Journal of Wine Economics, Volume 16, Number 4, 2021, Pages 429–438
doi:10.1017/jwe.2021.32

Business Cycles and Alcohol Consumption: Evidence from a Nonlinear Panel ARDL ApproachElkhan

Richard Sadik-Zada [a] and Britta Niklas [b]

Abstract

This study revisits the relationship between economic variables and alcohol consumption from a macro perspective. Focusing explicitly on the asymmetries of the responsiveness of alcohol consumption during the expansion and contraction phases of the business cycle, asymmetric panel estimators are employed. We employ a nonlinear autoregressive distributed lag model for a panel of 24 countries for the period 1961 to 2014. Findings show that expansion leads to a long-term increase in average alcohol consumption, while during contraction, the level of average alcohol consumption persists. Expansion, together with a pronounced reduction in the unemployment rate could, however, lead to a net reduction of gross alcohol and wine consumption. Nonetheless, if the recession corresponds with a surge in unemployment, this leads to a long-run increase in the level of total gross alcohol consumption but a decrease in wine and beer consumption. Reduction in unemployment does not lead to a reduction in beer consumption, as pre-expansion levels of beer consumption persist. (JEL Classifications: E32, I19, L66)

Keywords: alcohol intake, business cycles, unemployment, normal goods, PNARDL.

I. Introduction

There is a sizeable empirical literature on the relationship between economic variables and alcohol consumption. The unemployment rate, wage level, and per capita income growth are the variables most frequently employed to explain alcohol consumption from micro and macroeconomic perspectives (Helble and Sato, 2011; Čihák, 2020). The extant studies deliver a mixed picture. Econometric

*We thank Robin Back, the editor, and an anonymous referee for helpful comments and suggestions.
[a] Institute of Development Research and Development Policy, Ruhr University Bochum, Germany; Center for Environmental Management, Resources and Energy (CURE), Ruhr University Bochum, Germany; Centre for Studies on European Economy, Azerbaijan State University of Economics, Baku, Azerbaijan; Center for Economic Development and Social Change (CED), Naples, Italy; e-mail: sadi-kebd@ruhr-uni-bochum.de.
[b] Institute of Development Research and Development Policy, Ruhr University Bochum, Germany; e-mail: britta.niklas@ruhr-uni-bochum.de (corresponding author).

© The Author(s), 2021. Published by Cambridge University Press on behalf of American Association of Wine Economists

analyses of Skog (1986), Ruhm (1995), Catalano et al. (1993), and Freeman (1999) indicate rather pro-cyclical consumption patterns of alcoholic beverages. Baker (1985), Karsek and Theorell (1990), and Sokejima and Kagamimori (1998), on the contrary, validate counter-cyclical patterns of alcohol consumption.

In contrast to previous studies, the present inquiry focuses on the possible asymmetries in alcohol consumption patterns during the expansion and contraction phases of the business cycle. To this end, a panel nonlinear autoregressive distributed lag (PNARDL) model for the panel of 24 countries is used.

PNARDL enables the assessment of asymmetries in the responsiveness of alcohol consumption to changing economic variables. The reason for assessing the nonlinear relationship is because alcoholic beverages can also have the character of addictive or luxury goods (Nelson, 2013; Niklas and Sadik-Zada, 2019). This could be the reason for a disproportionate persistence of alcohol consumption during the phases of economic downturn and rising unemployment (Boymal, 1995).

The remainder of this paper is structured as follows. Section II discusses the existing literature, Section III presents methodology and data sources, and Section IV presents empirical estimation results. The final section concludes.

