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Purchasing Power Gap and Consumer Resilience: An Empirical Investigation with Australia, Germany, Japan, and the United States

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Abstract

Recent developments in the world in the aftermath of the COVID pandemic have generated never before seen challenges and hardship to consumers since the Great Depression. This context has raised interest in the resilience of consumers across the globe. This research project conducts an empirical reflection on the matter with a focus on developed nations of Australia, Germany, Japan and the United States. A framework including impulse response functions along with data spanning from 1980 to 2020 is considered. Findings show that innovations to purchasing power gaps of consumers in Australia, Japan and the United States are essentially absorbed within four years. However, it takes much longer in Germany as these innovations mostly dissipate within six years. This suggests that German consumers exhibit relatively weaker resilience than their counterparts in Australia, Japan, and the United States. The paper further argues that a combination of policies geared toward propping up aggregate demand and reinforcing the supply chain, both quantitatively and qualitatively, could prove to be effective in boosting consumer resilience.

Keywords: Consumer resilience; Purchasing power; Impulse response.

1. Introduction

Consumers in the United States, and most parts of the world, have been experiencing as of late the unsettling reality of their purchasing power being chipped away. Indeed, their pockets and bank accounts have taken such a hit that some observers wasted no time assimilating this situation to the severe economic downturn which took place during the great depression in the 1930s.

Since the summer of 2020, inflation in the United States in particular has had widespread impacts on consumers. It was revealed by the US Department of Labor on January 12, 2022, that inflation had reached a 40-year high. Consumers of all strides in urban, suburban, exurban, and rural areas have undergone a sense of dismay before price hikes across basically all categories of goods and services. The phenomenon has become so pervasive that a new terminology, namely, *shrinkflation*, has emerged on Main Street. For a good or service, it refers to a situation where the size or quantity is reduced, while the retail price is kept the same – or moderately increased, in some cases.

This new state of affairs was the outcome of a combination of four stylized facts identified by most economists. First, the destabilizing spread of the Coronavirus pandemic that struck the United States, and beyond, in the spring of 2020. It caused an explosion in demand for a variety of goods and services. Second, the massive disruption in the domestic and global supply chains of goods and services and other resources. Third, the substantial injections of new money in the economy by the Federal Reserve System. Fourth, the uncertainties and disturbances created by the Russo-Ukrainian war on the eastern border of Europe. The salvo of these factors has drastically pushed up prices of goods, services and resources across the board. This situation stress-tested as well, in a real-world setting, the resilience of consumers.

Attempting to understand this resilience has become a compelling contemporary exercise worth exploring due to the high stakes for consumers and their living standards. At this juncture, it behooves us to ask the following question: What is consumer resilience? In a nutshell, it refers to the ability of consumers to successfully adapt, absorb or accommodate shocks to the economy that directly threaten or challenge their purchasing power.

Understanding and assessing consumer resilience have become major goals for a great deal of stakeholders, including decision-makers, academics, consumers, and businesspeople. The pertinence and urgency of these goals are enhanced by a new context wherein virtually everyone has come to realize how fragile economic systems could be. This fragility has been exposed for even the largest and traditionally most robust developed economies, namely, Australia, Germany, Japan, and the United States, among others. This fact has been even more evident in the face of shocks, such as the forms driven by COVID-19-type pandemics.

In the business world, the interest in the topic has gained enough traction to the point where the reputable corporation Fair, Isaac and Company (FICO) has decided to innovate in the current socio-economic context. Case in point, FICO announced on July 20, 2020, that it will be releasing henceforth a *resilience index* with the sole purpose of gauging the resilience of consumers. Against this background, the research objective governing this project is to explore the extent of consumer resilience in four developed nations: Australia, Germany, Japan and the United States.

In pursuing its main objective, the paper considers the following structure. The next section conducts a review of the literature. A methodological approach along with the data is discussed in the third section, while results and implications are presented in the fourth section. Section five wraps up the study with concluding remarks.

