Don't Break the Habit: Structural Stability Tests of Consumption Models in the UK

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Abstract

Using quarterly data over 35 years for the UK on asset returns and consumption expenditure, the traditional power utility consumption based capital asset pricing model (C-CAPM), the recursive preferences model proposed by Epstein and Zin (1991) and a habit formation specification model are estimated using GMM. We analyze the models at both the economy level and individual sector groupings. We find evidence supportive of the both habit formation specification and the traditional C-CAPM at the economy level. However, structural stability tests for both known and unknown change points, clearly reject parameter stability in the traditional C-CAPM. Parameter stability is not rejected for the habit formation specification.

Keywords: Risk Aversion, Intertemporal Substitution, Habit Formation, Structure Stability
JEL Classification: G21, G28

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1 Introduction

The relationship between asset prices, consumption and investment decisions has long been investigated in both the economic and financial literature. In the basic capital asset pricing model (CAPM) framework, asset prices are determined by the portfolio selection process of agents who are assumed to consume all their wealth after just one period. This simplification ignores the complexity of the intertemporal consumption decision and the interaction between consumption and portfolio choices. A rational agent will seize intertemporal trade opportunities reflected in expected asset returns by adjusting his consumption growth, by an amount, which is negatively related to his counteracting desire for a smooth consumption profile. The degree of this consumption growth response is called elasticity of intertemporal substitution in consumption (EIS). Accordingly, the elasticity of intertemporal substitution controls the desire to smooth consumption between periods. If the EIS is very low, consumers will be very reluctant to adjust consumption over time and hence will imply that consumption will be too smooth as soon as consumers are allowed to save. Research in many fields of macroeconomics has established this parameter as crucial for many questions ranging from government policy to the determinants of long run growth.

The intertemporal consumption-based asset pricing model developed by Merton (1973), Lucas (1978), and Breeden (1979) has been a popular framework for understanding the valuation of assets and the serial correlation properties of asset returns and consumption. However, empirical investigations of the consumption based capital asset pricing model have not been supportive. For example, *inter alia* Hansen and Singleton (1983) and Breeden et al. (1989) reject the traditional C-CAPM using US data, while Lund and Engsted (1996), Roy (1996) and Allais et al. (2000) fail to find supportive evidence using UK data at annual and quarterly frequencies. Generally, the model can only be reconciled with the observed levels of consumption growth and asset returns if we adopt implausible levels for the coefficient of risk aversion.

Traditionally, the high average stock return and the low rate of return on a risk free asset have produced a high expected excess stock return, or equity premium. This premium is too large to be explained by the observed levels of consumption growth using standard models. This is the equity premium puzzle of Mehra and Prescott (1985). Any consumption-based asset pricing model must be able to resolve this puzzle if it is to hold empirically.

This study tests not only the implications of the C-CAPM model for a UK data set spanning 35 years but also considers the recursive preferences model developed by Epstein and Zin (1989, 1991) and external habit formation model. Attansio and Weber (1989) investigate this approach in the UK using data collated from the Family Expenditure Survey over a 15 year period. They obtain results which a generally supportive of the Epstein-Zin model but advocate the analysis using a longer span of data.

Following recent interest in consumption asset pricing, see, *inter alia*, Allais et al. (2000), Campbell and Cochrane (1999, 2000), Engsted et al. (2001), Neely et al. (2001) and Weber (2000), we investigate the traditional C-CAPM, the Epstein - Zin and external habit formation specification using quarterly data from 1965-2000. The models are estimated using non-durable and service consumption measure and stock return data from 28 different sectors

In addition, this study segments the stock market into four industrial groups to enable the estimation of the underlying parameters for both the whole market and the 4 smaller groups. Here we can identify whether there are any structural differences between the different industrial groups within the economy.

2 The Consumption CAPM

The consumption-based asset pricing model can be considered as a natural extension of consumption theory into the financial field. The development of consumption-based asset pricing theory ranks as one of the major advances in financial economics during the last two decades. This model has been developed both by macroeconomists and financial economists. Financial economists want to understand asset returns while macro-economists want to understand the behavior of consumption under uncertainty. Consumption and asset returns turn out to be intricately related to each other.

