

Discussion: “Durability of Output and Expected Stock Returns”

by Gomes, Kogan, and Yogo

Lu Zhang

University of Michigan
and NBER

NBER Summer Institute, Asset Pricing Workshop
July 11, 2008

Theme

The paper

Durability is an important determinant of the cross section of returns

Theme

My discussion

Intuitive, but with fairly fragile evidence

Outline

1 Empirics

2 Model

3 Summary

Empirics

Claim 1: “In the cross-section, a strategy that is long on durables and short on services earns a sizable risk premium (p. 1).”

Period	Services	Nondurables	Durables	Investment	Other
Panel A: Average Excess Returns (%)					
1927–2004	5.99	-8.52	10.40	8.18	8.51
1927–1934	-4.47	2.74	10.59	5.28	5.77
1935–1944	12.65	9.48	17.16	13.67	11.31
1945–1954	11.33	16.67	18.73	18.58	16.47
1955–1964	11.09	10.65	12.00	11.43	8.89
1965–1974	-6.13	-0.39	-6.00	-0.23	-2.78
1975–1984	7.68	6.31	10.99	4.77	8.04
1985–1994	8.19	11.73	9.10	1.60	8.74
1995–2004	5.47	9.76	10.67	9.77	11.07

Empirics

Durability does not go beyond the static CAPM (1927–2004, 78 observations)

$$r_{\text{durables-services}} = \begin{matrix} 4.45 \\ (2.03) \end{matrix} + \epsilon_1$$

$$r_{\text{durables-services}} = \begin{matrix} 0.19 \\ (0.14) \end{matrix} + \begin{matrix} 0.51 \\ (4.00) \end{matrix} r_{\text{MKT}} + \epsilon_2 \quad R^2 = 31\%$$

$$r_{\text{durables-services}} = \begin{matrix} -0.24 \\ (-0.17) \end{matrix} + \begin{matrix} 0.41 \\ (4.31) \end{matrix} r_{\text{MKT}} + \begin{matrix} 0.35 \\ (1.65) \end{matrix} r_{\text{SMB}} \\ + \begin{matrix} -0.00 \\ (-0.04) \end{matrix} r_{\text{HML}} + \epsilon_3 \quad R^2 = 36\%$$

Empirics

Durability does not go beyond the static CAPM (1927–2004, 78 observations)

$$r_{\text{durables-nondurables}} = \begin{matrix} 1.79 \\ (0.85) \end{matrix} + \epsilon_1$$

$$r_{\text{durables-nondurables}} = \begin{matrix} -2.12 \\ (-1.31) \end{matrix} + \begin{matrix} 0.47 \\ (5.30) \end{matrix} r_{\text{MKT}} + \epsilon_2 \quad R^2 = 28\%$$

$$r_{\text{durables-nondurables}} = \begin{matrix} -2.43 \\ (-1.32) \end{matrix} + \begin{matrix} 0.40 \\ (3.87) \end{matrix} r_{\text{MKT}} + \begin{matrix} 0.24 \\ (1.90) \end{matrix} r_{\text{SMB}} \\ + \begin{matrix} 0.00 \\ (0.00) \end{matrix} r_{\text{HML}} + \epsilon_3 \quad R^2 = 36\%$$

“Durability is priced in the cross section” = “the static CAPM works”

Empirics

The durability effect does not exist in the 1965–2004 sample

$$r_{\text{durables-services}} = \begin{matrix} 2.39 \\ (1.11) \end{matrix} + \epsilon_1$$

$$r_{\text{durables-services}} = \begin{matrix} 0.45 \\ (0.29) \end{matrix} + \begin{matrix} 0.33 \\ (3.11) \end{matrix} r_{\text{MKT}} + \epsilon_2 \quad R^2 = 19\%$$

$$r_{\text{durables-services}} = \begin{matrix} -0.94 \\ (-0.52) \end{matrix} + \begin{matrix} 0.29 \\ (2.48) \end{matrix} r_{\text{MKT}} + \begin{matrix} 0.26 \\ (2.30) \end{matrix} r_{\text{SMB}} \\ + \begin{matrix} 0.09 \\ (0.94) \end{matrix} r_{\text{HML}} + \epsilon_3 \quad R^2 = 28\%$$