2. Literature Review

There is a broad and long-established consensus among scholars in the literature about the origin of the concept of resilience. Admittedly, it emerged in the field of ecology with a landmark study by Holling (1973). It has since become a concept used across many disciplines in biological, physical, and social sciences. In economics in particular, it has found insightful applications in both microeconomics and macroeconomics. This paper approaches the concept within the framework of the former.

Milaković (2021) probes the relevance of consumer vulnerability, resilience, and adaptability in the behavioral processes guiding purchase satisfaction and repurchase intention during the COVID-19 pandemic. Among others, she finds that vulnerability and resilience directly influence the purchase satisfaction and indirectly influence the repurchase intention via satisfaction. She further establishes that purchase satisfaction positively affects the repurchase intention.

Similarly, Bender *et al.* (2021) look into consumer behavior in general under the duress of the same devastating pandemic to understand the extent of resilience, particularly in the US food system. Using national survey data from 2020, they discover a notable shift in the behavior of households as they overwhelmingly choose homemade food. Importantly, they reveal that the propagation of shocks through the supply chain are reduced by improved food skills.

Sheth (2020) delves into consumer resilience wondering if old habits will return or die. The author contends that old habits will undergo changes via for instance advances in technology, demographic shifts, and a new learning process to reconcile work, leisure and education, which have become less and less distinct from one another.

From another perspective, Rew and Minor (2018) prospect the impacts of consumer resilience on the relationship between corporate social responsibility (CSR) and consumer attitudes. With a methodology centered around ordinary least squares, they uncover a key finding that CSR is positively related to consumer attitudes and resilience. Specifically, it is found that consumer attitudes are affected by the level of resilience − which exerts a boosting effect.

Beyond the United States, Szmigin *et al.* (2020) scrutinize the resilience of European consumers in the face of austerity. Their work considers an interpretivist approach including 38 interviews conducted across Ireland, UK, Spain, Portugal, Italy and Greece. They argue that in a context of consumption austerity, factors such as persistent stressors, temporal orientation, day-to-day coping, pragmatism, consumer adjustment, repertoires of resistance and transformation play major roles in determining persistent resilience. From a different angle, Goodman (2017) zooms in on the United Kingdom and checks out the resilience of consumers by looking at both their income and savings. He explains that the saving ratio had been undervalued as a result of higher than estimated actual household income in 2015.

3. Methodology and Data

3.1. Methodology

The current research work uses a methodological approach that revolves around impulse-response functions (IRFs) as introduced by Sims (1980) in economic modeling to track the response of variables following an innovation. Cooley and LeRoy (1985) and Pagan (1987) further increased the potency and applicability of this technique across disciplines.

For the purpose at end, the IRFs are based upon the deterministic features of purchasing power gaps, and two steps are in order. First, a statistical approach using data on purchasing power helps extract the stochastic trend of the series. Once the stochastic trend is isolated, gap series are computed through the differences between actual and derived trend data points. There exist two well-known filtering methods in the literature to derive trends of series, namely, the trend-cycle decompositions of (i) Hodrick & Prescott (1997) and (ii) Baxter & King (1999). The univariate Hodrick-Prescott (HP) is considered in this analysis. Suffice it to mention that each method presents advantages and shortcomings. According to the HP method, any series s_t can be structured into a growth component (z_t) and cyclical component (r_t):

$$s_t = z_t + r_t, \text{ with } t = 1, \ldots, T \quad (1)$$

The growth component is obtained by minimizing the following function:

$$Min \{\sum_{t=1}^{T}(r_t^2) + \gamma \sum_{t=1}^{T}[(z_t - z_{t-1}) - (z_{t-1} - z_{t-2})]^2\} \quad (2)$$

where γ is a parameter accounting for the smoothness of the growth component series. Equation (2) is minimized with respect to z_t.[1] (Hodrick and Prescott, 1997) explain that the solution series of the function above gets smoother with higher values of γ.

