INFLUENCE OF INVESTMENT DECISIONS AND CONSUMPTION ON ASSET PRICING: CCAPM APPROACH

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Abstract

Purpose of the study: This study examines the influence of investment decisions and consumption on asset pricing from 1980 to 2016.

Methodology: This study has used a quantitative research design and a secondary source is deployed to collect data from 1980 to 2016. The data was gathered from Saint Louis Fed, whereas Standard and Poor's 500 (S&P 500 index at a closing price of the first day of the month) was from Yahoo Finance. The software used for the data analysis was R Studio and statistical methods such as descriptive statistics, Generalized Method of Moments (GMM) model Fitting and Consumption Capital Asset Pricing Model (CCAPM) Fitting was performed to examine the influence of investment decisions and consumption on asset pricing.

Main Findings: The finding of the study shows that Personal Consumption Expenditures: Nondurable Goods (PCE): Nondurable goods, (PCEN) and 1-Year Treasury Constant Maturity Rate (GS1) jointly accounted for about 7.9% of the variance observable in excess return SP500. Furthermore, independently, GS1 (annualized 1-Year Treasury Constant Maturity Rate) was significant while PCE (Personal Consumption Expenditures: Nondurable Goods) and PCEN: Nondurable goods were insignificant.

The implication of the Study: The current study is useful for investors and especially fund managers across the globe to determine what return they expect on their investment for putting their capital at risk on it.

Novelty/Originality of this study: Studies have been conducted to analyze the impact of investment decision based on the CAPM model, whereas this study introduces the influence of investment decisions and consumption on asset pricing by deploying the CCAPM approach which is an extension of the capital asset pricing model that uses a consumption beta instead of a market beta to explain expected return premiums over the risk-free rate.

Keywords: *Investment Decision, Consumption, Asset Pricing, CCAPM.*

INTRODUCTION

Investment decisions had been identified as driving factors for different economic measures in the fields of investment, stock market stability, growth of the economy as well as risk management (Breeden, 2015; Husain, & Javed, 2019; Husain, & Javed, 2019; Ullah, Shaikh, Channar, & Shaikh, 2021). This is the explanation behind which customer inclination, behavior pattern, and determinant of investments have gotten important concentration from scholars and from experts in the field of economic policy growth (Aoki et al, 2004). As indicated by Allen and Gale (2013), the factors encompassing investment decisions and consumption are required to have an effective impact on asset pricing in any economic framework. The impact of investment decisions and consumption has been researched broadly within the field of economic and financial studies (Christiano et al, 2005; Khan, Khan, Ullah, Usman, Farhat, 2020).

The Capital Asset Pricing Model (CAPM) is one of the tools used by investors to determine the risks and returns on their investments. The model was first introduced in 1960 by William Sharpe. The standard model looks at the effects of systemic risk (beta coefficient) on a portfolio of investments. Regression between the return of the controlled portfolio and the return of a benchmark portfolio yields the beta coefficient. This paradigm piqued the attention of many investors and financial analysts. As a result, it has been included in several recent reports, including: (Iqbal& Brooks, 2006) Lahore Stock Exchange; is a stock exchange in Lahore, Pakistan, (Galagedera,2016) Australia Stock Exchange; (Grandes, Panigo, and Pasquini, 2016) Latin American Stock Exchange; (Galagedera, 2016) Oslo Stock Exchange; (Gunnlaugsson, 2017) Iceland Stock Exchange; (Xu-song and Cheng-qi, 2008) Shanghai Stock Exchange; and (Rogers and Securato, 2019) São Paolo Stock Exchange.

Researchers found that data distributions are not necessarily natural in subsequent experiments, and as a result, the CAPM was modified. A new model is called the Downside Capital Asset Pricing Model (DCAPM). The DCAPM was analyzed using the following studies: Madrid Stock Exchange (Estraa, 2017).