Lucas (1978) was the first to provide a compete theoretical examination of the stochastic behavior of the equilibrium asset prices resulting from a pure exchange economy. In such a single good economy the representative consumer aims to maximize life time utility.[1] The consumer has a time separable utility function with constant relative risk aversion (TS-CRRA). This function is

$$U(c_t) = \frac{(c_t^{1-\gamma} - 1)}{(1-\gamma)} \qquad \gamma > 0, \gamma \neq 1 \tag{1}$$

Where c_t denotes aggregate real per capita consumption, U(.) is the period utility function and γ represents the coefficient of relative risk aversion. As γ approaches one, the utility function in (1) approaches the log utility function $U(c_t) = log(c_t)$. The representative agent needs to maximize the expected value of the time additive utility as follows:

$$\max E_t \Big[\sum_{\tau=0}^{\infty} \beta^\tau U(c_{t+\tau}) \Big] \tag{2}$$

Where $c_{t+\tau}$ is the representative investor's consumption in the period $t+\tau$, $U(c_{t+\tau})$ is the representative investor's utility function at time $t+\tau$, E_t is expectation operator and β^τ is the utility discount factor which depends upon the investor's subjective rate of time preference, $0 < \beta < 1$. An Euler equation describing the investor's optimal consumption is given by: $(\tau = 1)$

$$U'(c_t) = \beta E_t \big[R_{i,t+1} U'(c_{t+1}) \big] \tag{3}$$

[1] Ignoring transactions costs, liquidity and borrowing constraints.

This equation describes the optimum since it equates the marginal cost of future consumption over current consumption with the marginal benefit. $U'(c_t)$ is the marginal cost of consuming one pound less at time t. The right hand side of the equation gives the expected marginal benefit from investing that pound in asset i at time t, selling it at time $t+1$ for $R_{i,t+1}$ pounds, and consuming the proceeds.

Substituting (1) into (3) gives:

$$E_t\Big[\beta\left(\frac{c_{t+1}}{c_t}\right)^{-\gamma}R_{i,t+1}\Big]-1=0 \tag{4}$$

The power utility function has several important properties. One of these properties is that risk premium do not change overtime - as aggregate wealth and the scale of economy increase - with constant return distributions[2]. Another related property is that if different investors in the economy have the same power utility function and can freely trade all the risks they face, they can be aggregated into a single representative investor with the same utility function as the individual investors even if they have different wealth levels[3]. The less desirable property of power utility is that it rigidly links two important concepts relative risk aversion (RRA) and the elasticity of intertemporal substitution (EIS).

3 The Epstein-Zin Model

Building on Kreps and Porteus (1978), Epstein and Zin (1991) have formulated a preference specification which allows the distinction between RRA and the elasticity of intertemporal substitution (EIS).

One generalization, considered in this paper, which relaxes the restriction on risk aversion and intertemporal substitution but maintains time consistency is recursive utility approach, of which the standard specification is a special case. We use the model described in Epstein and Zin (1991), which retains many of the attractive features of power utility but breaks the link between the parameter γ (RRA) which describes the consumer's reluctance to substitute consumption across states of the world and σ (EIS), which describes the consumer's willingness to substitute consumption over time.

The objective function is defined recursively by:

$$U_t=\left\{\Big(1-\beta\Big)C_t^{\frac{1-\gamma}{\Psi}}+\beta\Big(U_{t+1}^{1-\gamma}\Big)^{\frac{1}{\Psi}}\right\}^{\frac{\Psi}{1-\gamma}} \tag{5}$$

Where $\Psi=(1-\gamma)\,/\,\left(1-\frac{1}{\sigma}\right)$, $\sigma=(1-\rho)^{-1}$ and $\beta=\frac{1}{1+\delta}$ given $\delta>0$.

The intertemporal budget constraint for a representative agent can be written as:

[2]Scale-invariant.

