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"Time-Varying Expected Returns: Evidence from the U.S. and the U.K"

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Time-Varying Expected Returns: Evidence from the U.S. and the U.K.

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Abstract

I assess the relative performance of several empirical proxies developed in the literature of asset pricing to capture time-variation in expected future returns using data for the U.S. and the U.K.. I show that the wealth composition risk by Sousa (2010) exhibits strong forecasting power.

Keywords: asset pricing, wealth, empirical proxies, expected returns.

JEL classification: E21, E44, D12.

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1 Introduction

A growing body of empirical literature has documented the long-term predictability of asset returns and the linkages between wealth and other macroeconomic variables (Fama and French, 1988; Poterba and Summers, 1995).

An important reason for the interest in this relation is that expected excess returns on assets appear to vary with the business cycle and, as a result, authors have paid a great deal of effort towards the development of many economically motivated variables and focused on their predictability for asset returns. In this line, Michaelides (2003) and Kiyotaki and Moore (2005) address the role of liquidity, while Julliard (2004) focuses on labor income risk. Fernandez-Corugedo et al. (2007) follows Lettau and Ludvigson (2001) and, in addition to the transitory deviation from the common trend in consumption, aggregate wealth and labor income, highlight the importance of the relative price of durable goods. Santos and Veronesi (2006) show that as the labor income-consumption ratio fluctuates, the relationship between stock returns and consumption growth varies.

More recently, authors have investigated the channels that transmit shocks originated in the housing market to the risk premia in asset markets, in particular, and to the economy, in general. Kiyotaki et al. (2008) find that an exogenous change in the interest rate leads to substantial reaction of housing prices when the share of land in the value of real estates is large. Yogo (2006) shows that stock returns are unexpectedly low at business cycle troughs when durable consumption falls sharply, because preferences are nonseparable in nondurable and durable consumption. Piazzesi et al. (2007) argue that fluctuations of the relative share of housing in the consumption basket can be used to forecast returns on stocks. Lustig and Van Nieuwerburgh (2005) consumers are more exposed to idiosyncratic income risk when housing prices fall - as collateral is destroyed - and, therefore, the ratio of housing wealth to human wealth helps predicting stock returns. Finally, Sousa (2010) emphasizes the role of wealth composition: financial wealth shocks produce only temporary effects on consumption, while changes in housing wealth have very persistent effects. As a result, deviations from the shared trend in consumption, financial wealth, housing wealth, and labor income are mainly described as transitory movements in financial wealth.

In this paper, I assess the relative forecasting power of different asset pricing models using data for the U.S. and the U.K. Specifically, I compare the predictive content of major empirical proxies that capture time-variation in expected future returns. In this sense, the current work is indebted to Malkiel (2004) who interestingly compares the success of stock return predictability of the Campbell and Shiller (1988) mean-reversion models and the Federal Reserve-type models. While these models are built on financial indicators, I focus on those that combine wealth and macroeconomic information to deliver stock return forecasting properties. I show that stock markets are somewhat predictable, in line with the strand of the literature that questions the efficient market hypothesis. Moreover, I find that the consumption-(dis)aggregate wealth ratio developed by Sousa (2010) performs relatively well vis-a-vis other models. Therefore, wealth composition is a driving source of risk.

2 Empirical Results

I consider five empirical proxies that track time-varying in expected returns, namely: (*i*) the consumption-wealth ratio, *cay*, by Lettau and Ludvigson (2001); (*ii*) the labor-income consumption ratio, *lc*, by Santos and Veronesi (2006); (*iii*) the expenditure share on housing, share on housing share expenditure, φ, by Piazzesi et al. (2007); (*iv*) the housing collateral ratio, *myrw*, by Lustig and Van Nieuwerburgh (2005); and (*v*) the consumption-(dis) aggregate wealth ratio, *cday*, by Sousa (2010).

