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Adjusting Consumption Based Capital Asset Pricing Model within the Framework of an Open Economy: The Case of Iran

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ABSTRACT

The purpose of this study is to investigate the relationship of some macroeconomic variables and asset returns in the framework of a theoretical and empirical consumption based capital assets pricing model (CCAPM); for this purpose, this relationship is investigated through the development of a CCAPM basic model and the importation of imported consumer goods in Epstein and Zin recursive utility function. The research sample consisted of eight portfolios and monthly data from 2003 to 2014. In the first phase, the designed pricing model parameters were estimated using Euler equations and the generalized method of moments of Hansen and Singleton; estimation of Euler equations parameters indicates economic agents are patient and risk-averse, low elasticity of substitution (ES) between domestic consumer goods and imported consumer goods, and high intertemporal ES. In the second phase, impacts of exchange rate risk premium, inflation risk premium, market return risk premium, and consumption growth risk premium on asset premium were studied using Euler linear equations as asset pricing model and Fama-MacBeth two pass regression; results show that the exchange rate risk premium, inflation risk premium and market return risk premium have had a positive impact on asset premium, i.e., economic agents will have a demand for more premium reward in asset premium so as to have more risk appetite.

Keywords: Recursive Utility, Risk Aversion, Elasticity of Substitution, Consumption Based Capital Asset Pricing Model, Generalized Method of Moments
JEL Classifications: C58, D81, G11, G12, G15

1. INTRODUCTION

Among the factors influencing the price of securities, are their risk and returns so that maximal return regarding minimal risk is always an appropriate criterion for investment. Therefore, assets with higher risks should have higher returns so as to create the motivation to maintain such assets in investors (Reilly and Keith, 2000).

Today, with increased globalization, the risk of macroeconomic variables is considered as an important factor in the decisions of investors. Theoretically, fluctuations of macroeconomic variables impacts abroad commercial sector, in addition to domestic economy, particularly stock market. Developing countries, including Iran, have high degrees of instability of macroeconomic variables; in these countries, the stock price and other important macroeconomic variables have more fluctuations compared to advanced and industrial economies and these fluctuations in turn, create an uncertain environment for investors and disable them to easily and surely decide on future investment and they probably face large losses.

In most studies, in order to detect the presence and to relate between the exchange rate and asset returns, exchange rate risk is generally investigated as a risk factor, along with other traditional risk factors in the form of some pricing models and econometric models, and they lacked any specific theoretical basis; therefore they have been largely unsuccessful and they have not come a single conclusion. The following studies could be mentioned: Rodolfo and Aquino (2002), Antell and Vaihekoski (2007), Rjoub et al. (2009), Aggarwal and Harper (2010), Buyuksalvarci (2010), Singh et al. (2011), Samadi et al. (2012), Sohail and Hussain (2012), Khalid (2012), Kuwornu (2012), Masuduzzaman (2012), Mouna and Jarboui (2013), Gowriah et al. (2014), Chkili and Nguyen (2014), Kpanie et al. (2014), Ullah et al. (2014), Barakat et al. (2015), Stillwagon (2015), Najafzadeh et al. (2016), Jamaludin et al. (2017) and Das (2017).

In this regard, different pricing models have been designed and consumption based capital asset pricing model (CCAPM) is one of them. According to Lettau and Ludvigson (2001) and Cochrane (1996) in the rational equilibrium of financial markets, systemic risk in CCAPM is measured through the covariance between the marginal utility and asset returns, and this theoretical foundation is the special feature of this model over other models.

