33	37
$t+9$		March	54.19	75.02	81.29	87.41	112.74	81.25	−33	39
$t+10$		April	49.13	75.72	81.67	88.11	110.59	81.51	−40	35

Model: sGARCH, prediction: 10 periods ahead, Bootstrap method: Partial

Scenarios		Most pessimistic Minimum value		20% deviation from mean		15% deviation from mean		Mean value		15% deviation from maximum		25% deviation from maximum		Most optimistic maximum value	
Year	Month	MCSI	C	MCSI	C	MCSI	C	MCSI	C	MCSI	C	MCSI	C	MCSI	C
2020	July	61.38	12.025	65.59	12.050	68.45	12.066	78.71	12.127	90.52	14.737	94.45	14.761	90.06	14.735
	August	57.54	12.001	65.70	12.049	68.56	12.066	78.84	12.127	90.67	14.737	94.61	14.761	101.16	14.799
	September	56.15	11.992	66.11	12.051	68.98	12.068	79.33	12.129	91.23	14.739	95.20	14.763	104.73	14.820
	October	46.05	11.931	66.53	12.053	69.42	12.070	79.84	12.132	91.81	14.742	95.81	14.766	104.80	14.819
	November	48.29	11.944	66.70	12.053	69.59	12.070	80.03	12.132	92.04	14.742	96.04	14.766	105.56	14.822
	December	42.28	11.907	67.19	12.055	70.11	12.072	80.62	12.135	92.72	14.745	96.75	14.769	106.13	14.825
2021	January	50.91	11.958	67.49	12.056	70.43	12.073	80.99	12.136	93.14	14.747	97.19	14.771	104.07	14.812
	February	54.66	11.979	67.62	12.056	70.56	12.073	81.14	12.136	93.31	14.747	97.37	14.771	110.96	14.851
	March	54.18	11.975	67.74	12.056	70.68	12.073	81.29	12.136	93.48	14.747	97.54	14.771	112.74	14.861
	April	49.13	11.945	68.05	12.057	71.01	12.074	81.67	12.137	93.91	14.748	98.00	14.773	110.59	14.847
	Post-COVID-19 prediction (recovery) of monthly consumption (trillion US$) based on all scenarios														
	May		11.996		12.059		12.076		12.140		14.751		14.775		14.87
	June		12.023		12.060		12.076		12.144		14.752		14.776		14.88
	July		12.056		12.060		12.077		12.152		14.754		14.778		14.89
	August		12.094		12.061		12.078		12.164		14.755		14.779		14.90
	September		12.138		12.062		12.079		12.183		14.756		14.781		14.91
	October		12.188		12.063		12.080		12.210		14.758		14.782		14.92
	November		12.243		12.064		12.081		12.247		14.759		14.784		14.93
	December		12.303		12.065		12.082		12.296		14.760		14.785		14.94

Table 11.
Personal consumption expenditure based on seven scenarios

forecasted from December 2020. The projection for an extended period under this scenario shows that by July 2021, consumption expenditure will be back to the level of July 2020. The economy will be on the path of slow and gradual recovery. However, under an optimistic scenario, consumption remains within US$14.73 tn to 14.94 tn during this entire period (including the extended forecasts too). All other estimates for consumption expenditure stay within these two extreme values. These findings imply that consumer confidence must be restored and encouraged in order to boost economic growth. The first and second quarters of 2020 showed a 5% and 32.9% decrease in US economic growth, respectively. As the US economy is consumer-driven (where two-thirds of GDP come from consumption (Toossi, 2002)), consumer consumption must be increased to restore economic growth.

6. Conclusion and policy implications

COVID-19 has changed almost every aspect of our daily lives, and consumer consumption is no exception. Generally, consumers' spending dropped as compared to its pre-pandemic levels, due to lockdown measures, the increase in the number of cases and the economic consequences of the COVID-19 crisis. Results show that despite COVID-19 cases falling, the US consumption expenditure did not show fast pick up to reach its pre-pandemic level. All projections show a relatively slow recovery of the US economy with consumer confidence building gradually and steadily increasing consumption.