I use quarterly data for both the U.S. and the U.K. for the period 1975:1-2008:4, and all variables are measured at 2001 prices and expressed in the logarithmic form of per capita terms. In the case of the U.S., the major data sources are the Bureau of Economic Analysis from the U.S. Department of

Commerce and the Flow of Funds Accounts from the Board of Governors of Federal Reserve System. As for the U.K., data come from the Office for National Statistics (ONS), Halifax plc, the Nationwide Building Society and the Office of the Deputy Prime Minister. For both the U.S. and the U.K., asset returns are measured from the Total Return Indexes from the Morgan Stanley Capital International (MSCI).

Some asset pricing models are based on a rich description of the consumer's preferences and the role of housing in providing utility and/or collateral services. By its turn, the consumption-(dis)aggregate wealth ratio, *cday*, is directly formulated from the consumer's intertemporal budget constraint and emphasizes the composition of wealth as the major source of risk without specifying a functional form of consumer's preferences. While that could justify a better performance of the first models, Davis and Martin (2009) point out that the separability between housing and other forms of consumption in utility does not solve a wide range of economic puzzles for two major reasons. First, in order to be consistent with the housing price data, the degree of substitution between housing and consumption would need to be much higher. Second, the risk-free rate would need to be unrealistically higher in order to match both housing prices and stock returns. As a result, I compare the forecasting power of the different models.

Table 1 and 2 report the estimations of U.S. real returns and excess returns, over horizons spanning 1 to 4 quarters, on $\hat{cay}_t^{US}$ (Panel A), on $\hat{lc}_t^{US}$ (Panel B), on $\hat{\varphi}_t^{US}$ (Panel C), on $\hat{myrw}_t^{US}$ (Panel D), and on $\hat{cday}_t^{US}$ (Panel E). Table 1 shows that $\hat{cday}_t^{US}$ exhibits superior forecasting performance vis-a-vis other asset pricing models: (*i*) it outperforms both $\hat{lc}_t^{US}$ and $\hat{myrw}_t^{US}$ which have low predictive ability; and (*ii*) it is also able to capture more variation in future real returns than $\hat{\varphi}_t^{US}$. Similarly, Table 2 suggests that while the forecasting power of $\hat{cday}_t^{US}$ as measured by the $\bar{R}^2$ statistic ranges between 0.03 and 0.09 at the horizons of 1 to 4 quarters: (*i*) $\hat{lc}_t^{US}$ has similar predictive ability, but its associated coefficients are smaller in magnitude; (*ii*) $\hat{\varphi}_t^{US}$ explains just between 0.02 and 0.03; and (*iii*) $\hat{myrw}_t^{US}$ has very poor performance.

[PLACE TABLE 1 HERE.]

[PLACE TABLE 2 HERE.]

Tables 3 and 4 present the results of the regressions of U.K. real returns and excess returns, over horizons spanning 1 to 4 quarters, on $\hat{cay}_t^{UK}$ (Panel A), $\hat{lc}_t^{UK}$ (Panel B), $\hat{\varphi}_t^{UK}$ (Panel C), $\hat{myrw}_t^{UK}$ (Panel D), and $\hat{cday}_t^{UK}$ (Panel E). Table 3 shows that $\hat{cday}_t^{UK}$ performs pretty well in forecasting real returns in comparison to other asset pricing models: (*i*) it clearly outperforms $\hat{lc}_t^{UK}$, which has low predictive power; (*ii*) it predicts real returns better than $\hat{\varphi}_t^{UK}$, in particular, at the horizons of 1 to 3 quarters; and (*iii*) while the predictive power of $\hat{myrw}_t^{UK}$ is similar to the one of $\hat{cday}_t^{UK}$, the coefficients associated to $\hat{cday}_t^{UK}$ are larger in magnitude. Similar results can be found for excess returns (Table 4). In fact, while the forecasting power of $\hat{cday}_t^{UK}$ as measured by the $\bar{R}^2$ statistic ranges between 0.02 and 0.08 at the horizons of 1 to 4 quarters, $\hat{myrw}_t^{UK}$ explains just between 0.02 and 0.05 and its coefficient estimates are small. In addition, the predictive power of $\overset{\wedge}{\varphi}_t^{UK}$ ranges between 0.01 and 0.03, while $\overset{\wedge}{lc}_t^{UK}$ merely explains 1% of the excess returns over the next 4 quarters.