The next step in the growth of CAPM was to check the effects of liquidity risk on the model. The findings of this study contributed to the implementation of the Modified Capital Asset Pricing Model (A-CAPM). This model, like previous ones, was used to determine the utility of portfolio management by (Pastor & Stambaugh, 2013), (Acharya & Pedersen, 2015) New York Stock Exchange; (Chopra, Lakonishok, & Ritter, (1992) Tehran Stock Exchange; and (Minovic &

Zivkovic, 2010) Belgrade Stock Exchange.

The net consumption expenditure is another important consideration to consider when using CAPM. The Consumption Capital Asset Pricing Model is the latest model presented in this case (CCAPM). The following tests were used to assess the model's effectiveness: (Acharya & Pedersen, 2015), New York Stock Exchange; (Galagedera,2016) Australia Stock Exchange. The effect of expected and unexpected returns on an investment portfolio has recently piqued the attention of researchers. The CAPM uses the yield on the market portfolio to understand and forecast potential asset values, whereas the CCAPM uses marginal consumption. Risky assets cause volatility in an investor's capital, which is calculated by the stock portfolio, according to the CAPM (e.g., the S&P 500). Risky assets, on the other hand, generate volatility in consumption-what an individual can pay becomes unknown as a result of a decision to invest in risky assets, as his or her capital (i.e., income and property) becomes uncertain.

The risk premium on the stock portfolio in the CAPM represents the price of risk, while the beta indicates the amount of risk. The quantity of business risk is determined in the CCAPM by the movements of the risk premium with consumption growth. As a result, the CCAPM describes how much the stock market fluctuates in relation to consumption growth.

From the CCAPM model, the expected return on equity with consumption beta indicated a direct relationship between stock return volatility and consumption volatility. The model explains how modifications in stock market returns are associated with the consumption trend (Javed, Aldalaien, Husain, & Khan, 2019; Ullah, Malik, Zeb, Rehman, 2019). There is a direct correlation between beta of consumption and the excess return on assets in the standard CCAPM model, however inevitably, the CCAPM linear generated an equity payment problem. To explain the high equity, the payment will use a higher risk technique called the "equity premium puzzle."

THE NEED OF THE STUDY IN THE CURRENT SCENARIO

The CCAPM is more commonly used in research contexts than the CAPM across the globe. This is because it includes many categories of wealth other than capital market wealth and provides a basis for evaluating the variation of financial asset returns over a long period. The CAPM has a few flaws that the CCAPM tackles. Furthermore, it bridges macroeconomics and financial markets, offers insight into investors' risk aversion, and connects investment decisions to income and consumption.

The CCAPM explains the relationship between capital and consumption, as well as the risk tolerance of an investor. The CCAPM is an asset valuation model that determines the potential.

premium required by buyers to purchase a given stock, as well as how the return is influencing by the risk associated with consumption-driven stock price fluctuations. The CCAPM takes into account many types of wealth other than capital market wealth and provides a basis for analyzing financial asset returns over long periods. This is an improvement to the CAPM, which only addresses one-period asset returns. According to the CCAPM, the return premium on an asset is equal to its consumption beta.

PURPOSE OF THE STUDY

The purpose of this study is **to analyze the effect of consumption and investment decisions on the asset pricing model.** This involves the analysis of factors such as Personal Consumption Expenditures: Nondurable Goods, Personal consumption expenditures: Nondurable goods (chain-type price index) (PCEN), and 1-Year Treasury Constant Maturity Rate (GS1). Furthermore, the effect of Personal Consumption Expenditures: Nondurable Goods (PCE), Personal consumption expenditures: Nondurable goods (chain-type price index) (PCEN), and 1-Year Treasury Constant Maturity Rate (GS1) on Assets (SP500).

LITERATURE REVIEW

Bach and Moller (2011) analyzed the asset pricing model based on consumption, with restricted support of consumption, development, and propensities. Their study was carried out on an example of US family units, in which there were two groups: Those who hold shares and the individuals who did not hold shares. It was demonstrated that the consumption pattern of the individuals that own shares was better in productivity than those people that did not own shares.