In recent years, many studies have been conducted on CCAPM as a main model for explaining the behavior of the stock market. In most of the relevant studies, traditional CCAPM was not strong enough to explain the behavior of the market, and this model practically failed, so that this linear model led to the creation of equity premium puzzle. Therefore to explain the large equity premium (excess returns asset to asset return risk-free asset) there is a very high need for risk aversion, however, in the traditional CCAPM, the risk aversion parameter does not yield a large number. This puzzle was first introduced by Mehra and Prescott (1985) (Mohammadzadeh et al., 2015). After introducing puzzles such as equity premium, some adjustments were performed on CCAPM, among which the studies of Bach and Møller (2011), Epstein and Zin (1991) and Xiao et al. (2013) could be mentioned. According to Xiao et al. one of the main reasons for failure of standard CCAPM is that other variables, such as macroeconomic variables that can be effective on marginal utility of consumption, are ignored, because risk premium is also reflected on premium of macroeconomic variables. Therefore in this study, we expand CCAPM within the framework of an open economy and we solve equilibrium model by entering imported consumer goods in preferences proposed by Epstein and Zin (1989), we introduce a utility function with constant elasticity of substitution (CES) in order to determine the relationship of imported consumer goods and domestic consumer goods instead of the patient utility function with constant relative risk aversion (CRRA) in traditional CCAPM and the use of Euler equations we investigated the impact of some macroeconomic variables on asset returns within the framework of an exchange economy with the outside world in Iran stock exchange.

General framework of the study is as follows: In section two the feature and theoretical framework of traditional CCAPM and adjusted CCAPM and the way of extracting the research equations is stated, section three contains research data and variables, and in section four model's estimation is provided, and in section five conclusions and recommendations are provided.

2. ASSET PRICING MODEL

2.1. Traditional Consumption Based Capital Asset Pricing Model

The model was founded by Hansen and Singleton in 1982 so that in this model, the agent is trying to maximize his utility:

$$\max_{ct} E_t[\sum_{i=0}^{\infty}\beta^i u(C_{t+i})]=0;\quad i=1,2,...,N \tag{1}$$

$$u(C_t)=\frac{C_t^{1-\gamma}}{1-\gamma};\gamma>0 \tag{2}$$

$$u(C_t) = \ln(C_t);\ \gamma = 1 \tag{3}$$

C_t is consumption expenditure per capita during the time t, β captures the subjective time discount, γ is risk aversion parameter, and E_t is the conditional expectation operator. If β is low, then people are impatient, and in other words, people prefer the current consumption to the future consumption. In this model, utility function has CRRA property and stochastic discount factor (SDF) equal to intertemporal marginal rate of substitution. According to Dreyer et al. (2013), each asset pricing model, has unique pricing kernel or SDF, and the performance of each model may be compared together with the creation of Euler equations related to the SDF, so in order to obtain the SDF, by taking the first order condition with respect to C_t the equation 1, the optimal consumption will be achieved:

$$C_t^{-\gamma}=\beta E_t\left\{(1+R_{i,t+1})C_{t+1}^{-\gamma}\right\} \tag{4}$$

Moment condition of equation 4, is the generalized method of moments (GMM) estimator basis. According to the fact that the model variables should be stationary, this condition will be met by the theory of GMM and the following equation:

$$0=E_t\left\{1-\beta[(1+R_{i,t+1})\frac{C_{t+1}^{-\gamma}}{C_t^{-\gamma}}]\right\} \tag{5}$$

In the standard CCAPM only two parameters of β and γ are estimated. Equation 5 explains the cross sectional difference in the expected return through the return covariance with the SDF:

$$SDF_{t+1}=M_{t+1}=\beta(\frac{C_{t+1}}{C_t})^{-\gamma} \tag{6}$$

Now we assume that x_t is a M×1 vector from the collection of information available to investors based on equation 5, there are r = M×N moment conditions by which the asset pricing model is tested (Gutierrez and Issler, 2015) and the following linear approximation is usually used for the SDF:

$$SDF_{t+1} = M_{t+1}\approx\beta(1-\gamma\ \Delta\ln C_{t+1}) \tag{7}$$

After obtaining the pricing kernel we can estimate model parameters by putting it in Euler equations number 5.