In the second step, an economic model is developed to capture the deterministic components of purchasing power gaps aforementioned using a system comprising q endogenous variables. A reduced form of this system is introduced below:

$$c_t = a_0 + a_1 c_{t-1} + \ldots + a_k c_{t-k} + e_t \quad (3)$$

where c_t is a random vector of order (qx1); a_0 is a (qx1) vector of constants; a_r is a (qxq) vector of coefficients with r = 1, …, k; k is the lag; t is the time subscript, while e_t is a (qx1) vector of innovations assumed to be independent and identically distributed (iid). In addition, e_t is normally distributed with zero mean and constant variance, σ^2. That is, $e_t \sim N(0, \sigma^2)$.

In the present study, q = 5 with purchasing power gap, output, wealth, unemployment, and an interaction term between output and wealth.[2] Accordingly, an explicit form of equation (3) can be written as:

$$\begin{pmatrix} c_{t,11} \\ c_{t,21} \\ c_{t,31} \\ c_{t,41} \\ c_{t,51} \end{pmatrix} = \begin{pmatrix} a_{0,11} \\ a_{0,21} \\ a_{0,31} \\ a_{0,41} \\ a_{0,51} \end{pmatrix} + \begin{pmatrix} a_{1,11} & a_{1,12} & a_{1,13} & a_{1,14} & a_{1,13} \\ a_{1,21} & a_{1,22} & a_{1,23} & a_{1,24} & a_{1,23} \\ a_{1,31} & a_{1,32} & a_{1,33} & a_{1,34} & a_{1,33} \\ a_{1,41} & a_{1,42} & a_{1,43} & a_{1,44} & a_{1,43} \\ a_{1,51} & a_{1,52} & a_{1,53} & a_{1,54} & a_{1,55} \end{pmatrix} \begin{pmatrix} c_{t-1,11} \\ c_{t-1,21} \\ c_{t-1,31} \\ c_{t-1,41} \\ c_{t-1,51} \end{pmatrix} + \cdots + \begin{pmatrix} a_{k,11} & a_{k,12} & a_{k,13} & a_{k,14} & a_{k,15} \\ a_{k,21} & a_{k,22} & a_{k,23} & a_{k,24} & a_{k,25} \\ a_{k,31} & a_{k,32} & a_{k,33} & a_{k,34} & a_{k,35} \\ a_{k,41} & a_{k,42} & a_{k,43} & a_{k,44} & a_{k,45} \\ a_{k,51} & a_{k,52} & a_{k,53} & a_{k,54} & a_{k,55} \end{pmatrix} \begin{pmatrix} c_{t-k,11} \\ c_{t-k,21} \\ c_{t-k,31} \\ c_{t-k,41} \\ c_{t-k,51} \end{pmatrix} + \begin{pmatrix} e_{t,11} \\ e_{t,21} \\ e_{t,31} \\ e_{t,41} \\ e_{t,51} \end{pmatrix} \quad (4)$$

In practice, stationarity of variables in the system are considered to ensure consistent and efficient estimates. Using equation (4), all coefficients are derived, and IRFs are generated considering Cholesky one standard deviation innovations.

3.2. Data

All data are sourced from the *World Development Indicators (WDI)* published by The World Bank Group, and they cover a period spanning from 1980 to 2020. For each country, the purchasing power (PP) is approximated by the inverse of the consumer price index,[3] whereas output is captured by real gross domestic product (RGDP). The best available proxy found for wealth is accrued income in the form of net domestic income (NDI), and labor market conditions are controlled by the unemployment rate (UR).

4. Results and Policy Implications

4.1. Results

Exhibit 1 reports the summary statistics for Australia, Germany, Japan and the United States.[4] Varying ranges are observed across these countries for the variables considered in the study. As expected, ranges of data vary from country to country owing to differences in economic structures. A specific point can be noted regarding normality of series. Indeed, datasets pertaining to Australian and Japanese economies show combinations of both normally and non-normally distributed series. However, in Germany and the United States, all series are found to be normally distributed.