II. A Brief Literature Review

The nexus between socio-economic conditions and alcohol consumption patterns are far from trivial. During phases of economic growth and increasing wages, alcohol consumption should increase proportionately if alcohol is a normal or luxury good (De Goeij et al., 2015). Alcohol consumption could also increase during recessions, and especially depression phases of the business cycle with increased levels of unemployment due to more leisure time. Additionally, consumption of alcoholic beverages has lower opportunity costs for those who lost their jobs or have fewer working hours due to low business activity (Krüger and Svensson, 2010). Increasing consumption of alcoholic beverages could be driven by demographic aspects (Hart and Alston, 2019) and could be triggered during recessions and periods of unemployment due to increased stress, depression, and family discord (Baker, 1985; Catalano et al., 2011; Collins, 2016; Fenwick and Tausig, 1994; Jones, 1989; Karsek and Theorell, 1990; McGee and Thompson, 2015; Ritter and Chalmers, 2011; Sokejima and Kagamimori, 1998). However, empirical evidence on the relationship between the decline in emotional well-being because of economic problems and increased alcohol intake is scant, and its scrutiny yields rather a mixed picture (Freeman, 1999).

Wang, Shan, and Cochran (2016) analyze the data of 4,585 individuals over 45 in China, with the data set representative of Zheijang and Gansu provinces in 2008 and 2012, provided by China Health and Retirement Longitudinal Study. The authors find that the unemployment rate is positively associated with smoking behavior. This could be an indirect indication of the relevance of economic well-being for

the consumption of drugs. Based on weekly data sets from San Francisco, Catalano, Novaco, and McConnell (2002) find that to avoid the potential job loss or decreased earnings, people tend to reduce their alcohol intake during a recession.

In addition to unemployment, income inequality and wealth status are also shown to be powerful macroeconomic indicators of alcohol consumption, as shown by Kossova, Kossova, and Sheluntcova (2017) for Russian regions, and Niklas and Sadik-Zada (2019) for a panel of 12 major wine-producing and consuming countries. Based on data from France, Chaix and Chauvin (2003) find a positive relationship between the level of household income and alcohol consumption. Fogarty and Voon (2018) and Voon and Fogarty (2019) indicate that there is no systematic correlation between alcohol taxes or policies and alcohol consumption, demonstrating different methods of forecasting alcohol consumption, but without modeling macroeconomic indicators.

The empirical literature on "economy and alcohol consumption" is dominated by the country-specific symmetric time series estimators and individual-level data analyses, which, overwhelmingly, establish a procyclical relationship (Ettner, 1997; Ruhm, 1995; Freeman, 1999). A panel study by Helble and Sato (2011), which encompasses 159 countries and a time interval from 1960 to 2004, is based on the fixed and random effects panel estimators and also validates the procyclicality of the nexus.

III. Methodology and Data Sources

As previously mentioned, within the framework of this inquiry, at different stages of a business cycle, consumption patterns of gross alcohol in general and specific alcoholic beverages in particular, could be asymmetric. To approach the research question empirically, the study employs a PNARDL, developed by Shin, Yu, and Greenwood-Nimmo (2014). In contrast to standard cointegration techniques, PNARDL enables modeling asymmetric relationships between the variables of interest and cointegration in a single equation. Because PNARDL is fully analogous to the autoregressive distributed lag model (ARDL), it has the advantage of flexibility in terms of the order of integration: the time series can be I(0), I(1), or a mixture of both (Pesaran and Smith, 1995; Pesaran, Smith, and Shin, 1996). Furthermore, the proposed methodology is appropriate for handling the longitudinal data sets with heterogeneous panels (Blackburne and Frank, 2007; Salisu and Isah, 2017). For the traditional large N and small T the fixed- and random-effects estimators, their combination, and the generalized method-of-moments estimators are appropriate (Blackburne and Frank, 2007). The assumption of the homogenous slope parameters is, however, mostly not appropriate for large T panels such as ours (Salisu and Isah, 2017). Mean group (MG), pooled mean group (PMG), and dynamic fixed effects (DFE) are the most proliferated techniques for modeling dynamic heterogeneous panels. MG estimates N time-series regressions and identifies N long- and short-run slopes. PMG estimates the homogenous long-term cointegrating and heterogeneous short-term estimators (Pesaran, Smith, and Shin, 1996). DFE estimates the homogenous, that is, for all the panels equal cointegrating vector.