Ito et al (2011) in their study evaluated the variable of the CCAPM based on Japan's economy. They utilized the strategy for Basu (1983) that is the well-known generalized empirical likelihood (GEL). These parameters differed after some time in this analysis. The exploratory outcomes and the CCAPM factors demonstrated a level of risk avoidance. Notwithstanding the above discoveries, the outcomes demonstrated that the discount varies over time.

Based on their study, Gregoriouand et al (2016) assessed the CCAPM model in the UK stock exchange from 1980-2000 and deduced that, even though the model did not specify stock returns, the determinant cost of the transaction in every condition was extensive and could also be acknowledged for the model by the use of seasonal resources. Lewellen and Nagel (2016) analyzed the CCAPM model in the stock exchange of Britain by categorizing the shareholders into two categories of A and B. The outcomes revealed that the productivity of the two categories of the group was unique and had a diverse impact on the CCAPM.

Fernando et al (2019) utilizing the return of the S&P 500 as the market return, examined the relationships within the yearly stock returns of Dow Jones (1989-2008) and found that the joint shares with a beta which is equivalent to 1, perform optimally compared to computed betas. The authors similarly found that adjusted betas (i.e. 0.67 + 0.33) recorded a stronger correlation compared to computed betas however the correlation of adjusted betas had a weaker correlation compared to the beta which is equivalent to one.

According to Fernando (2019) estimated previous betas of Boeing, AT&T, and Coca- Cola during the two-month time of December 2001 to January 2002 on the S&P 500. Betas were computed each of the days using monthly data of 5 years, which suggests that on December 18, 2001, the beta is computed using regression of 60 monthly profits of the association against 60 every month returns of S&P 500 with profits of every month computed on the eighteenth of each month.

Chan, Hamao, and Lakonishok (2014) deployed 96 months of stock profits from January 1992 to December 1999 to assess the betas for 173 companies displayed on the stock exchange of Nigeria. The hidden beta of a share is presumably going to be nearer to 1.0 compared to the computed beta. To resolve this bias, Merrill Lynch created a modification methodology. In the wake of using the OLS to analyze a prior estimate of beta, utilizing 60 monthly profits, the OLS equation formulated drives higher betas down closer to 1.0 and lower betas up nearer 1.0. The raw calculated betas were modified to dispose of security bias.

MODELLING CCAPM

Consumption capital asset pricing models (CCAPMs) are the output of economic and fiscal literature that centers on identifying the correlation between the general price dynamics of stocks and the macroeconomic measures that exist in a system of the economy (Gregoriouand et al, 2016). Ito et al (2011) noted that the general basic formula utilized in the models is as follows:

$E_{t-1} = (R_t M_t) = 1$

The investment decision is represented by which is a function of, and is the overall return.

t-1 represents time;

M_t is the discounted price component

The CCAPM means that the potential risk premium on a risky asset, described as the estimated return on a risky asset minus the risk-free return, is relative to the covariance of its return and consumption over the return period. The consumption beta is incorporated, and the estimated return is computed in the following way:

r= rf + β (rm-rf)

r= expected return on security or portfolio

rf= risk-free rate

β= consumption beta (individual company or weighted average of the portfolio, and

rm= return from the market

The CAPM is applied in demonstrating how resources are measured. The choice of an asset return calculation is a crucial point of reference for CCAPM models (Ito et al, 2011). The main goal of the CCAPM is to illustrate the aggregate pattern. A representative entity decides on consumption patterns and investment to optimize his / her estimated discounted utility.

$$E \sum_{i=0}^{\infty} \delta_0^i \, U \, (c_{t+1}) | \Omega_t)$$

is consumption in period t, (.) firmly concave utility function, constant distant factor, agent's data set at time t. The agent can, at any time, plan to use the earnings on products for consumption or on investment in a combination of N resources, with maturities j = 1, 2,……N. The budget control is

$$c_t + \sum_{j=1}^{N} \rho_j \, t \, q_j, t = \sum_{j=1}^{N} r_j \, t \, q_j, t - m_j + w_t \, , \quad \forall \;\; j = 1, 2, \ldots\ldots N$$