[1] In their original model, Hodrick & Prescott (1997) consider z_t ranging from t = -1 to T in the minimization process.
[2] This study mitigates potential interdependence problems between output and wealth as control variables by introducing an interaction term.
[3] A typical definition of purchasing power is the amount of goods and services a unit of currency can afford.
[4] It is completed for all variables in the baseline model excepting the interaction term. Moreover, the CPI is reported in all countries, as original data only are considered at this exploratory stage of the empirical process.

Exhibit-1. Summary statistics

Australia

	CPI	RGDP	NDI	UR
Mean	76.85719	9.08E+11	5.25E+11	6.824146
Median	74.37565	8.73E+11	3.17E+11	6.28
Maximum	120.8117	1.49E+12	1.25E+12	10.87
Minimum	27.41935	4.52E+11	1.20E+11	4.23
Std. Dev.	27.46127	3.34E+11	3.83E+11	1.747524
Skewness	-0.058874	0.285908	0.694976	0.716432
Kurtosis	1.936139	1.752783	1.893191	2.578717
Jarque-Bera	1.957176	3.215979	5.393191	3.810573
Probability	0.375841	0.20029	0.067435	0.14878
Observations	41	41	41	41

Germany

	CPI	RGDP	NDI	UR
Mean	85.14682	2.73E+12	2.05E+12	6.881919
Median	85.69881	2.83E+12	1.86E+12	6.67
Maximum	113.4267	3.60E+12	3.59E+12	11.17
Minimum	52.17694	1.86E+12	6.10E+11	3.14
Std. Dev.	18.17985	5.31E+11	9.09E+11	2.086686
Skewness	-0.127494	-0.18392	-0.07215	0.167414
Kurtosis	1.796265	1.921396	1.79287	2.231049
Jarque-Bera	2.586409	2.21861	2.524891	1.201633
Probability	0.27439	0.329788	0.282961	0.548364
Observations	41	41	41	41

Japan

	CPI	RGDP	NDI	UR
Mean	97.72904	3.78E+12	3.23E+12	3.434634
Median	100.7119	3.99E+12	3.59E+12	3.2
Maximum	105.4843	4.59E+12	4.93E+12	5.39
Minimum	77.14888	2.26E+12	9.19E+11	2
Std. Dev.	7.324499	6.76E+11	1.14E+12	1.049095
Skewness	-1.27E+00	-0.90895	-0.89835	0.366614
Kurtosis	3.485644	2.66543	2.706895	1.755703
Jarque-Bera	11.4295	5.836875	5.661454	3.563412
Probability	0.003297	0.054018	0.05897	0.168351
Observations	41	41	41	41

United States

	CPI	RGDP	NDI	UR
Mean	79.54536	1.33E+13	9.26E+12	6.247317
Median	78.97072	1.37E+13	8.80E+12	5.78
Maximum	118.6905	2.00E+13	2.05E+13	9.7
Minimum	37.79237	7.08E+12	2.30E+12	3.67
Std. Dev.	24.14993	4.02E+12	5.01E+12	1.672237
Skewness	-0.023425	-0.0045	0.401068	0.555293
Kurtosis	1.765716	1.6907	2.074215	2.414626
Jarque-Bera	2.606323	2.928676	2.563355	2.692444
Probability	0.271672	0.231231	0.277571	0.260221
Observations	41	41	41	41

Prior to deriving empirical estimates through the vector auto regression procedure, the stationarity of variables is assessed. This work incorporates the purchasing power gap (PPgap), which is the difference between PP and the common trend of the PP series as determined by the HP-filtering process. Using the Elliot-Rothenberg-Stock DF-GLS test statistic, unit root tests are performed, and results are compiled in Exhibit 2. These tests reveal that PPgap is I(0) in all four countries. RGDP, NDI, and the interaction term NDI*RGDP are all I(1) in Australia, Germany and Japan. UR is I(1) in Germany and Japan, while it comes up as I(0) in Australia and the United States. In the latter, NDI is I(0), whereas RGDP and NDI*RGDP are I(1).