2.2. Adjusting Consumption Based Capital Asset Pricing Model

It is assumed that there are N assets with gross return of $R_t = (R_{1,t}, R_{2,t},\ldots,R_{N,t})'$ in economy, $\omega_{j,t}$ represents a proportion of agent invested in asset j and period t, then:

$$\sum_{j=1}^{N}\omega_{j,t}=1;\quad t=1,2,...,N \tag{8}$$

The total wealth or budget constraint that the agent has during t is equal to S_t:

$$S_{t+1} = (S_t - P_t^* e_t^n C_t^f - P_t C_t^d)\omega_t' R_{t+1} \tag{9}$$

Where C_t^d is consumption of domestic goods and C_t^f is consumption of foreign goods, by which the economic agent receives utility in each period. Denote P_t as the price of domestic goods in domestic currency and P_t^* as the price of foreign goods in foreign currency. Let e_t^n denote the nominal exchange rate, which is expressed as the value of domestic currency per unit of foreign currency, then the price of foreign goods can be expressed as $P_t^* e_t^n$ indirect quotation. Financial markets of developing (emerging) countries are faced with many restrictions. One of these serious restrictions that face foreign currency. Therefore, in this study it is assumed that domestic consumers can buy goods from both domestic and foreign markets, but can only invest in the domestic market.

Dividing equation 9 by P_t on both sides, and letting W_t denote the wealth in domestic currency, i.e., $W_t=\frac{S_t}{P_t}$ the budget constraint condition in equation 9 can be rewritten as:

$$\pi_{t+1}W_{t+1}=(W_t-e_tC_t^f-C_t^d)\omega_t' R_{t+1} \tag{10}$$

The real exchange rate will be equal to $e_t=\frac{P_t^* e_t^n}{P_t}$ and the price changes of domestic goods will be $\pi_{t+1}=\frac{P_{t+1}}{P_t}$ the price changes of domestic. Furthermore, we assume that in any period t, the subject has preferences with CES as follows:

$$U(C_t^f,C_t^d)=\left[(1-\alpha)(C_t^d)^\rho+\alpha(C_t^f)^\rho\right]^{1/\rho} \tag{11}$$

Where $\alpha\epsilon(0,1)$ measures the subjective preferences between the two types of goods and $\rho\epsilon(-\infty,1]$ determines ES between two types of goods, so that $ES=\frac{1}{1-\rho}$ Î[0, +¥). When $\rho<0$, then $0<ES<1$, i.e., the substitution effect between domestic and foreign goods is small, and when $0<\rho<1$, then $ES>1$, i.e., the substitution effect between domestic and foreign goods is large and impressive (consistent with the findings of Dunn and Singleton, 1986; Ogaki and Ogaki, 1998). To model the agent behavior, the preferences of Epstein and Zin (1989) is used; it is assumed that the utility function of the agent's lifetime, has the following recursive utility form:

$$U(C_t^f,C_t^d)=\left\{(1-\beta)\left[(1-\alpha)(C_t^d)^\rho+\alpha(C_t^f)^\rho\right]^{\sigma/\rho}+\beta[E_t(J_{t+1}(W_{t+1})^\gamma)]^{\sigma/\gamma}\right\}^{1/\sigma} \tag{12}$$

Where $\beta\epsilon(0,1)$ captures the subjective time preferences and $\gamma\epsilon(-\infty,1)$ is risk aversion parameter, when γ is reduced, then the degree of risk aversion will increase; the relative risk aversion parameter is also equal to $(1-\gamma)$. $\sigma\epsilon(-\infty,1)$ determines the elasticity of intertemporal substitution in $EIS=\frac{1}{1-\sigma}$, is equal to the value function for the Bellman equation and E_t is the conditional expectation operator to information available at time t. The advantages of the utility function 12 is that, first, it separates the risk aversion parameter and elasticity of intertemporal substitution; second, we can capture the substitution effect between domestic goods and foreign goods, so the agent not only chooses his consumption during different times, but he can also choose his consumption from domestic and foreign goods. Thus, the agent not only can choose consumption across different periods, but also can choose consumption among different types of goods, and these results are consistent with the findings of Epstein and Zin (1989), Weil (1989), Kreps and Porteus (1978) and Pepin (2015).

