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PERSISTENCE IN US REAL PERSONAL CONSUMPTION EXPENDITURE: DURABLE VERSUS NON-DURABLE GOODS

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Abstract

This note examines persistence in US real personal consumption expenditure, distinguishing between durable and non-durable goods. For this purpose, fractional integration methods are applied to analyse data over the period from 1965q4 to 2024q4. The results suggest that seasonality is not an important feature of the two series. Further, while durables are characterised by short memory, non-durables exhibit long memory with a statistically significant and positive fractional integration parameter. This indicates that the effects of shocks last longer in the case of non-durables compared to durables.

Keywords: Real personal consumption expenditure; durables; non-durables; persistence; fractional integration; shocks

JEL Classification: C22, E21, E30

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1. Introduction

Several Western countries including the US have experienced a sharp rise in real personal consumption expenditure over the years. More specifically, in the US real personal consumption of durable goods has increased by more 52 times from 1947 to 2024, while during the same period real personal consumption of non-durable goods has risen more than seven-fold (Federal Reserve Bank of St. Louis, 2025). Further, the corresponding per capita series have increased by more than 22 times and more than three-fold respectively over the same period (Federal Reserve Bank of St. Louis, 2025).

Despite this upward trend, there have been periods when consumption has declined as a result of exogenous shocks. Most notably, consumption fell during the Covid period (Dong et al. 2021). For instance, real personal consumption of non-durable goods decreased by more than 3.35% and in per capita terms by 3.28% (Federal Reserve Bank of St. Louis, 2025). Establishing whether the effects of such shocks are long-lived or not (i.e. how persistent the series is) is a key issue for policy makers tasked with the formulation of appropriate policy responses. These will also depend on whether real channels of transmission are deemed to be more important, as in Real Business Cycle models emphasising the effects of shocks on real variables such as productivity and capital accumulation, or whether nominal rigidities, such as price and wage stickiness, are thought to matter more for the transmission of shocks, as in New Keynesian models.

It is noteworthy that the existing literature on real personal consumption expenditure has analysed various issues such as its determinants, including labour income, stock prices, interest rate and consumer confidence (Dees et al. 2013; Juhro and Iyke, 2020) and household risk (Hu et al. 2024), and its positive impact on subject well-being (Noll and Weick, 2015), and happiness (Wang et al. 2019), but much less is known about the degree of persistence of consumption.

The aim of the present study is to shed some light on this issue by applying fractional integration methods to data on real personal consumption of both durable and non-durable goods in the US over the period from 1965q4 to 2024q4. The adopted framework was introduced by Granger (1980), Granger and Joyeux (1980), and Hosking (1981) and is much more general and flexible than standard models based on the dichotomy between I(0) stationary and I(1) non-stationary series. In particular, the differencing parameter d is allowed to take any real value, including fractional ones. Therefore, this approach encompasses a much wider range of stochastic processes, including the unit root case, and sheds light on whether or not the series of interest are mean-reverting (and thus on whether exogenous shocks have permanent or transitory effects) and on their degree of persistence, with crucial policy implications.

The remainder of this note is structured as follows: Section 2 describes the data and presents the empirical results; Section 3 offers some concluding remarks.

2. Data Description and Empirical Results

We collect quarterly data on US real consumption expenditure on durables and non-durable goods from 1965q3 to 2024q4. The source of the data is the Federal Reserve Bank of St. Louis database: https://fred.stlouisfed. org/series/. Using the raw data we then compute the quarter on quarter percentage growth rate which is the series analysed in both cases**.**

Figure 1 displays the time plots of the two series. Visual inspection confirms a well-known stylised fact about the behaviour of durables versus non-durables, namely that the response of the former to shocks is larger than that of the latter, but of the same sign, in others words there is co-movement (Monacelli, 2009; Cantelmo and Melina, 2018). For instance, in both cases a sharp drop occurred during the Covid period, which was followed by a rebound; however, the magnitude of the observed changes is much bigger in the case of durables.