METHODOLOGY AND DATA

The work is based on the CCAPM model of Gregoriouand et al, (2016). The data used for this study was gotten from (1980-2016) from Saint Louis Fed, while SP500 (S&P 500 index at the closing price of the first day of the month) from Yahoo Finance. Dependent Variable: SP500: S&P 500 index at the closing price of the first day of the month.

Independent Variables: Personal Consumption Expenditures: Nondurable Goods (PCE), Personal consumption expenditures: Nondurable goods, (PCEN), and 1-Year Treasury Constant Maturity Rate (GS1).

ANALYSIS

Descriptive Statistics

```
     date            M1SL              PCE              PCEN           CNP160V
       :  3     Min.   : 139.6    Min.   :  324.0   Min.   : 20.00   Min.   :116594
01/01/1960:  1   1st Qu.: 268.5    1st Qu.:  929.9   1st Qu.: 33.10   1st Qu.:150012
01/01/1961:  1   Median : 779.4    Median : 3447.0   Median : 64.40   Median :185244
01/01/1962:  1   Mean   : 939.3    Mean   : 4598.4   Mean   : 63.32   Mean   :184877
01/01/1963:  1   3rd Qu.:1249.8    3rd Qu.: 7661.7   3rd Qu.: 84.85   3rd Qu.:220540
01/01/1964:  1   Max.   :3564.6    Max.   :13525.5   Max.   :113.51   Max.   :255562
(Other)   :688   NA's   :3         NA's   :3         NA's   :3        NA's   :3
    SP500        Employment          GS1
       :  3     Min.   :63.9     Min.   : 0.100
100.6  :  3     1st Qu.:70.3     1st Qu.: 3.030
103.8  :  3     Median :76.1     Median : 5.160
107.7  :  3     Mean   :75.0     Mean   : 5.155
101.2  :  2     3rd Qu.:79.1     3rd Qu.: 6.990
101.3  :  2     Max.   :82.0     Max.   :16.720
(Other):680     NA's   :3        NA's   :3
```

The data had 696 observations with 5 numeric variables namely M1SL, PCE, PCEN, Employment, and GS1, while the date and SP500 were factor variables and CNP160V was an integer. The descriptive statistics revealed that M1SL had a mean score of 939.3, PCE means was 4598.4, PCEN mean was 63.32, CNP160V had a mean of 184877, and Employment with a mean of 75.0.

GMM Model Fitting

```
        Call:
        gmm(g = g2.x.theta, x = x, t0 = c(0.99, 3), type = "iterative",
            vcov = "iid")
> capm.fit = lm(SP500~PCE + PCEN + GS1, data=tim)
> summary(capm.fit)

Call:
lm(formula = SP500 ~ PCE + PCEN + GS1, data = tim)                |t|)
                                                                 494e-05
Residuals:                                                       409e-11
    Min      1Q  Median      3Q     Max
-370.64 -150.83    9.21  125.77  392.29

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept) 504.824554  26.818903  18.823  < 2e-16 ***
PCE          -0.001670   0.008819  -0.189  0.84984
PCEN         -1.802610   1.012705  -1.780  0.07552 .
GS1          -9.715781   3.398891  -2.859  0.00438 **
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Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 183.8 on 689 degrees of freedom
  (3 observations deleted due to missingness)
Multiple R-squared:  0.07901,   Adjusted R-squared:  0.075
F-statistic: 19.7 on 3 and 689 DF,  p-value: 2.905e-12
```

The result of the GMM model fitting shows that the J-test value is 12.57 with a p-value of 0.01358 which is significant which implies that one or more of our instruments are valid (assuming that the model is otherwise correctly specified).