Now, optimization problem using the utility return function, CES function and budget constraint (equations 8 and 10) will be as follows:

$$J_t(W_t)=\max\left\{(1-\beta)\left[(1-\alpha)(C_t^d)^\rho+\alpha(C_t^f)^\rho\right]^{\sigma/\rho}+\beta[E_t(J_{t+1}(W_{t+1})^\gamma)]^{\sigma/\gamma}\right\}^{1/\sigma} \tag{13}$$

Assuming that $J_t(W_t)=\phi_t W_t$, by maximizing the utility and the first-order condition of the equation 12 to C_t^d and C_t^f the following equations can be obtained:

$$\frac{\partial U}{\partial C_t^d}=0;(1-\beta)\frac{\sigma}{\rho}\left[(1-\alpha)\rho(C_t^d)^{\rho-1}\right]\left[(1-\alpha)(C_t^d)^\rho+\alpha(C_t^f)^\rho\right]^{\sigma/\rho-1}$$
$$=\sigma\beta(W_t-e_tC_t^f-C_t^d)^{\sigma-1}E_t[\varphi_{t+1}^\gamma R_{W,t+1}^\gamma]^{\sigma/\gamma} \tag{14}$$

$$\frac{\partial U}{\partial C_t^f}=0;(1-\beta)\frac{\sigma}{\rho}\left[\alpha\rho(C_t^f)^{\rho-1}\right]\left[(1-\alpha)(C_t^d)^\rho+\alpha(C_t^f)^\rho\right]^{\sigma/\rho-1}$$
$$=\sigma\beta(W_t-e_tC_t^f-C_t^d)^{\sigma-1}E_t[\varphi_{t+1}^\gamma R_{W,t+1}^\gamma]^{\sigma/\gamma}e_t \tag{15}$$

Where the optimal portfolio return is $\omega_t' R_{t+1}=R_{W,t+1}$ and represents the return on the total wealth. According to equations 14 and 15, the ratio of the two types of goods is as follows:

$$\frac{\partial C_t^f}{\partial C_t^d}=\left[\frac{e_t(1-\alpha)}{\alpha}\right]^{\frac{1}{\rho-1}}\quad \rho\in(-\infty,1) \tag{16}$$

This equation shows that when the real exchange rate decreases, the ratio of consumption of imported goods over domestic goods will increase, in other words, measures the relative prices of domestic goods and foreign goods; by increased e_t, foreign goods will be cheaper compared to domestic goods, and demand for foreign goods to domestic goods will increase. In each period t, the total value of agent's domestic goods and imported goods will be equal to $e_tC_t^f+C_t^d$, and according to equation 16 the total value of consumption is equal to:

$$e_tC_t^f+C_t^d==e_t\left[\frac{e_t(1-\alpha)}{\alpha}\right]^{\frac{1}{\rho-1}}C_t^d+C_t^d=C_t^d\left[1+e^{\frac{\rho}{\rho-1}}\left(\frac{1-\alpha}{\alpha}\right)^{\frac{1}{\rho-1}}\right] \tag{17}$$

Assuming $A_t=\left[1+e^{\frac{\rho}{\rho-1}}\left(\frac{1-\alpha}{\alpha}\right)^{\frac{1}{\rho-1}}\right]$, then:

$$e_t C_t^f + C_t^d = A_t C_t^d \tag{18}$$

Thus $\frac{1}{A_t}$ measures the proportion of domestic goods expenditure in total value of consumption; equation 18 is the impact of the real exchange rate and subjective parameters α and ρ on the rate of consumption of domestic goods and foreign goods. $\frac{1}{A_t}$ is a decreasing function of α; a small represents a larger proportion of domestic goods value in total expenditure; when ρ<0 (ES<1), $\frac{1}{A_t}$ is also a decreasing function of e_t; when e_t is decreased, then costs of domestic goods to the total expenditure will be more indicating the consumption value of domestic goods will be worth more in the total expenditure, but according to equation 16 we can show that, when e_t is decreased, because of the substitution effect between the two goods, it actually increases the fraction of the foreign goods in total consumption (substitution effect), in other words, low elasticity between two goods (ES<1), means that the agent is less willing to substitute the goods and with decreased e_t, the relative value of domestic goods will increase. So the effect of increased value of domestic goods (income effect) will dominate its decreased effect (substitution effect) and will lead to an increase in total expenditure and eventually, the increasing value in domestic goods would induce an increasing proportional value of domestic goods in total expenditure. In contrast, when 0<ρ<1 (ES>1), then the results are completely reverse.