[3]This is justification as for why we use aggregate consumption rather than individual consumption in the C-CAPM.

$$W_{t+1} = (1 + R_{m,t+1)})(W_t - C_t) \tag{6}$$

Where W_{t+1} is the representative agent's wealth, and $(1 + R_{m,t+1})$ is the return on the market portfolio of all invested wealth. Epstein and Zin show that (5) and (6), together imply an Euler equation of the form:

$$E_t\Big[\Big\{\beta\Big(\frac{c_{t+1}}{c_t}\Big)^{\frac{-1}{\sigma}}\Big\}^{\gamma}\Big\{\frac{1}{(1+R_{m,t+1})}\Big\}^{1-\gamma}\Big(1+R_{i,t+1}\Big)\Big] - 1 = 0 \tag{7}$$

To maintain the identifiability of the parameter $\sigma = (1-\rho)^{-1}$ it is necessary to include the following equation linking the market return with consumption growth:

$$E_t\Big[\Big(\Big(\beta\Big(\frac{c_{t+1}}{c_t}\Big)^{\frac{-1}{\sigma}}\Big(1+R_{m,t+1}\Big)\Big)^{\gamma} - 1\Big)/\gamma\Big] = 0 \tag{8}$$

Equations (7) and (8) are then estimated using GMM.

4 The Habit Formation Model

Researchers have developed the expected utility framework to account for different preference structures which better represent observed consumption behaviour. These preference structures emphasise the persistence of previous consumption and its impact on the current utility, i.e. habit formation. There are numerous different specifications which can be categorised as habit formation models, for example, see *inter alia* Campbell and Cochrane (1999), Abel (1990), Ferson and Constantinides (1991), Heaton (1995).

The model proposed by Abel (1990) model incorporates three classes of utility functions, one of them is known as the "catching up with the Joneses" model where utility depends on the level of consumption relative to the lagged average level of consumption. This specification of the utility function assumes that the individual's consumption habit is equal to aggregate consumption. Therefore, the stochastic discount factor is:

$$\beta\left(\frac{C_{t+1}}{C_t}\right)^{-\gamma}\left(\frac{C_t}{C_{t-1}}\right)^{\psi(\gamma-1)} \tag{9}$$

Given the stochastic discount factor defined above, and its relation with the market return, Abel's specification yields the following Euler equation:

$$E_t\left[\beta\left(\frac{C_{t+1}}{C_t}\right)^{-\gamma}\left(\frac{C_t}{C_{t-1}}\right)^{\psi(\gamma-1)}(1+R_{i,t+1}) - 1\right] = 0 \tag{10}$$

To estimate the Euler equation, we estimate first the habit level, as a function of past consumption levels. To estimate habit as a function of past consumption levels, we assume that the data generating process for consumption follows an ARIMA process.

In order to ascertain the order of the ARIMA process, we initially test the stationarity of the consumption series. The consumption series, figure 1, clearly trends upward over time. To determine whether this persistent upward trend arises from the positive drift term of a random walk or from a deterministic time trend we employ a unit root test.

Using the SBC (Schwarz Bayes Information) criterion to determine the preferred ARIMA model and having assumed that the data generating process is an ARIMA (p,1,q), with p=0,1,...50 and q=0,1,...15. We find that the preferred process is an ARIMA(0,1,15).

5 Structure Stability Tests of Consumption Models

There has been a great deal of recent interest in tests for constancy of parameters in dynamic econometric models. Developments have focussed on moving from classic tests assuming that the date of structural change is known to tests which allow for procedures which do assume the the change date is unknown.

We are interested in tests of H_0 when the true change point t_0 is unknown. Quandt (1960) proposed the likelihood ratio test which is equivalent to $SupF_n = suptF_t$. Andrews and Ploberger (1994) developed a theory of optimal testing, and suggested a related family of tests, including an exponentially weighted Wald test (optimal against distant alternatives) ExpF and the average F test (optimal against very local alternatives) AveF. Accordingly, it is more appropriate to test for instability at any point in the sample in which the breakpoint is unknown.