[PLACE TABLE 3 HERE.]

[PLACE TABLE 4 HERE.]

The empirical evidence, therefore, suggests that *cday* captures the wealth composition risk and describes well the agents' expectations about future returns. For instance, when investors hold a portfolio that has a larger exposure to housing wealth, they face high transaction costs involved in trading housing assets up or down. As a result, asset portfolios associated with different degrees of liquidity, taxation, transaction costs - that is, characterized by a specific composition - should be priced differently in terms of risk.

3 Conclusion

This paper uses data for the U.S. and the U.K. to provide a comparison of the forecasting power of different proxies to capture time-variation in asset returns developed in the literature of asset pricing. It shows that wealth composition risk (Sousa, 2010) is important in explaining future U.S. and U.K. returns, in particular, relative to models that emphasize the role of housing in consumer's preferences.

Although Sousa (2010) treats separately financial and housing wealth, the author does not disentangle between the relative shares of land and structures in the total market value of the housing stock. Nevertheless, Davis and Heathcote (2007) argue that the growth rate of the price of housing is a weighted average of the growth rate of the price of structures and the price of land. Similarly, Kiyotaki et al. (2008) show that when the share of land in value of real estates is large, housing prices adjust strongly to interest rate changes. Therefore, one avenue to explore in the future consists in assessing the contribution of the dynamics of housing and land prices for asset return predictability.

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Tables

Table 1
Long-Run Horizon Regressions for Real Returns: U.S. Evidence.

The table reports results from long-horizon regressions of U.S. real returns on $\widehat{cay}_t^{US}$, $\widehat{lc}_t^{US}$, $\widehat{\varphi}_t^{US}$, $\widehat{myrw}_t^{US}$, and $\widehat{cday}_t^{US}$.
The dependent variable is H-period U.S. real return $r_{t+1}^{US}+...+r_{t+H}^{US}$.
Symbols ***, **, and * represent significance at a 1%, 5% and 10% level, respectively.
Newey-West (1987) corrected t-statistics appear in parenthesis. The sample period is 1975:1-2008:4.

	Forecast Horizon H			
Regressor	1	2	3	4
Panel A: Real Returns, using $\widehat{cay}_t^{US}$				
$\widehat{cay}_t^{US}$	0.914***	1.691***	2.475***	3.568***
(t-stat)	(2.643)	(2.689)	(2.834)	(3.041)
$\bar{R}^2$	[0.03]	[0.05]	[0.08]	[0.12]
Panel B: Real Returns, using $\widehat{lc}_t^{US}$				
$\widehat{lc}_t^{US}$	-0.017	0.003	0.018	0.04
(t-stat)	(-0.143)	(0.012)	(0.052)	(0.095)
$\bar{R}^2$	[0.00]	[0.00]	[0.00]	[0.00]
Panel C: Real Returns, using $\widehat{\varphi}_t^{US}$				
$\widehat{\varphi}_t^{US}$	1.355	3.341	5.613*	8.055**
(t-stat)	(1.134)	(1.467)	(1.737)	(1.963)
$\bar{R}^2$	[0.00]	[0.01]	[0.03]	[0.05]
Panel D: Real Returns, using $\widehat{myrw}_t^{US}$				
$\widehat{myrw}_t^{US}$	0.123	0.188	0.380	0.477
(t-stat)	(0.526)	(0.426)	(0.589)	(0.570)
$\bar{R}^2$	[0.00]	[0.00]	[0.00]	[0.00]
Panel E: Real Returns, using $\widehat{cday}_t^{US}$				
$\widehat{cday}_t^{US}$	1.168***	2.168***	3.100***	4.305***
(t-stat)	(3.127)	(3.376)	(3.489)	(3.886)
$\bar{R}^2$	[0.05]	[0.09]	[0.12]	[0.17]

Table 2
Long-Run Horizon Regressions for Excess Returns: U.S. Evidence.