In light of its vital role as an engine of economic growth in the US, it is important to encourage consumption expenditure. In this context, expansionary economic policies (both fiscal and monetary) should be considered.

As far as public spending is concerned, the US government should consider increasing its spending on infrastructure-related projects, particularly transportation, water and energy. There is a backlog of about US$2tn for these infrastructures (Katseff *et al.*, 2020). The Health and Economic Recovery Omnibus Emergency Solutions Act(HEROES Act) with a stimulus package of US$2.2tn and another ongoing package of US$500bn (approved by the US Senate in May 2020) are steps in the right direction. These packages for unemployment benefits and funding for schools will certainly produce benefits for consumers. However, these packages cannot (and should not) be considered in isolation without looking into the US economy's other fundamentals. For instance, the ongoing twin-deficit (federal budget and current account deficits) may worsen. Therefore, using any expansionary policies without considering the consequences for the other fundamentals may create further economic problems in the future. However, with the unprecedented shock of COVID-19 affecting the global economy, these situations may require an unorthodox approach to tackle the issue.

Moreover, enhancing consumer confidence will help expedite the recovery of personal consumption expenditure. With health issues being a top priority, completion of the vaccination process and development of a medication to the virus can support consumer confidence. It is noticed that the actual announced values of personal consumption expenditure since June 2020 were closer to the optimistic scenarios rather than the pessimistic ones (Bureau of Economic and Business Affairs, 2020). This might be explained by the partial regain of consumer confidence after the announcement of two approved vaccines and working on making them available for everyone.

Finally, businesses can also have a significant role both in enhancing consumer confidence and expenditure. The pandemic crisis highlighted the role of digitalization in raising consumer confidence. Digital markets ensures an easier and safer alternative that supports recovery of private consumption spending, provides employment chances and supports business profits throughout the pandemic.

Given the US economy's nature, with consumers' consumption expenditure making up a significant percentage, this particular study's findings are equally useful for the country's

economic policymakers, as a significant portion of national income is derived from consumer expenditure. The findings of this study have some theoretical and practical implications. The study extends the limited knowledge about the impact of COVID-19 on consumer confidence and their consumption patterns, as well as offers a significant addition to the available literature about shocks from pandemics. In addition, the current study has significant practical implications for marketers, consumers and policymakers. The COVID-19 pandemic has changed market dynamics. Due to the emergence of global business, there was almost perfect market completion, which was beneficial for consumers. Severe lockdowns due to COVID-19 have restricted international trade, and as a result local monopoly reemerged, which results in a shortage of supplies and price increases. This study presents significant guidance to help marketers with planning of their production and supplies in case of future lockdowns and epidemics. Additionally, the study forecasts the expected recovery of the economy in both worst case and most optimistic scenarios. This gives clear directions to marketers, investors, consumers, policymakers and decision-makers.

The study has several limitations, which offer significant research opportunities. First, our study is limited to a focus on the US's consumer confidence index. Future studies can build on this by taking the consumer confidence indexes of different countries to generalize the effect of pandemics on different economies. Moreover, this study uses long serial data of 42 years, using only the data from pandemic years and recovery periods can enable researchers to get more streamlined results. Future studies can also compare the influence of different waves of the COVID-19 pandemic to investigate whether they have different impacts on consumer" confidence and hence their expenditure.

Note

1. As data show, the graph went down sharply during March and April which is in line with the first wave of COVID-19 infections in 2020.

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Appendix

Unique events	Start date	End date
Early 1980s recession	July 1981	November 1982
Black Monday	October 1987	–
Gulf War	August 1990	February 1991
World Trade Center bombing	February 1993	–
Oklahoma City bombing	April 1995	–
Dot-com bubble	2000	2001
Terrorist Attack	September 2001	-
Anthrax attacks	September 2001	October 2001
War in Afghanistan	October 2001	–
Iraq War	20 March 2003	–
2008 financial crisis	September 2008	May 2009
Swine flu pandemic (H1N1)	April 2009	August 2010
Subprime mortgage crisis	2007	2010
COVID-19	2020	Till now

Table A1.
Major shocks in the US, 1981–2020

Corresponding author
Suzanna Elmassah can be contacted at: suzanna.elmassah@zu.ac.ae