Empirics

The durability effect does not exist in the 1965–2004 sample

$$r_{\text{durables-nondurables}} = \begin{matrix} -0.83 \\ (-0.28) \end{matrix} + \epsilon_1$$

$$r_{\text{durables-nondurables}} = \begin{matrix} -3.04 \\ (-1.20) \end{matrix} + \begin{matrix} 0.38 \\ (2.52) \end{matrix} r_{\text{MKT}} + \epsilon_2 \quad R^2 = 13\%$$

$$r_{\text{durables-nondurables}} = \begin{matrix} -5.40 \\ (-1.67) \end{matrix} + \begin{matrix} 0.35 \\ (2.87) \end{matrix} r_{\text{MKT}} + \begin{matrix} 0.31 \\ (1.95) \end{matrix} r_{\text{SMB}} \\ + \begin{matrix} 0.21 \\ (0.57) \end{matrix} r_{\text{HML}} + \epsilon_3 \quad R^2 = 21\%$$

Empirics

Claim 2: “[T]he durability of output is a source of consumption risk that is priced in both the cross-section and the time series of expected returns (p. 29).”

Cross-sectional tests with FF factors and five industry portfolios (8 assets)

Factor	Price	Fama-French	Consumption-Based
Market		3.24 (1.14)	
SMB		1.05 (1.22)	
HML		2.60 (1.41)	
Nondurables			22.30 (25.39)
Durables			93.11 (38.87)
MAE (%)		0.85	0.42
R^2		0.67	0.92
J -test		12.36 (0.03)	8.21 (0.22)

Empirics

No evidence that durability is a priced source of consumption risk in the cross-section (1930–2004, 75 observations)

Annual Fama-MacBeth cross-sectional regressions with 10 size, 10 book-to-market, 10 momentum, and 10 industries as testing assets

	CAPM	Fama French		Consumption growth
MKT	2.74 (0.78)	-0.34 (-0.10)	g_{Dur}	-0.46 (-0.21)
SMB		2.07 (1.09)	g_{NonDur}	-0.36 (-1.17)
HML		2.34 (1.22)		
R^2	20%	51%		24%

Empirics

No evidence that durability is a priced source of consumption risk in the cross-section (1965–2004, 40 observations)

Annual Fama-MacBeth cross-sectional regressions with 10 size, 10 book-to-market, 10 momentum, and 10 industries as testing assets

	CAPM	Fama French		Consumption growth
MKT	-1.94 (-0.27)	1.53 (0.25)	g_{Dur}	-2.68 (-1.48)
SMB		-1.38 (-0.41)	g_{NonDur}	-1.32 (-2.29)
HML		-0.24 (-0.06)		
R^2	19%	49%		23%

Model

Tastes and technology

C_t : nondurable-good consumption, E_t : durable-good consumption:

$$D_t = (1 - \delta)D_{t-1} + E_t$$

The Epstein-Zin (1991) recursive utility:

$$U_t = \left[(1 - \beta)u(C_t, D_t)^{1-1/\sigma} + \beta \left(E_t[U_{t+1}^{1-\gamma}] \right)^{1/\kappa} \right]^{1/(1-1/\sigma)}$$

Aggregate productivity:

$$X_{t+1} = X_t \exp(\mu + z_{t+1} + \epsilon_{t+1})$$

$$z_{t+1} = \phi z_t + \nu_{t+1}$$

Model

Firms and production

The production function for the nondurable firm:

$$C_t = X_t L_t^\theta$$

and for the durable firm:

$$E_t = X_t^\lambda (1 - L_t)^\theta$$

in which $\lambda \geq 1$

Model

Interpreting λ as production leverage? “[T]he productivity of the durable sector has grown faster than that of the nondurable sector, which can be modeled through the parametrization $\lambda > 1$ (p. 17).”

Statistic	Services	Nondurables	Durables
Panel A: Sales			
Mean (%)	5.62	4.54	3.15
Standard Deviation (%)	5.94	5.43	8.16
Correlation with the Growth of			
Service Consumption	0.13	-0.01	0.62
Nondurable Consumption	0.19	0.04	0.49
Durable Expenditure	0.07	-0.10	0.81
Panel B: Operating Income			
Mean (%)	5.36	4.70	3.00
Standard Deviation (%)	5.99	5.55	12.77
Correlation with the Growth of			
Service Consumption	0.25	0.27	0.60
Nondurable Consumption	0.20	0.31	0.39
Durable Expenditure	0.29	0.33	0.79

Model

Economic mechanism

“[T]he profits of the durable firm are more volatile than those of the nondurable firm because a proportional change in the durable stock requires a much larger proportional change in its expenditure (p. 20).”

What happens if $\lambda < 1$?

Summary

The focus of the paper seems a bit misplaced

Contribution framed as mainly empirical, but with only fragile evidence

- The durability effect is either non-existent or entirely absorbed by the static CAPM

Use the model to address more important questions (e.g., the equity premium puzzle with production)