With the placement of equations 16 and 18 in the utility function CES, the utility function of domestic goods and foreign goods, a function of A_t can be obtained:

$$U(C_t^f, C_t^d) = \left[(1-\alpha)(C_t^d)^\rho + \alpha(C_t^f)^\rho\right]^{\frac{1}{\rho}} = C_t^d\left[(1-\alpha)A_t\right]^{\frac{1}{\rho}} \tag{19}$$

According to optimization problem in equation 13 and the assumption about ϕ_t:

$$J_{t+1}^\gamma(.) = (\varphi_{t+1}W_{t+1})^\gamma = \varphi_{t+1}^\gamma \pi_{t+1}^{-\gamma}(W_t - A_tC_t^d)^\gamma(\omega_t' R_{t+1})^\gamma \tag{20}$$

By substituting equations 19 and 20 in equation 13 and the first order condition of the equation to C_t^d the following equation will be obtained:

$$\sigma(1-\beta)\left[(1-\alpha)A_t\right]^{\frac{\sigma}{\rho}}(C_t^d)^{\sigma-1} = \sigma\beta\left[W_t - A_tC_t^d\right]^{\sigma-1}A_t(\mu^*)^\sigma \tag{21}$$

Where $\mu^* = (E_t[\varphi_{t+1}^\gamma \pi_{t+1}^{-\gamma} R_{W,t+1}^\gamma])^{\frac{1}{\gamma}}$ and $C_t^d = \phi W_t$ is the optimal consumption of domestic goods which is a proportion of total wealth. From equation 21 we conclude that:

$$(\mu^*)^\sigma = \frac{(1-\beta)\left[(1-\alpha)A_t\right]^{\frac{\sigma}{\rho}}\phi_t^{\sigma-1}}{\beta(1-\phi_tA_t)^{\sigma-1}A_t} \tag{22}$$

Now with replacement of equation 22 in equation 13 and rearranging it, the following equations will be established:

$$(\varphi_tW_t)^\sigma = (1-\beta)(C_t^d)^\sigma\left[(1-\alpha)A_t\right]^{\frac{\sigma}{\rho}} + \beta W_t^\sigma(1-\phi_tA_t)^\sigma\frac{(1-\beta)\left[(1-\alpha)A_t\right]^{\frac{\sigma}{\rho}}\phi_t^{\sigma-1}}{\beta(1-\phi_tA_t)^{\sigma-1}A_t} \tag{23}$$

$$\varphi_t = \left[(1-\beta)(1-\alpha)^{\frac{\sigma}{\rho}}A_t^{\frac{\sigma}{\rho}-1}\right]^{\frac{1}{\sigma}}\phi_t^{1-\frac{1}{\sigma}} \tag{24}$$

$$B_t = \left[(1-\beta)(1-\alpha)^{\frac{\sigma}{\rho}}A_t^{\frac{\sigma}{\rho}-1}\right]^{\frac{1}{\sigma}} \tag{25}$$

$$\varphi_t = B_t\phi_t^{1-\frac{1}{\sigma}} = B_t\left(\frac{C_t^d}{W_t}\right)^{1-\frac{1}{\sigma}} \tag{26}$$

By replacing φ_t in the equation μ* and placing it in the equation 21, the following equation is obtained:

$$E_t\left[\beta\pi_{t+1}^{-1}\left(\frac{B_{t+1}}{B_t}\right)^\sigma\left(\frac{C_{t+1}^d}{C_t^d}\right)^{\sigma-1}R_{W,t+1}\right]^{\frac{\gamma}{\sigma}} = 1 \tag{27}$$

And this equation will determine the optimal of C_t^d. Also for The optimal choice of the portfolio ω_t, Bellman equation (equation 13) will be as follows:

$$V = \max\left[E_t(J_{t+1}(W_{t+1})^\gamma)]^{\frac{1}{\gamma}}\right];\ \text{s.t.}\sum_{j=1}^{N}\omega_{j,t} = 1 \tag{28}$$