The adjustment term and short-term coefficient are also assumed to be equal for all panels. Only the panel-specific intercepts differ across individual panels (Blackburne and Frank, 2007). The choice between MG, PMG, and DFE estimators is predicated on the Hausman test statistics.

A. The Symmetric Panel ARDL

The symmetric version of the panel ARDL can be expressed as

$$\begin{aligned}\Delta Alcohol_{it} = {} & \beta_{0i} + \beta_{1i} Alcohol_{i,\,t-1} + \beta_{2i} Lag\ 1\_Unemp_{t-1} + \beta_{2i} PCI_{t-j} \\ & + \sum_{j=0}^{N1} \lambda_{ij} \Delta Alcohol_{i,\,t-j} + \sum_{j=0}^{N2} \gamma_{ij} \Delta Lag\ 1\_Unemp_{t-j} \\ & + \sum_{j=0}^{N2} \psi_{ij} \Delta PCI_{t-j} + \mu_i + \varepsilon_{it}\mu_i + \varepsilon_{it},\end{aligned} \tag{1}$$

where $i = \overline{1, N}$, $t = \overline{1, T}$; $Alcohol_{it}$ is the average alcohol consumption for each country i over a period of time t; $Unemp_t$ denotes the level of unemployment at period t; μ_i is the group-specific effect; i indicates the countries in the sample; and t is the number of time periods. For each cross-section, the long-run slope coefficient is calculated as $-\frac{\beta_{2i}}{\beta_{1i}}$. The short-run estimate for the unemployment rate and PCI are γ_{ij} and PCI ψ_{ij}, respectively (Salisu and Isah, 2017).

B. *The Asymmetric Panel ARDL*

The asymmetric version of Equation (1) is expressed as

$$\begin{aligned}\Delta Alcohol_{it} = {} & \beta_{0i} + \beta_{1i} Alcohol_{i,\,t-1} + \beta_{2i}^{+} Lag1\_Unemp_{t-1}^{+} + \beta_{2i}^{-} Lag1\_Unemp_{t-1}^{-} \\ & + \beta_{3i}^{+} PCI_{t-1}^{+} + \beta_{3}^{-} PCI_{t-1}^{-} + \sum_{j=1}^{N1} \lambda_{ij} \Delta Alcohol_{i,t-j} \\ & + \sum_{j=0}^{N2} (\gamma_{ij}^{+} \Delta Lag1\_Unemp_{t-j}^{+} + \gamma_{i,j}^{-} \Delta Lag1\_Unemp_{t-j}^{-}) \\ & + \sum_{j=0}^{N3} (\psi_{ij}^{+} \Delta PCI_{t-j}^{+} + \psi_{ij}^{-} \Delta PCI_{t-j}^{-}) + \mu_i + \varepsilon_{it},\end{aligned} \tag{2}$$

where $Unemp_t^{+}$ denotes the labor market shock that leads to increasing unemployment, and $Unemp_t^{-}$ implies a labor market shock that triggers a decrease of unemployment. Analogously, PCI_t^{+} implies a positive and PCI_t^{-} a negative income shock. These shocks are computed as positive and negative partial sum decompositions of average income and unemployment indicator changes, respectively (Shin, Yu, and Greenwood-Nimmo, 2014).

The error correction version of Equation (2) is

$$\Delta Alcohol_{it} = \tau_i \xi_{i,\,t-1} + \sum_{j=1}^{N1} \lambda_{ij} \Delta Alcohol_{i,t-j} + \sum_{j=0}^{N2} (\gamma_{ij}^{+} \Delta Lag1\_Unemp_{t-j}^{+} + \gamma_{ij}^{-} \Delta Lag1\_Unemp_{t-j}^{-}) + \sum_{j=0}^{N3} (\psi_{ij}^{+} \Delta PCI_{t-j}^{+} + \psi_{ij}^{-} \Delta PCI_{t-j}^{-}) + \mu_i + \varepsilon_{it}, \quad (3)$$

where $\xi_{i,\,t-1}$ is the error-correction term that captures the long-term equilibrium in the asymmetric PNARDL, and τ_i is the speed of adjustment that indicates the time that the system requires to converge to the long-run equilibrium in the face of a shock (Salisu and Isah, 2017).