In this context we find that there are two main approaches which can shed light on this issue. Firstly, Andrews and Fair (1988) proposed Wald, likelihood ratio LR type, and lagrange multiplier LM as tests of parameter stability (constancy). Whereas the second approach has been concentrating on the sample moment condition from one sub-sample evaluated at the parameter estimates from the other sample, the common example here is the predictive test proposed by Ghysels and Hall (1990). Recently, these methods have been extended to allow for unknown breakpoints, see (*inter alia* Andrews (1993), Andrews and Ploberger (1994) and Sowel (1996).

We follow the approach of Hall and Sen (1999) whereby they propose a decomposition of the null hypothesis of structural stability into orthogonal components involving the identifying and the overidentifying restrictions. This decomposition facilities the discrimination between situations in which the instability is confined to the parameters alone and those in which the instability permeates other aspects of the model. As a result of the limitation of the traditional tests of stability as they ignore the overidentifying restrictions from one side and the predictive test does not allow us to determine the source of instability. For those reasons we will use the most recent approaches to test the consumption model.

To test the stability of identifying restrictions H_0^i, we use the following set of tests, see Hall and Sen (1999):

$$\sup W_T = \sup_{\pi \in \Pi} \{W_T(\pi)\} \tag{11}$$

$$avW_T = \int_{\Pi} W_T(\pi) dJ(\pi) \tag{12}$$

and

$$\exp W_T = \log \left\{ \int_{\Pi} \exp[(0.5)W_T(\pi)] dJ(\pi) \right\} \tag{13}$$

Where $\pi_1 = 0.30 \times T$ and $\pi_2 = 0.70 \times T$ where T is the number of observations, and assume that π lies in a range π_1, π_2 and $W_T(\pi)$ defined as the Wald statistic of the hypothesis that $\beta_1 = \beta_2$ for each possible value of π.

To test the stability of overidentifying restriction H_0^o, we use the following set of tests, see Hall and Sen (1999):

$$\sup OV_T = \sup_{\pi \in \Pi} \{OV_T(\pi)\} \tag{14}$$

$$avOV_T = \int_{\Pi} OV_T(\pi) dJ(\pi) \tag{15}$$

and

$$\exp OV_T = \log \left\{ \int_{\Pi} \exp[(0.5)OV_T(\pi)] dJ(\pi) \right\} \tag{16}$$

Where

$$OV_T(\pi) = OV1_T(\pi) + 0V2_T(\pi) \tag{17}$$

Where $OV1_T(\pi)$ and $OV2_T(\pi)$ are the overidentifying restrictions tests for each sub-sample.

The main advantage of this decomposition of the null hypothesis is that it offering the potential to discriminate between two implies which might be of interest to empirical researchers. The first one is in which only the parameter values have changed but all other aspects of the model have stayed without change which is consistent with violation of $H_0^i(\pi)$ but not $H_0^o(\pi)$. The second alternative is one in which the instability causes a more fundamental misspecification involving more than just the parameters, which be reflected in violation of $H_0^o(\pi)$ and then $H_0^i(\pi)$.

6 Data and Empirical Results

The data adopted in this study is quarterly data from the period 1965:1 through 2000:4. We use non-durable plus services as a measure of consumption expenditure. The consumption measure is deflated using the appropriate implicit consumption deflator and divided by a measure of UK population to give real per capita consumption.

The market return is the FTSE all Share index, the short-term bond yield is taken to be a 91-day treasury-bill and equity returns for 28 sectors, classified into four sectoral groups (capital goods, consumer goods, financial and others).

Again all series are deflated by the appropriate implicit consumption deflator corresponding to each measure of consumption.

The traditional C-CAPM, Epstein-Zin and habit formation specifications are estimated with two different sets of instrumental variables. These are INST1 = (1, C_t/C_{t-1}, M_t/M_{t-1}, B_t/B_{t-1}, DIV_t/DIV_{t-1}), and INST2 = (1, C_{t-1}/C_{t-2}, B_{t-1}/B_{t-2}, M_{t-1}/M_{t-2}, DIV_{t-1}/DIV_{t-2}). We also adopt Hansen's test of overidentifying restrictions in the initial analysis to test the specification of each model.