Exhibit-2. Unit root tests

Australia

	Level	**First Difference**
	t-Statistics	t-Statistics
PPgap	-3.290814***	-
RGDP	-1.516846	-4.058285***
NDI	-1.472446	-4.604059***
UR	-3.098048*	-
NDI*RGDP	-0.979522	-4.642418***

Germany

	Level	**First Difference**
	t-Statistics	t-Statistics
PPgap	-5.334902***	-
RGDP	-2.412143	-4.721753***
NDI	-2.548418	-5.644521***
UR	-1.327145	-4.459406***
NDI*RGDP	-2.715016	-5.98279***

United States

	Level	**First Difference**
	t-Statistics	t-Statistics
PPgap	-3.805158***	-3.805158***
RGDP	-0.741316	-0.741316
NDI	-2.118678	-2.118678
UR	-1.930085	-1.930085
NDI*RGDP	-1.534745	-1.534745

Japan

	Level	**First Difference**
	t-Statistics	t-Statistics
PPgap	-3.308515**	-
RGDP	-2.759091	-3.43006**
NDI	1.93478*	-
UR	-3.515234**	-
NDI*RGDP	-0.167104	-3.766121**

Following unit root tests, cointegrations tests are performed. Evidence, using the τ and/or z statistics, shows that variables are cointegrated (See Exhibit 3). This finding allows for the derivation of impulse response functions (IRFs), which constitute the centerpiece in understanding resilience in the countries of interest. All IRFs are illustrated in Exhibit 4.

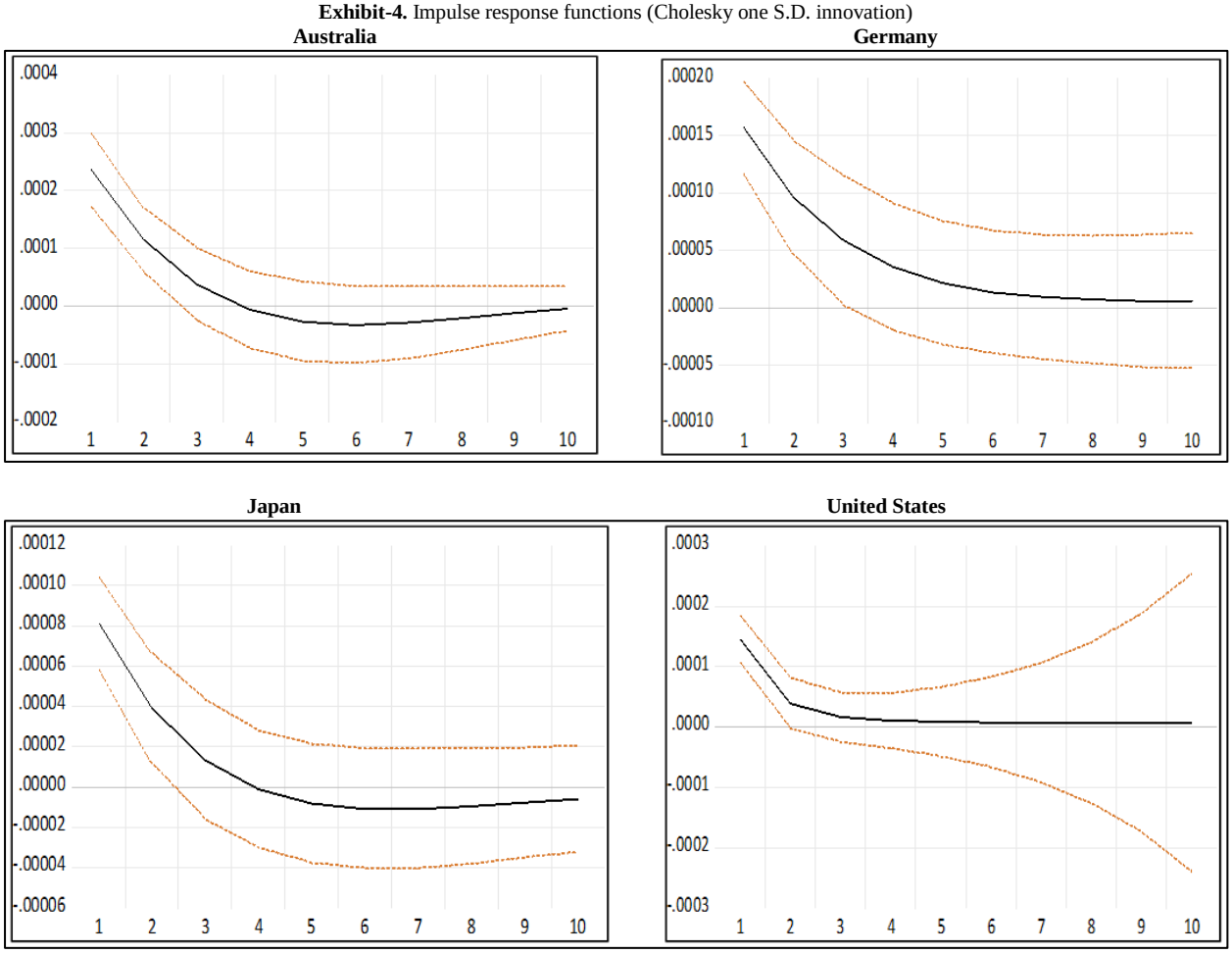
Exhibit-3. Cointegration tests, Ho: Series are not cointegrated