CCAPM Model Fitting

The outcomes of the CCAPM model revealed that the independent variables (Personal Consumption Expenditures: Nondurable Goods (PCE), Nondurable goods, (PCEN) and 1-Year Treasury Constant Maturity Rate (GS1) jointly influenced excess return SP500 at [(R^2 = 0.079; $F_{(3,689)}$ =19.7; $P<.05$]. This infers that Personal Consumption Expenditures: Nondurable Goods (PCE), Personal consumption expenditures: Nondurable goods (chain-type price index) (PCEN), and 1-Year Treasury Constant Maturity Rate (GS1) jointly accounted for about 7.9% of the variance observable in excess return SP500.

The outcomes are in the line with the previous studies (Bach and Moller, 2011; Gregoriouand et al 2016; Ito et al 2011; Shaikh, Channar, & Shaikh, Ullah, 2021) that have provided evidences that investment decision and consumption significantly influence assets pricing using CCAPM approach.

In addition, the outcomes of the current study indicated that independently, GS1 (annualized 1-Year Treasury Constant Maturity Rate) was significant at (β= -9.7157, p<.05) whereas PCE (Nondurable Goods) was not significant (β= -0.001670, p>.05) and PCEN (Nondurable goods (chain-type price index)) were not also significant (β= -1.802610, p>.05).

The finding of this research is in line with Fernando et al (2019) who used of S&P 500 as the market return while examining the relationship between the yearly stock returns of Dow Jones (1989-2008) and found that the joint shares with a beta which is equivalent to 1, performs optimally compared to computed betas.

The authors similarly found that adjusted betas (i.e. 0.67 + 0.33) recorded a stronger correlation compared to computed betas. The results of this study support the preceding studies of (Amihud, 2012; Fernando et al, 2019) that have provided evidences that PCE and PCEN (Nondurable Goods) are not statistically significant with pricing using the CCAPM approach.

CONCLUSION

The current study concludes that for Consumption Capital Assets Pricing Model (CCAPM) jointly the endogenous variables (Personal Consumption Expenditures: Nondurable Goods (PCE), Nondurable goods, (PCEN), and 1-Year Treasury Constant Maturity Rate (GS1)) significantly impact return. However, the endogenous variables individually; the GSI (1-Year Treasury Constant Maturity Rate) significantly influence the return whereas, the PCE (Nondurable Goods) and PCEN (Nondurable goods (chain-type price index) were not statically significant.

LIMITATIONS AND FUTURE RESEARCH

This study has deployed one of the new model CCAPM in order to analyze the influence of Investment Decisions and Consumption on Asset Pricing however, the future researcher can deploy other CAPM approach like Behavioral Assets Pricing Model (BAPM), Inter-temporal Capital Asset Pricing Model (I-CAPM), and ownside Capital Asset Pricing Model (D-CAPM) to examine its impact on investment decision. Furthermore, the future studies may be conducted by comparing the same model (CCAPM) with other models (BAPM, DCAPM, or ICAPM) to check its effect on investment decisions.

RECOMMENDATIONS

The CAPM uses the yield on the market portfolio to understand and forecast potential asset values, while the CCAPM uses marginal consumption. The CCAPM predicts that an asset's return premium is proportional to its consumption beta. In the CAPM, risky assets cause volatility in an investor's capital, which is calculated by the stock portfolio e.g., the S&P 500, therefore, investors and fund managers must use CCAPM to adequately measure the risk and return on their investment.

AUTHORS' CONTRIBUTIONS

Mahboob Ullah: Data Analysis and its interpretation, Abstract and Conclusion writing, review of the article after completion, and correspondence with the journal.

Samiuddin Shaikh: Data Collection, working on Literature and after completion of research, its review.

Paras Channar: Data Collection, working on Literature and after completion of research, its review.

Muhammad Abbas: Data Collection, working on Literature and after completion of research, its review.

Maria Shaikh: Data Collection, working on Literature, writing references, and after completion of research review the article.

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