The consumption series and consumption growth series are shown in figure 1. In order to establish an ARIMA process for habit formation, unit root tests were performed on the consumption series. For the consumption series the Phillips-Perron statistic is -0.7628 (c.v. -3.4417), for the consumption growth series the Phillips-Perron statistics is -12.3032. The habit formation specification was modelled using an ARIMA(0,1,15) process.

Table (1) presents the GMM results for the three consumption models of the whole economy using stock returns and consumption. The results clearly show that estimates obtained using INST1 are superior to those obtained using INST2. The values obtained for the traditional C-CAPM and the Habit Formation model conform to expected theoretical values. The value for the rate of intertemporal substitution, β is close to one, while the value for the risk aversion parameter, γ is positive. All coefficient estimates are significant. Hansen's test of overidentifying restrictions further supports both models as neither specification is rejected. The estimates for the Epstein-Zin specification are poor, producing negative values for the risk aversion parameter.

The three specifications are further tested using the structural stability tests outlined in section 5. The results of this analysis are presented in table (2) for $\Pi = 0.3, 0.7$ [4]. The identifying tests are supportive of all three specification (although test statistics for the Epstein-Zin model are close to their critical values). However, the tests of overidentifying restrictions are not rejected for only the habit formation model. For both the C-CAPM and the Epstein-Zin formulation either some or all of the tests are rejected. These tests clearly identify parameter stability in the habit formation specification and highlight the model as superior to the other specifications.

Table 3 presents the results of the analysis of the four sector groupings. There are found to be significant similarities between sectors for the Epstein-Zin specification although the other two models are suggestive of significant differences. Again estimates of coefficients for the Epstein-Zin model are often imprecise and incorrectly signed. For the industrial sectors the parameter estimates for the traditional C-CAPM are also imprecise and incorrectly signed. However, the evidence is more supportive of the habit formation model.

The results at both the economy level and the industrial sector level suggest that a habit formation specification is superior to both the traditional C-CAPM and the Epstein-Zin specification. Further, the estimated model is able to describe the observed data and exhibits parameter stability.

[4]The estimation is performed in GAUSS

7 Conclusion

This paper has tested the traditional C-CAPM, the Epstein and Zin (1989, 1991) and external habit formation specifications using GMM on a quarterly data set spanning 35 years. The models are estimated for both the whole economy and four separate industrial sector groupings.

We find little evidence to support the recursive preferences model of Epstein and Zin (1991). The estimated elasticity of intertemporal substitution, σ, is small but insignificant, and estimates for the risk aversion parameter, γ, are inconsistent across instrumental variables, they are imprecisely estimated and often incorrectly signed at both the economy level and the sector level.

The traditional C-CAPM performs well at the economy level but is less successful for the industrial sectors. However, structural stability tests reject the parameter estimates for the economy model. There is supportive evidence for the performance of the habit formation model, using the specification proposed by Abel (1990), at both the economy level and the industrial sector level. Further, this specification is not rejected by the structural stability tests. Thus, there exists a stable consumption model for the UK based on habit formation which can describe behaviour not only economy wide but for individual sector components.