To account for multicollinearity between average per capita income and unemployment, the study instruments the lagged values of the unemployment rate as an indicator of average income. The data on average income have not been lagged. In order to interpret the regression coefficients as percentages, all nonnegative time series have been transformed to their natural logarithms.

The required data series to run a PNARDL has been compiled into a single data set from two sources. These sources are Holmes and Anderson (2017) and World Development Indicators (WDI) of the World Bank (2020). We draw on annual data on average consumption of beer, wine, and gross alcohol in total from Holmes and Anderson (2017).[1] Per capita GDP data (in constant 2010 US$) and unemployment rate come from the World Bank (2020). Our panel is comprised of 24 countries[2] and spans the period 1961 to 2014.

IV. Estimation Results

Due to the possible differences in the consumption behavior of different alcoholic beverage types, three analogous pooled mean group-based PNARDL models with three different independent variables have been conducted: the natural logarithm

[1] The data on gross alcohol consumption is an aggregation of beer, wine, and spirits. All three data series are indicated in liters of alcohol (lal), whereby it is assumed that the alcohol content of wine is 12 and the alcohol content of beer is 4.5 percent by volume. Spirits have an alcohol content of at least 20 percent. Non-grape wines are not considered in the data series because of their negligible share in total alcohol consumption. The data on consumption incorporates only recorded consumption. Consumption of informally produced or homemade alcoholic drinks is not considered in the data set.

[2] The countries are Argentina, Australia, Austria, Brazil, Canada, Chile, China, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Italy, Japan, Korea, Netherlands, Norway, South Africa, Spain, Sweden, the United Kingdom, and the United States.

Table 1
Panel Nonlinear ARDL Estimations, 1961–2014

	(1)		*(2)*		*(3)*	
	ln Average Gross Alcohol Consumption		*ln Average Wine Consumption*		*ln Average Beer Consumption*	
Dependent Variables	*Long Run*	*Short Run*	*Long Run*	*Short Run*	*Long Run*	*Short Run*
Adjustment Term		–0.472***		–0.280***		–0.522***
(EC)		(0.0624)		(0.0729)		(0.0773)
Δ Log Average Per		0.0269		–0.503		0.441
Capita Income^{+}		(0.247)		(0.498)		(0.422)
Δ Average Per		2.08e-05		–3.06e-05*		–0.000170
Capita Income^{-}		(1.37e-05)		(1.74e-05)		(0.000148)
Δ Lag 1 Log		0.00816		–0.0467		–0.0480
Unemployment^{+}		(0.0279)		(0.0445)		(0.0564)
Δ 1 Log		–0.0123		–0.0622		–0.0545
Unemployment		(0.0174)		(0.107)		(0.0463)
Time Period		–0.00543***				0.00414
		(0.00191)				(0.00511)
Log Average Per	0.129***		0.524***		0.103***	
Capita Income^{+}	(0.0230)		(0.0350)		(0.0101)	
Average Per	1.73e-07***		–1.57e-06***		–1.10e-07***	
Capita Income^{-}	(6.18e-08)		(5.90e-07)		(3.08e-08)	
Lag 1 Log	0.0326**		–0.170***		–0.0232***	
Unemployment^{+}	(0.0131)		(0.0269)		(0.00847)	
Lag 1	–0.0142***		–0.0244***		0.00254	
Unemployment^{-}	(0.00421)		(0.00355)		(0.00238)	
Constant		0.316*		–1.814***		–0.522
		(0.180)		(0.598)		(0.395)
Observations	514		514		515	
Hausman	H_0: PMG/ H_1: DFE		H_0: PMG/ H_1: DFE		H_0: PMG/ H_1: DFE	
	0.00		1.12		0.10	
$\chi 2[p>\chi 2]$	[0.9861]		[0.2907]		[0.7561]	

Notes: Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; a plus sign $^{+}$ indicates an increasing portion and a minus sign $^{-}$ indicates a decreasing portion of the respective variable. To account for the short-term effects of the individual time periods, time period has been included to the error-correction equation.

of average alcohol consumption in liters in Model 1; the natural logarithm of average wine consumption in Model 2; and the natural logarithm of average beer consumption in Model 3. The estimation results are presented in Table 1. Adjustment terms in all three cointegration models are statistically significant at 1 percent level, negative, and range between –0.280 and –0.522. Hence, the cointegration models are valid.