Where $J_{t+1}(W_{t+1}) = \varphi_{t+1}W_{t+1} = \varphi_{t+1}\pi_{t+1}^{-1}(W_t - A_tC_t^d)(\omega_t'R_{t+1})$, now let's consider the first asset j = 1. Denote $\omega_{1t} = 1 - \sum_{j=2}^{N}\omega_{j,t}$, by replacing in budget constraint and obtaining the first order condition to $\omega_{j,t}$ from the equation 28 then:

$$\frac{\partial V}{\partial\omega_{j,t}} = \frac{1}{\gamma}V^{\frac{1}{\gamma}-1}\gamma E_t\left[(\varphi_{t+1}\pi_{t+1}^{-1}\omega_t'R_{t+1})^{\gamma-1}\varphi_{t+1}\pi_{t+1}^{-1}(R_{j,t+1} - R_{1,t+1})\right] = 0;\ \ j \neq 1 \tag{29}$$

Now if equation 24 is placed in equation 29 then:

$$E_t\left[\left(\frac{B_{t+1}}{B_t}\right)^\gamma\left(\frac{C_{t+1}^d}{C_t^d}\right)^{\gamma(1-\frac{1}{\sigma})}\pi_{t+1}^{-\frac{\gamma}{\sigma}}R_{W,t+1}^{\frac{\gamma}{\sigma}-1}(R_{j,t+1} - R_{1,t+1})\right] = 0; j \neq 1 \tag{30}$$

According to equation 30 and equation 27, in a state of equilibrium we have $R_{j,t+1} = R_{W,t+1}$. Thus for each asset j≠1, equation 31 will be established:

$$E_t\left[\beta^{\frac{\gamma}{\sigma}}\pi_{t+1}^{-\frac{\gamma}{\sigma}}\left(\frac{B_{t+1}}{B_t}\right)^{\gamma}\left(\frac{C_{t+1}^d}{C_t^d}\right)^{\gamma(1-\frac{1}{\sigma})}R_{W,t+1}^{\frac{\gamma}{\sigma}-1}R_{1,t+1}\right]=1; j\neq 1 \tag{31}$$

Then for j = 2,…,N, equation 31 will be established, so the optimal investment for all assets will settle the following condition:

$$E_t\left[\beta^{\frac{\gamma}{\sigma}}\pi_{t+1}^{-\frac{\gamma}{\sigma}}\left(\frac{B_{t+1}}{B_t}\right)^{\gamma}\left(\frac{C_{t+1}^d}{C_t^d}\right)^{\gamma(1-\frac{1}{\sigma})}R_{W,t+1}^{\frac{\gamma}{\sigma}-1}R_{j,t+1}\right]=1;\ j=1,2,\ldots,N \tag{32}$$

Where $R_{W,t+1}$ is return on the total wealth induced by optimal portfolio return. Using Euler equations (equation 32) and GMM method, parameters of preferences of equation 32 can be estimated. According to the literature in this field and the experimental work of Epstein and Zin (1989), the SDF is defined as follows:

$$SDF_{t+1}=E_t\left[\beta\pi_{t+1}^{-1}\left(\frac{B_{t+1}}{B_t}\right)^{\sigma}\left(\frac{C_{t+1}^d}{C_t^d}\right)^{\sigma-1}\right]^{\frac{\gamma}{\sigma}}R_{W,t+1}^{\frac{\gamma}{\sigma}-1} \tag{33}$$

SDF function has two parts; the first part is in relation to the domestic consumption and the second part is in relation to the return on total wealth. In the CCAPM traditional, in a model of open economy compared to a closed economy, the SDF function will also be influenced by two macroeconomic factors of inflation rate and real exchange rate.

According to the theory of traditional CCAPM, a risk averse agent faces the volatility of consumption because of economic fluctuation, when the future consumption is high due to high income or high asset returns, and the marginal utility will be low and asset returns won't have a high value in this state, and when future consumption is low, the marginal utility will be high and high asset returns would be expected in this state; this suggests that risk of assets will be indicated with a negative correlation between return and marginal utility, therefore, riskiest assets should have higher returns so as to create motivation in investors to keep such assets; according to the results of the study by Campbell and Cochrane (2000), this relationship will be established by which the pricing equation of assets can be stated; according to equation 33 it is assumed that for each risky assets and risk-free assets this relationship is established, so:

$$E_t\,[SDF_{t+1}R_{j,t+1}]=1 \tag{34}$$

$$E_t[R_{j,t+1}]E_t\,[SDF_{t+1}]+\mathrm{cov}[SDF_{t+1}R_{j,t+1}]=1 \tag{35}$$

Given that for each risk-free asset $\mathrm{cov}[SDF_{t+1}R_{f,t+1}]=0$, therefore equation 35 will turn into the following format:

$$E_t[R_{j,t+1}]E_t\,[SDF_{t+1}]+\mathrm{cov}[SDF_{t+1}R_{j,t+1}]=1 \tag{36}$$

By replacing equation 36 in equation 35, the below asset pricing equation will be achieved:

$$E_t\,(R_{j,t+1}-R_{f,t+1})=-R_{f,t+1}\,\mathrm{cov}(SDF_{t+1,}R_{j,t+1})=-R_{f,t+1}\,\mathrm{cov}(f(.)MU(C_{t+1}),R_{j,t+1}) \tag{37}$$

$MU(C_{t+1})$ is the marginal utility of consumption and f(.) is a function of the variables in the utility function. In the model presented, exchange, inflation and consumption rates will affect asset returns through SDF function.

To better understand coefficient B_t^{γ}, it is assumed that the condition γ<0 and σ<ρ<0 is met, in accordance with this assumptions it is needed that the relative risk aversion coefficient 1−γ be >1; and these results are consistent with experimental findings in the literature relating to the equity premium (study by Mehra and Prescott, 2003), hence the condition σ<ρ<0 implies EIS<ES<0. When these two conditions are provided, it can be shown that the B_t^{γ} coefficient will be an increasing function of e_t which can be proved based on equations 18 and 19:

$$\frac{d(B_t)^{\gamma}}{dA_t}=\frac{\gamma}{\sigma}\left[(1-\beta)(1-\alpha)^{\frac{\sigma}{\rho}}A_t^{\frac{\sigma}{\rho}-1}\right]^{\frac{\gamma-\sigma}{\sigma}}\left(\frac{\sigma}{\rho}-1\right)A_t^{\frac{\sigma}{\rho}-2}>0 \tag{38}$$

$$\frac{dA_t}{de_t}=\left(\frac{1-\alpha}{\alpha}\right)^{\frac{1}{\rho-1}}\left(\frac{\rho}{\rho-1}\right)e_t^{\frac{1}{\rho-1}}>0 \tag{39}$$

So considering the equations 38 and 39, B_{t+1}^{γ} will be an increasing function of e_{t+1}. Considering the SDF in equation 32, if $(B_t)^{\sigma}=(1-\beta)(1-\alpha)^{\frac{\sigma}{\rho}-\frac{1}{\rho}}V(e_t)^{\sigma-\rho}$ and $V(e_t)=[1-\alpha+\alpha(\frac{e_t(1-\alpha)}{\alpha})^{\frac{\rho}{\rho-1}}]^{\frac{1}{\rho}}$, then SDF_t will be equal to:

$$SDF_t=\beta^{\frac{\gamma}{\sigma}}\left[\left(\frac{V(e_t)}{V(e_{t-1})}\right]^{\frac{\gamma}{\sigma}(\sigma-\rho)}\left(\frac{C_t^d}{C_{t-1}^d}\right)^{\frac{\gamma}{\sigma}(\sigma-1)}\pi_t^{-\frac{\gamma}{\sigma}}R_{W,t}^{\frac{\gamma}{\sigma}-1} \tag{40}$$

Take the logarithmic at both sides of equation 40 in accordance with researches of Yogo (2004 and 2006):

$$\lim_{\rho\to 0}\log(SDF_t)=\frac{\gamma}{\sigma}\log^{2}-\alpha\gamma\Delta\log(e_t)+\frac{\gamma}{\sigma}(\sigma-1)\Delta\log(C_t^d)+\left(\frac{3}{\sigma}-1\right)\log(R_{W,t})-\frac{\gamma}{\sigma}\Delta\log(P_t) \tag{41}$$

Where $\Delta\log(e_t)=\log(\frac{e_t}{e_{t-1}})$, $\Delta\log(C_t^d)=\log(\frac{e_t}{e_{t-1}})$ and $\Delta\log(P_t)=\log(\frac{P_t}{P_{t-1}})=\log(\pi_{t+1})$.