	τ-statistic	**Prob.**	**z-statistic**	**Prob.**
AUS	-3.83026	0.2511	-25.4276	0.1075
GER	-5.501123	0.0111	-34.3684	0.0098
JPN	-4.129223	0.1599	-29.5747	0.0404
USA	-4.800617	0.0484	-31.5509	0.0233

In Australia, the response of PPgap to an innovation starts off with an uptick, but it remains relatively mild. Altogether, this increase dies out within four years. The downward momentum suggests that Australian consumers gradually and quickly weather economic and non-economic turbulences that jolt their purchasing power. In Germany, however, the effects of an innovation to PPgap can linger for much longer, up to 10 years. It's worth pointing out that these lingering effects stay extremely low, even negligible, starting around the seventh year.

In Japan, similarly to Australia, economic agents completely surmount any innovations to their purchasing power, which reverts back to its long-term trend, within four years. On the other hand, it takes no more than four years for the United States to ride out almost all effects of shocks to their purchasing power. Case in point, the PPgap closes in on zero within four years and idles at that negligible level thereafter.

Exhibit-4. Impulse response functions (Cholesky one S.D. innovation)



Overall, the timeframes associated with PPgap responses to a shock suggest that consumer resilience is comparable in Australia, Japan and the United States. As a matter of fact, in Germany, it takes about twice as much time as in other countries to shrug off impacts of shocks to their purchasing power. Accordingly, it can be argued that German consumers appear less resilient than their counterparts in Australia, Japan, and the United States.

This said, the cases of Australia and Japan deserve further attention. In both countries, the IRFs of PPgap dip into negative territory after the fourth year. It indicates that Australian and Japanese consumers more than clear out the impacts of shocks to their purchasing power. Some form of persistent inertia is built in consumers' behavior creating an overreaction or an over-accommodation of shocks. It carries on to the ninth year and beyond in Japan, although remaining relatively low past this point in time. In Australia, it is rather a little sooner around the eighth and half year. For Japan in particular, this situation is unique and may find some roots in the long deflationary periods experienced by this country for nearly two decades − from circa 1993 to 2013.

4.2. Policy Implications

Notwithstanding the magnitudes of responses of purchasing power gaps to innovations, four to six years for full absorption may seem like a long time from a consumer’s perspective. The policy implications of findings can be subsumed under one prime point. This study advances that any actions taken by decision-makers to enhance the consumer's purchasing power will move the needle in the right direction, especially during moments of heightened uncertainties due to internal or external shocks. Indeed, such actions will support the general level of consumer resilience in the country. That is, a PPgap that arises will fade away and be absorbed quicker.