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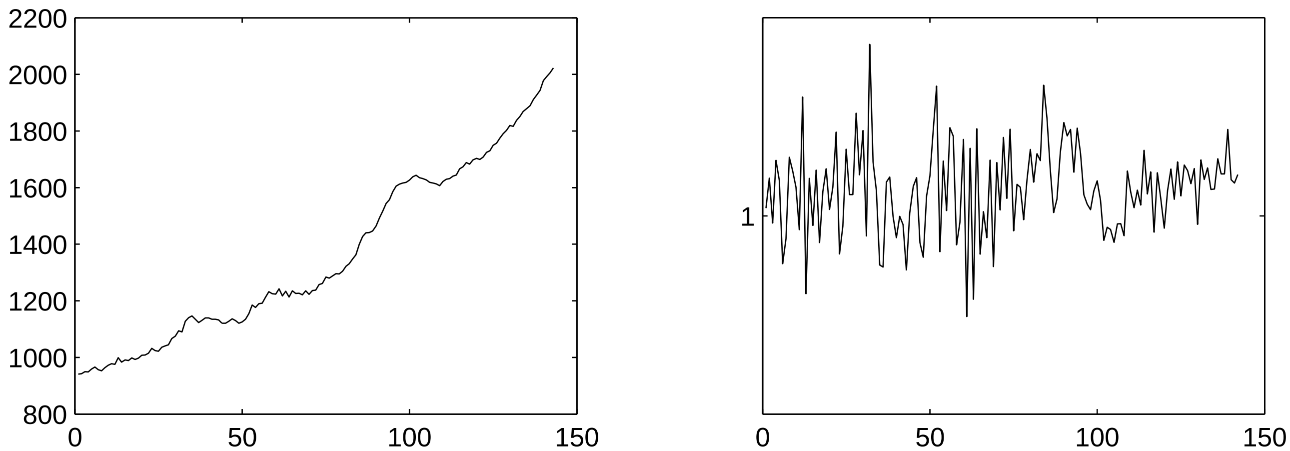

Figure 1: (a) Per capita quarterly consumption expenditure and (b) consumption growth 1965:1 - 2000:4

Table 1: Consumption Models, Economy - Stocks and Consumption

	C-CAPM		Epstein and Zin		Habit Formation	
	INST1	INST2	INST1	INST2	INST1	INST2
β	1.0066	0.9896	1.0212	1.0301	1.0093	1.0144
	(0.0031)	(0.0028)	(0.0031)	(0.0037)	(0.0044)	(0.0082)
γ	2.1247	-0.7808	-0.2761	-0.0382	1.9299	0.2130
	(0.4572)	(0.5226)	(1.9921)	(4.3674)	(0.4901)	(0.9807)
$\sigma(\pi)$	-	-	0.7512	0.8547	1.6956	2.7659
	-	-	(0.2351)	(0.9832)	(0.7894)	(0.4198)
χ^2	6.9214	15.9472	11.658	10.2327	6.5849	7.3688
J(n)	[0.3281]	[0.0140]	[0.07005]	[0.1152]	[0.2533]	[0.1946]

Note: INST1 = (1, C_t/C_{t-1}, M_t/M_{t-1},B_t/B_{t-1}, DIV_t/DIV_{t-1}), INST2 =(1, C_{t-1}/C_{t-2}, B_{t-1}/B_{t-2},M_{t-1}/M_{t-2}, DIV_{t-1}/DIV_{t-2}). J(n)is Hansen's test of over identifying restrictions. Asymptotic standard errors are in parentheses, and asymptotic p-values are in brackets.

Table 2: Structural Stability Tests $\Pi = (0.30, 0.70)$

	C-CAPM		Epstein-Zin		Habit Formation	
Stability tests	test statistic value	critical value	test statistic value	critical value	test statistic value	critical value
$supW_T$	4.7102	8.57	9.34	10.76	6.21	10.76
avW_T	2.8514	4.02	5.11	5.50	2.53	5.50
$expW_T$	1.5318	2.42	2.91	3.34	1.12	3.34
$supOV_T$	12.3395	16.33	25.31	28.76	8.23	12.78
$avOV_T$	13.2793	9.91	23.08	19.91	4.52	7.21
$expOV_T$	5.8273	5.73	12.01	11.41	3.67	4.17

Note: For $sup0V_T, avOV_T$ and $expOV_T$, the critical values are from table 1, Hall & Sen (1999) with q (instruments $\times$ no.of equations) - p (the no. of parameters in the model)= 3, 2, 7 for each model respectively. For $supW_T$ the critical values are from table 1, Andrews (1993). For avW_T and $expW_T$ the critical values are from table 1 and 2, Andrews and Ploberger (1994) with m (number of parameters for identification test) = 2, 3, 3 respectively for each model.