The table reports results from long-horizon regressions of U.S. excess returns on $\hat{cay}_t^{US}$, $\hat{lc}_t^{US}$, $\hat{\varphi}_t^{US}$, $\hat{myrw}_t^{US}$, and $\hat{cday}_t^{US}$. The dependent variable is H-period U.S. excess return, $r_{t+1}^{US} - r_{f,t+1}^{US} + ... + r_{t+H}^{US} - r_{f,t+H}^{US}$.
Symbols ***, **, and * represent significance at a 1%, 5% and 10% level, respectively.
Newey-West (1987) corrected t-statistics appear in parenthesis. The sample period is 1975:1-2008:4.

	Forecast Horizon H			
Regressor	1	2	3	4
Panel A: Excess Returns, using $\hat{cay}_t^{US}$				
$\hat{cay}_t^{US}$	0.900*	1.675*	2.442*	3.519**
(t-stat)	(1.908)	(1.860)	(1.926)	(2.146)
$\bar{R}^2$	[0.02]	[0.04]	[0.05]	[0.07]
Panel B: Excess Returns, using $\hat{lc}_t^{US}$				
$\hat{lc}_t^{US}$	-0.295**	-0.568**	-0.863**	-1.167**
(t-stat)	(-1.995)	(-2.001)	(-2.144)	(-2.282)
$\bar{R}^2$	[0.03]	[0.05]	[0.08]	[0.10]
Panel C: Excess Returns, using $\hat{\varphi}_t^{US}$				
$\hat{\varphi}_t^{US}$	0.986	2.844	5.174	7.789
(t-stat)	(0.673)	(0.990)	(1.228)	(1.412)
$\bar{R}^2$	[0.00]	[0.00]	[0.02]	[0.03]
Panel D: Excess Returns, using $\hat{myrw}_t^{US}$				
$\hat{myrw}_t^{US}$	-0.069	-0.185	-0.142	-0.159
(t-stat)	(-0.261)	(-0.367)	(-0.198)	(-0.179)
$\bar{R}^2$	[0.00]	[0.00]	[0.00]	[0.00]
Panel E: Excess Returns, using $\hat{cday}_t^{US}$				
$\hat{cday}_t^{US}$	1.018**	1.909**	2.758**	3.919***
(t-stat)	(2.411)	(2.407)	(2.376)	(2.674)
$\bar{R}^2$	[0.03]	[0.05]	[0.06]	[0.09]

Table 3
Long-Run Horizon Regressions for Real Returns: U.K. Evidence.

The table reports results from long-horizon regressions of U.K. real returns on $\hat{cay}_t^{UK}$, $\hat{lc}_t^{UK}$, $\hat{\varphi}_t^{UK}$, $\hat{myrw}_t^{UK}$, and $\hat{cday}_t^{UK}$.
The dependent variable is H-period U.K. real return $r_{t+1}^{UK} + ... + r_{t+H}^{UK}$.
Symbols ***, **, and * represent significance at a 1%, 5% and 10% level, respectively.
Newey-West (1987) corrected t-statistics appear in parenthesis. The sample period is 1975:1-2008:4.