[Figure 1 about here]

The estimated model is the following:

$$y(t) \;=\; \alpha + \beta t + x(t), \qquad (1-L)^d x(t) \;=\; u(t), \qquad (1)$$

where y(t) is the observed time series and u(t) is assumed to be autocorrelated, in the first instance as a seasonal AR process of the form

$$u(t) = \rho\, u(t-4) + \varepsilon(t), \qquad (2)$$

where $\varepsilon(t)$ is a white noise process. Then, a more general form of autocorrelation based on the model by Bloomfield (1973) is considered. The latter is a non-parametric method that approximates AutoRegressive (AR) structure and that performs very well in the context of fractional integration (Gil-Alana, 2005). We first estimate the model with both the intercept (α) and the time trend (β); however, the latter coefficient is found to be statistically insignificant. Therefore, we only include an intercept in the regression (1). The estimated coefficients are reported in Tables 1 and 2 for the two cases of seasonal AR and Bloomfield disturbances respectively.

[Insert Tables 1 and 2 about here]

It can be seen from Table 1 that, under the assumption of seasonal AR residuals, the estimated value of d is negative for durables and positive for non-durables, but the short memory or I(0) null hypothesis cannot be rejected for either of the two series; further, the seasonal AR coefficient is very close to zero, which suggests that seasonality is not an important feature of the series under investigation.

Table 2 shows that, under the assumption that instead the disturbances follow the exponential spectral model of Bloomfield (1973), the short memory hypothesis cannot be rejected for durables but it is rejected in favour of long memory ($d > 0$) in the case of non-durables. Specifically, the estimated value of d is equal to 0.06 for durables and 0.27 for non-durables, which indicates a higher degree of persistence in the latter series. [1]

3. Conclusions

This note applies fractional integration methods to analyse the behaviour of real personal consumption expenditure in the US from 1965q4 to 2024q4, distinguishing between durable and non-durable goods. The chosen approach provides information about the degree of persistence of the series, and thus on whether the effects of shocks are permanent or transitory, which is crucial to decide on appropriate policy actions.

The evidence suggests that consumption of durables and non-durables are characterised by short and long memory respectively. This might appear surprising at first sight, since it is normally thought that the former is more sensitive to shocks (since the purchase of durables is often financed through credit which might no longer be available during a crisis – Monacelli, 2009), and also its reaction might be delayed as consumers only gradually adjust their spending plans. By contrast, non-durables include essential items such as food and clothing whose consumption tends to be less affected by shocks. However, non-durable goods such precious metals or real estate might be seen as a safe haven during a crisis, which might account for the observed faster dynamic adjustment.

Our findings also have policy implications. Specifically, they suggest that in the case of consumption of durables only temporary fiscal or monetary adjustments, such as tax and interest rate cuts, are required to counteract the effects of shocks. On the contrary, more structural policies such as financial reforms might be required to react to shocks hitting the consumption of non-durables; such policies should focus on channelling funds

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[1] We also conducted the analysis using the per capita series. The results (not reported to save space) confirm the patterns previously identified, namely they imply greater persistence in the case of non-durables.

from savers to borrowers, who are likely to use them partly to finance their consumption expenditure on non-durables during economic crises.