Table 3: Consumption models - Industrial sectors

Capital goods

	C-CAPM (df=3)		Epstein - Zin (df=7)		Habit Formation (df=2)	
	INST1	INST2	INST1	INST2	INST1	INST2
β	0.9795	0.9923	0.9800	0.9828	0.9805	0.9742
	(0.0119)	(0.0110)	(0.0085)	(0.0078)	(0.0084)	(0.0101)
γ	-1.8788	2.9200	-0.5118	-0.0821	1.5671	0.8129
	(0.9296)	(2.8626)	(0.2692)	(3.0317)	(1.9921)	(0.0406)
σ (ψ)	-	-	0.2122	0.0275	-0.3606	-0.0234
	-	-	(0.3893)	(0.0249)	(0.2242)	(0.5216)
χ^2	10.4883	9.9273	11.1687	13.2917	6.3686	6.4390
J(n)	[0.6535]	[0.6998]	[0.1314]	[0.0563]	[0.4974]	[0.4895]

Consumer goods

	C-CAPM		Epstein - Zin		Habit Formation	
	INST1	INST2	INST1	INST2	INST1	INST2
β	0.9865	0.9747	0.9910	1.0574	0.9748	0.9841
	(0.0079)	(0.0064)	(0.0075)	(0.0036)	(0.0104)	(0.0104)
γ	-1.9564	-2.1202	-0.0861	2.2587	0.2282	0.7043
	(2.6865)	(0.6545)	(0.2692)	(4.0317)	(0.0117)	(0.0406)
σ (ψ)	-	-	0.2122	0.0275	-0.3606	-0.0004
	-	-	(0.3893)	(0.0249)	(3.2242)	(0.8216)
χ^2	5.8110	4.891	9.4321	10.3240	3.9107	2.7200
J(n)	[0.1211]	[0.1799]	[0.2231]	[0.1709]	[0.1415]	[0.2566]

Financial goods

	C-CAPM		Epstein - Zin		Habit Formation	
	INST1	INST2	INST1	INST2	INST1	INST2
β	0.9893	0.9933	0.9707	0.9976	0.9753	0.9780
	(0.0105)	(0.0103)	(0.0079)	(0.0103)	(0.0094)	(0.009)
γ	-2.0766	4.2584	3.5118	-0.0821	2.0049	1.23264
	(0.7964)	(0.7331)	(4.2692)	(1.0317)	(1.0312)	(2.0424)
σ (ψ)	-	-	0.2231	0.2175	-0.4321	-0.5620
	-	-	(0.2341)	(0.2019)	(3.2242)	(0.9216)
χ^2	7.8110	3.891	14.9687	16.6415	1.9107	2.8971
J(n)	[0.0501]	[0.2734]	[0.0364]	[0.0198]	[0.3846]	[0.2349]

Other goods

	C-CAPM		Epstein - Zin		Habit Formation	
	INST1	INST2	INST1	INST2	INST1	INST2
β	0.9760	0.9792	0.9670	0.9785	0.9829	0.9717
	(0.0089)	(0.0086)	(0.0085)	(0.0085)	(0.0093)	(0.0087)
γ	0.7645	-2.0350	-0.5118	-0.0821	1.0021	0.9129
	(2.2977)	(0.0402)	(0.2692)	(0.0317)	(0.2341)	(0.1406)
σ (ψ)	-	-	0.2122	0.0275	-0.2181	0.5326
	-	-	(0.3893)	(0.0249)	(3.2242)	(0.9216)
χ^2	5.6211	7.4046	12.9687	13.6415	2.5024	4.3917
J(n)	[0.1315]	[0.0600]	[0.0728]	[0.0579]	[0.2862]	[0.1112]

Note: INST1 $= (1, C_t/C_{t-1}, M_t/M_{t-1}, B_t/B_{t-1}, DIV_t/DIV_{t-1})$, INST2 $=(1, C_{t-1}/C_{t-2}, B_{t-1}/B_{t-2}, M_{t-1}/M_{t-2}, DIV_{t-1}/DIV_{t-2})$. J(n)is Hansen's test of over identifying restrictions. Asymptotic standard errors are in parentheses, and asymptotic p-value are in brackets.