	Forecast Horizon H			
Regressor	1	2	3	4
Panel A: Real Returns, using $\hat{cay}_t^{UK}$				
$\hat{cay}_t^{UK}$	0.629**	1.262**	1.635**	1.677**
(t-stat)	(2.291)	(2.216)	(2.153)	(1.974)
$\bar{R}^2$	[0.01]	[0.03]	[0.03]	[0.03]
Panel B: Real Returns, using $\hat{lc}_t^{UK}$				
$\hat{lc}_t^{UK}$	0.055	0.118	0.323	0.631
(t-stat)	(0.348)	(0.382)	(0.679)	(0.959)
$\bar{R}^2$	[0.00]	[0.00]	[0.00]	[0.01]
Panel C: Real Returns, using $\hat{\varphi}_t^{UK}$				
$\hat{\varphi}_t^{UK}$	1.116**	2.108**	2.706*	3.446**
(t-stat)	(2.061)	(1.999)	(1.924)	(2.041)
$\bar{R}^2$	[0.01]	[0.02]	[0.03]	[0.04]
Panel D: Real Returns, using $\hat{myrw}_t^{UK}$				
$\hat{myrw}_t^{UK}$	0.583***	0.918***	1.244**	1.508**
(t-stat)	(2.787)	(2.490)	(2.425)	(2.335)
$\bar{R}^2$	[0.03]	[0.04]	[0.05]	[0.06]
Panel E: Real Returns, using $\hat{cday}_t^{UK}$				
$\hat{cday}_t^{UK}$	0.804***	1.576***	2.043**	2.053**
(t-stat)	(2.699)	(2.475)	(2.309)	(1.976)
$\bar{R}^2$	[0.02]	[0.04]	[0.05]	[0.04]

Table 4
Long-Run Horizon Regressions for Excess Returns: U.K. Evidence.

The table reports results from long-horizon regressions of U.K. excess returns on $\widehat{cay}_t^{UK}$, $\widehat{lc}_t^{UK}$, $\widehat{\varphi}_t^{UK}$, $\widehat{myrw}_t^{UK}$, and $\widehat{cday}_t^{UK}$. The dependent variable is H-period U.K. excess return, $r_{t+1}^{UK} - r_{f,t+1}^{UK} + ... + r_{t+H}^{UK} - r_{f,t+H}^{UK}$.
Symbols ***, **, and * represent significance at a 1%, 5% and 10% level, respectively.
Newey-West (1987) corrected t-statistics appear in parenthesis. The sample period is 1975:1-2008:4.

	Forecast Horizon H			
Regressor	1	2	3	4
Panel A: Excess Returns, using $\widehat{cay}_t^{UK}$				
$\widehat{cay}_t^{UK}$	0.698**	1.374**	1.826**	2.114***
(t-stat)	(2.405)	(2.362)	(2.415)	(2.641)
$\bar{R}^2$	[0.01]	[0.03]	[0.05]	[0.05]
Panel B: Excess Returns, using $\widehat{lc}_t^{UK}$				
$\widehat{lc}_t^{UK}$	0.102	0.215	0.448	0.649
(t-stat)	(0.698)	(0.763)	(1.046)	(1.149)
$\bar{R}^2$	[0.00]	[0.00]	[0.00]	[0.01]
Panel C: Excess Returns, using $\widehat{\varphi}_t^{UK}$				
$\widehat{\varphi}_t^{UK}$	0.851	1.695*	2.124	2.986*
(t-stat)	(1.552)	(1.656)	(1.575)	(1.894)
$\bar{R}^2$	[0.00]	[0.01]	[0.02]	[0.03]
Panel D: Excess Returns, using $\widehat{myrw}_t^{UK}$				
$\widehat{myrw}_t^{UK}$	0.518**	0.795**	1.079**	1.372**
(t-stat)	(2.397)	(2.225)	(2.257)	(2.377)
$\bar{R}^2$	[0.02]	[0.03]	[0.04]	[0.05]
Panel E: Excess Returns, using $\widehat{cday}_t^{UK}$				
$\widehat{cday}_t^{UK}$	0.904***	1.745***	2.317***	2.695***
(t-stat)	(2.971)	(2.769)	(2.691)	(2.884)
$\bar{R}^2$	[0.02]	[0.06]	[0.07]	[0.08]

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