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Figure 1: Time series plots

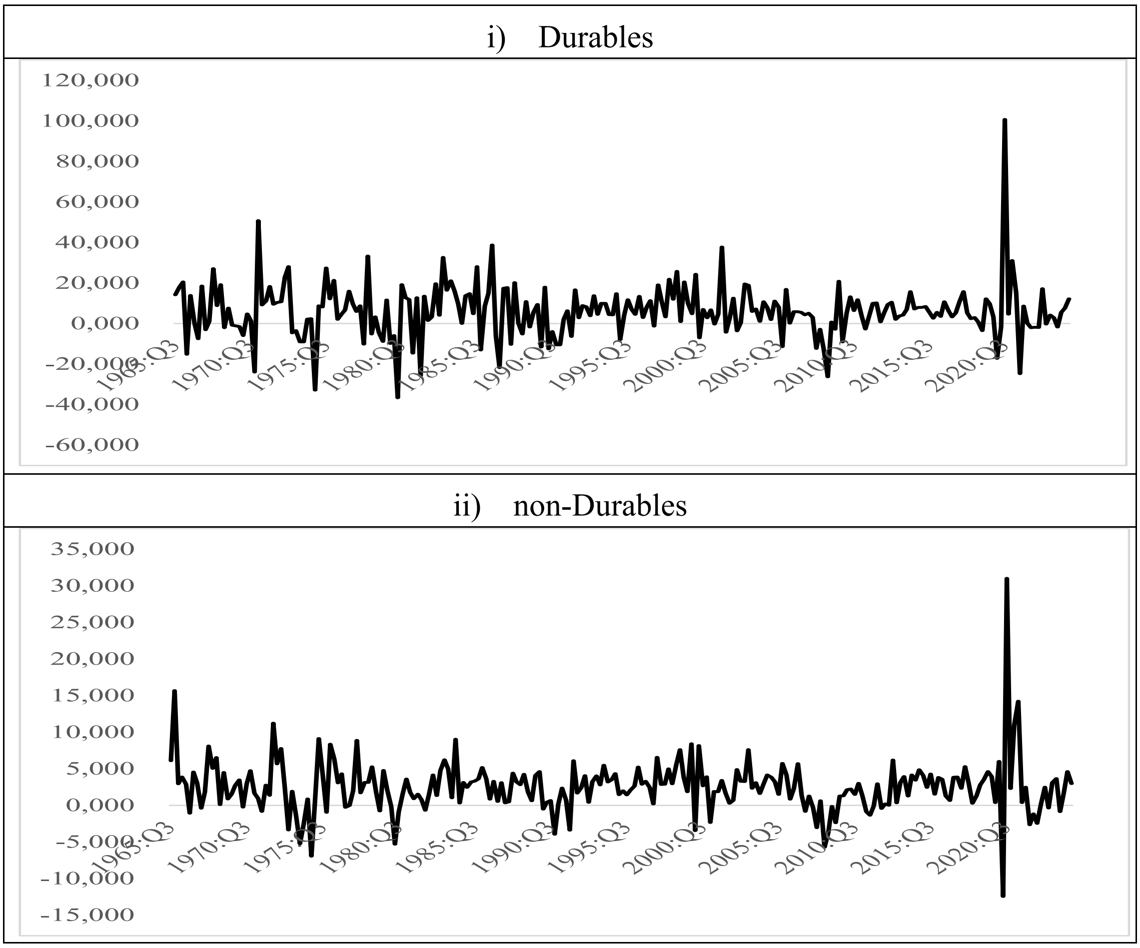

Table 1: Estimated coefficients in a model with seasonal AR(1) disturbances

Series	d (95% band)	Intercept (t-value)	Seasonal coeff.
Durables	-0.02 (-0.11, 0.09)	6.028 (1067.13)	-0.068
Non-durables	0.07 (-0.01, 0.17)	2.532 (1059.78)	-0.062

Note: The values in column 2 indicates the estimates of the differencing parameter (d) along with the corresponding 95% confidence intervals; column 3 reports the estimates of the intercept with the corresponding t-values in brackets, while column 4 shows the seasonal AR coefficient.

Table 2: Estimated coefficients in a model with Bloomfield (1) disturbances

Series	d (95% band)	Intercept (t-value)	Bloomfield coeff.
Durables	0.06 (-0.14, 0.29)	6.064 (5.24)	-0.128
Non-durables	0.27 (0.05, 0.64)	2.851 (3.23)	-0.272

Note: The values in column 2 indicates the estimates of the differencing parameter (d) along with the corresponding 95% confidence intervals; column 3 reports the estimates of the intercept with the corresponding t-values in brackets, while column 4 shows the Bloomfield autocorrelated coefficient.