To be more pragmatic, a three-pronged approach could prove to be effective. First, decision-makers may pursue a reinforcement of the financial safety net of households via an expansion of unemployment benefits or temporary suspensions of certain eligibility restrictions. Second, a tax holiday may be introduced on some essential items such as gas and staples. In essence, these two practices will prop up aggregate demand, which will in turn stimulate economic activities, or at minimum prevent their collapse. Legitimate concerns about worsening an existing deficit could be alleviated as economic activities pick up pace. Third, it is argued as well that, to achieve a long-term improvement in consumer resilience, decision-makers might consider looking into an unlikely place, which is the supply chain. A diversified supply chain, both qualitatively and quantitatively, will ensure an uninterrupted flow of goods and key resources across the economy. The diversification should be calibrated to the structure of each economy. In addition to creating and protecting thousands of jobs, the continuous supply of goods would tame shocks to prices, and ultimately to consumer's purchasing power and resilience.

5. Conclusion

This study has found that consumer resilience in Australia, Japan and the United States shows some similarities in light of the number of years it takes to absorb an innovation to these countries respective purchasing power gap. However, German consumers appear to exhibit less resilience in comparison to their peers in the other three countries. In order to strengthen consumer resilience, a combination of policies propping up aggregate demand and underpinning the supply chain could be pursued. An expansion of this investigation in the literature to include developing countries will further our understanding of purchasing power gap and consumer resilience.

References

Baxter, M. and King, R. (1999). Measuring business cycles: Approximate band-pass filters for economic time series. *Review of Economics and Statistics*, 81(4): 575-93.

Bender, K. E., Badiger, A., Roe, B. E., Shu, Y. and D, Q. (2021). Consumer behavior during the COVID-19 pandemic: An analysis of food purchasing and management behaviors in U.S. households through the lens of food system resilience. *Socio-Economic Planning Sciences*: Available: https://doi.org/10.1016/j.seps.2021.101107

Cooley, T. F. and LeRoy, S. F. (1985). Atheoretical macroeconomics: A critique. *Journal of Monetary Economics*, 16: 283-308.

Goodman, D. (2017). *U.K. Consumers Display Resilience as Saving Ratio Climbs.* Bloomberg.com. https://www.bloomberg.com/news/articles/2017-09-29/u-k-consumers-display-resilience-as-saving-ratio-climbs

Hodrick, J. and Prescott, E. (1997). Postwar us business cycles: An empirical investigation. *Journal of Money, Credit, and Banking*, 29(1): 1-16.

Holling, C. S. (1973). Resilience and Stability of Ecological Systems. *Annual Review of Ecology and Systematics*, 4: 1-23. Available: https://doi.org/10.1146/annurev.es.04.110173.000245

Milaković, I. K. (2021). Purchase experience during the COVID-19 pandemic and social cognitive theory: The relevance of consumer vulnerability, resilience, and adaptability for purchase satisfaction and repurchase. *International Journal of Consumer Studies*, 45(6): 1425-42.

Pagan, A. (1987). Three Econometric Methodologies: A Critical Appraisal. *Journal of Economic Surveys*, 1(1): 3-24.

Rew, D. and Minor, M. (2018). Consumer resilience and consumer attitude towards traumatic events. *Journal of Customer Behaviour*, 17(4): 319-34.

Sheth, J. (2020). Impact of Covid-19 on consumer behavior: Will the old habits return or die? *Journal of Business Research*, 117: 280-83. Available: https://doi.org/10.1016/j.jbusres.2020.05.059

Sims, C. A. (1980). Macroeconomics and Reality. *Econometrica*, 48(1): 1-48.

Szmigin, I. T., O'Loughlin, D. M., McEachern, M., Karantinou, K., Barbosa, B., Lamprinakos, G. and Fernández-Moya, M. E. (2020). Keep calm and carry on: European consumers and the development of persistent resilience in the face of austerity. *European Journal of Marketing*, 54(8): 1883-907. Available: https://doi.org/10.1108/EJM-04-2018-0253