A. Long-Run Effects

In the phases of economic expansion, gross alcohol, wine, and beer consumption increases: 1 percent increase in average per capita income corresponds with a 0.103

percent increase in beer, 0.129 percent increase in gross alcohol, and 0.524 percent increase in wine consumption. Decreasing levels of average per capita income lead to very small changes in gross alcohol, wine, and beer consumption. The coefficients are statistically significant at 1 percent level, but they range between –110e-07 and +1.73e-07. Thus, the effect of decreasing average income can be neglected. This is an indication of the persistence of alcohol consumption during recessions.

For the long-run relationship between unemployment and gross alcohol intake, the estimation Model 1 shows that increasing levels of unemployment have a statistically significant positive impact on gross average alcohol consumption: 1 percent increase in the unemployment rate leads to a 0.0326 percent increase in gross alcohol intake. Models 2 and 3 indicate that the long-run effect of rising unemployment on wine and beer consumption is negative: 1 percent increase in the unemployment rate leads to a 0.170 percent decrease in wine and a 0.0232 percent decrease in beer consumption.

Phases of rising employment, that is, decreasing unemployment, correspond with decreasing gross alcohol and wine consumption. A decrease in the unemployment rate by one unit leads to a decrease in alcohol consumption by 1.42 percent in Model 1 and a reduction in wine consumption by 2.4 percent in Model 2. There is no significant impact of decreasing unemployment rates on the level of beer consumption.

In summary, during expansion phases of the business cycle, epitomized by increasing levels of average per capita income and decreasing levels of unemployment, the intake of gross alcohol is driven by diametrically opposite effects: increasing level of average income leads to an increasing level of gross alcohol, wine, and beer consumption. A reduction in unemployment, however, leads to a reduction in gross alcohol and wine consumption. Beer consumption is not affected by decreasing unemployment rates. Due to the greater absolute value of the coefficients of $Lag1\_Unemployment^{-}$ than that of PCI^{+}, we could expect a net reduction in alcohol consumption if the job creation effects of the expansion phase of the business cycle are more pronounced. Economic growth without massive job creation effects could, on the contrary, lead to increased alcohol and wine consumption.

In the phases of recession, expressed by decreasing levels of average income and increasing levels of unemployment, the level of gross alcohol consumption increases, driven only by the rising unemployment. Interestingly, increasing unemployment corresponds with a reduction in the average level of wine and beer consumption.

B. Short-Run Effects

Assessment of the short-term coefficients of all three models shows that fluctuations in the levels of average income and unemployment have, in most cases, no statistically significant impact on the intake of beer, wine, and gross alcohol consumption. Statistical significance is only shown for the impact of decreasing levels of per capita income on wine intake. The value of the coefficient is, however, negligible.

V. Concluding Remarks

The present inquiry addresses the differences in the responsiveness of alcohol consumption during the expansion and contraction phases of economic growth. Findings show that during the expansion phase of a business cycle, increasing levels of average income lead to a substantial increase in the average consumption of gross alcohol, wine, and beer. However, expansions with pronounced job creation effects could lead to a net reduction of average level alcohol and wine consumption.

During the recession phase, there is no symmetric reduction in average gross alcohol or beer consumption. Wine consumption reduction is statistically significant, but the elasticity is rather weak. Consumption of alcoholic drinks during recessions mostly persists at the pre-recession phase's levels. During recessions, with insufficient public labor market interventions to prevent increasing levels of unemployment, the surge in unemployment could trigger an additional increase in the average alcohol intake.

Based on this quantitative inquiry, the asymmetric responsiveness of alcohol intake to fluctuations of central macroeconomic variables, such as per capita income and level of unemployment, could be established. In addition, it is found that the consumption behavior of wine and beer diverges from the aggregate indicator of average alcohol consumption. Findings further show that, during the boom phase, alcoholic beverage consumption is in line with the hypothetic consumption of normal and during the recession phase with the hypothetic consumption of luxury or culture goods.

This study is based on highly aggregated macroeconomic data and provides only a tendentious bird's-eye perspective on the nexus between macroeconomic variables and the average intake of alcoholic drinks. This macro-perspective is, nonetheless, sufficient in showing the risks of persistent or increasing levels of alcohol consumption during contraction. For the formulation of concrete health policies, case studies with less aggregated data sets in the respective contexts are necessary.

References

Baker, D. B. (1985). The study of stress at work. *Annual Review of Public Health*, 6, 367–381.

Blackburne, E. F., and Frank, M. W. (2007). Estimation of nonstationary heterogenous panels. *Stata Journal*, 7(2), 197–208.

Boymal, J. (1995). *The economics of alcohol addiction*. Department of Economics, Monash University. Seminar Paper No. 26/95. Download at https://scholar.archive.org/work/qz6whkmzvbgcvb2hh47a3hgbny/access/wayback/https://au-east.erc.monash.edu.au/fpfiles/8588470/monash_6983.pdf.

Catalano, R., Dooley, D., Novaco, R. W., Hough, R., and Wilson, G. (1993). Using ECA survey data to examine the effect of job layoffs on violent behavior. *Hospital and Community Psychiatry*, 44(9), 875–879, https://pubmed.ncbi.nlm.nih.gov/8225302/.

Catalano, R., Goldman-Mellor, S., Saxton, K., Zilko-Margerison, C., Subbaraman, M., Lewinn, K., and Anderson, E. (2011). The health effects of economic decline. *Annual Review of Public Health*, 32, 431–450, https://www.annualreviews.org/doi/full/10.1146/annurev-publhealth-031210-101146.

Catalano, R., Novaco, R. W., and McConnell, W. (2002). Layoffs and violence revisited. *Aggressive Behavior*, 28(3), 233–247, doi: 10.1002/ab.80003.

Chaix, B., and Chauvin, P. (2003). Tobacco and alcohol consumption, sedentary lifestyle, and overweightness in France: A multilevel analysis of individual and area-level determinants. *European Journal of Epidemiology*, 18(6), 531–538.

Čihák, J. (2020). The effect of economic conditions on alcohol consumption. *International Review of Economics*, 67(4), 481–497, doi: 10.1007/s12232-020-00351-z.

Collins, S. E. (2016). Associations between socioeconomic factors and alcohol outcomes. *Alcohol Research*, 38(1), 83–94.

De Goeij, M. C. M., Suhrke, M., Toffolutti, V., Van de Mheen, D., Schoenmakers, T. M., and Kunst, A. E. (2015). How economic crises affect alcohol consumption and alcohol-related health problems: A realist systematic review. *Social Science & Medicine*, 131, 131–146.

Ettner, S. L. (1997). Measuring the human cost of a weak economy: Does unemployment lead to alcohol abuse? *Social Science Medicine*, 44(2), 251–260, doi: 10.1016/s0277-9536(96)00160-8.

Fenwick, R., and Tausig, M. (1994). The macroeconomic context of job stress. *Journal of Health and Social Behavior*, 35(3), 266–282.

Fogarty, J., and Voon, D. (2018). Alcohol consumption in the United States: Past, present, and future trends. *Journal of Wine Economics*, 13(2), 121–143.

Freeman, D. G. (1999). A note on 'economic conditions and alcohol problems'. *Journal of Health Economics*, 18(5), 661–670.

Hart, J., and Alston, J. M. (2019). Persistent patterns in the U.S. alcohol market: Looking at the link between demographics and drinking. *Journal of Wine Economics*, 14(4), 356–364.

Helble, M., and Sato, A. (2011). *Booms and booze: On the relationship between macroeconomic conditions and alcohol consumption*. London School of Economics and Political Science, LSE Research Online. Available from https://core.ac.uk/download/pdf/6258656.pdf.

Holmes, A. J., and Anderson, K. (2017). Convergence of national alcohol consumption patterns: New global indicators. *Journal of Wine Economics*, 12(2), 117–148.

Jones, L. (1989). The relationship between unemployment and divorce. *Journal of Divorce*, 12(1), 99–112, https://doi.org/10.1300/J279v12n01_06.

Karsek, R. A., and Theorell, T. (1990). *Healthy Work: Stress, Productivity, and the Reconstruction of Working Life*. New York: Basic Books.

Kossova, T., Kossova, E., and Sheluntcova, M. (2017). Alcohol consumption and individual time preferences of Russians. *International Review of Economics*, 64(1), 47–85, https://doi.org/10.1007/s12232-016-0262-3.

Krüger, N. A., and Svensson, M. (2010). Good times are drinking times: Empirical evidence on business cycles and alcohol sales in Sweden 1861–2000. *Applied Economics Letters*, 17(6), 543–546, doi: 10.1080/13504850802167215.

McGee, R. E., and Thompson, N. J. (2015). Unemployment and depression among emerging adults in 12 states, behavioral risk factor surveillance system, 2010. *Preventing Chronic Disease*, 12(E38), 1–11.

Nelson, J. P. (2013). Robust demand elasticities for wine and distilled spirits: Meta-analysis with corrections for outliers and publication bias. *Journal of Wine Economics*, 8(3), 294–317.

Niklas, B., and Sadik-Zada, E. R. (2019). Income inequality and status symbols: The case of fine wine imports. *Journal of Wine Economics*, 14(4), 365–373.

Pesaran, H. M., and Smith, R. (1995). Estimating long-run relationships from dynamic heterogeneous panels. *Journal of Econometrics*, 68(1), 79–113.

Pesaran, M. H., Smith, R. J., and Shin, Y. (1996). Testing for the existence of a long run relationship. Department of Applied Economics, University of Cambridge, DAE Working Paper No. 9622. Available at https://doi.org/10.17863/CAM.5093.

Ritter, A., and Chalmers, J. (2011). The relation between economic conditions and substance use and harm. *Drug and Alcohol Review*, 30(1), 1–3.

Ruhm, C. J. (1995). Economic conditions and alcohol problems. *Journal of Health Economics*, 14(5), 583–603, https://doi.org/10.1016/0167-6296(95)00024-0.

Salisu, A. A., and Isah, K. O. (2017). Revisiting the oil price and stock market nexus: A nonlinear panel ARDL approach. *Economic Modelling*, 66(C), 258–271.

Shin, Y., Yu, B., and Greenwood-Nimmo, M. (2014). Modelling asymmetric cointegration and dynamic multipliers in a nonlinear ARDL framework. In R. C. Sickles and W. C. Horrace (eds.), *Festschrift in Honor of Peter Schmidt*, 281–314. New York: Springer.

Skog, O.-J. (1986). An Analysis of divergent trends in alcohol consumption and economic development. *Journal of Studies on Alcohol*, 47(1), 19–25.

Sokejima, S., and Kagamimori, S. (1998). Working hours as a risk factor for acute myocardial infarction in Japan: A case control study. *British Medical Journal*, 317(19), 775–780.

Voon, D., and Fogarty, J. (2019). A note on forecasting alcohol demand. *Journal of Wine Economics*, 14(2), 208–213.

Wang, Q., Shan, J. J., and Cochran, C. (2016). Unemployment rate, smoking in China: Are they related? *International Journal of Environmental Research and Public Health*, 13(1), 1–12.

World Bank (2020). *World Development Indicators*. Washington, DC: The World Bank.