Again, according to the Yogo (2006) method, equation SDF can be rewritten as:

$$\frac{SDF_t}{E_{t-1}[SDF_t]}\approx 1+\log(SDF_t)-E_{t-1}[\log(SDF_t)] \tag{42}$$

By substituting equation 41 in equation 42, the adjusted SDF pricing model will be like a linear model:

$$-\frac{SDF_t}{E_{t-1}[SDF_t]}\approx k+b_1\Delta\log(e_t)+b_2\Delta\log(C_t^d)+b_3\Delta\log(P_t)+b_4\log(R_{W,t}) \tag{43}$$

$$k=-1-\alpha\gamma E_t[\Delta\log(e_t)]+\frac{\gamma}{\sigma}(\sigma-1)E_t[\Delta\log(C_t^d)]-\frac{\gamma}{\sigma}E_t[\Delta\log(P_t)]$$
$$+(\frac{\gamma}{\sigma}-1)E_t[\log(R_{W,t})];\ b_1=\alpha\gamma,\ b_2=\frac{\gamma}{\sigma}(1-\sigma),$$
$$b_3=\frac{\gamma}{\sigma},\ b_4=1-\frac{\gamma}{\sigma} \quad (44)$$

Equation 43 can be stated as the following form briefly:

$$-\frac{SDF_t}{E_{t-1}[SDF_t]}\approx k+b'f_t \quad (45)$$

Where $b = (b_1,b_1,b_1,b_1)'$ and the factor vector will be equal to $f_t=(\Delta\log(e_t),\Delta\log(C_t^d),\Delta\log(P_t),\log(R_{W,t}))'$. Given that for each asset $E[SDF_t(R_{j,t}-R_{f,t})]=0$ is true, then:

$$E_t[SDF_t]E_t[R_{j,t}-R_{f,t}]=-cov(SDF_t,R_{j,t}-R_{f,t}) \quad (46)$$

$$E[R_{j,t}-R_{f,t}]=cov(-\frac{SDF_t}{E_{t-1}[SDF_t]},R_{j,t}-R_{f,t})=cov(k+b'f_t,R_{j,t}-R_{f,t})$$
$$=b'cov(f_t,R_{j,t}-R_{f,t}) \quad (47)$$

Finally, the Euler equation implied of the utility function in equation 32, can be approximately stated from the adjusted linear factor model of asset pricing as follows:

$$E[R_{j,t}-R_{f,t}]=b_1cov(\Delta\log(e_t),R_{j,t}-R_{f,t})+b_2cov(\Delta\log(C_t^d),R_{j,t}-R_{f,t})$$
$$+b_3cov(\Delta\log(P_t),R_{j,t}-R_{f,t})+b_4cov(\log(R_{W,t}),R_{j,t}-R_{f,t}) \quad (48)$$

Equation 48 represents the linear model of asset pricing which will be estimated using Fama-MacBeth two pass regression (1973), coefficients of sensitivity, and risk premium of this variable to asset premium (portfolios).

3. DATA SOURCES AND VARIABLES

Data and variables that are needed for estimating Euler equations and Fama-Macbeth regression, are gathered from April 2003 to March 2014; the information have been collected through the web and annual reports of the central bank of Iran, Rahavard Novin's data bank and Organization for Economic Co-operation and Development. The statistical society of the research included 47 companies accepted by the stock exchange of Tehran[1], and Other variables that are needed for estimating the model, are as follows:

Return per share (of company), it is calculated by the following formula:

$$R_{j,t}=\frac{(1+a_{j,t})\times p_{j,t}-p_{j,t-1}+D_{j,t}-M}{p_{j,t-1}} \quad (49)$$

$R_{j,t}$ is stock return of the company j,$P_{j,t}$ is stock price of the company j, $a_{j,t}$ is the proportion of capital increase per share of the company j,$D_{j,t}$ is the dividends per share of the company j in during the periods of t and M of cash flow of the shareholders for per share. Asset returns (or portfolio returns), according to the way of forming the portfolios of Fama and French (1992 and 1993) and Carhart (1997), eight portfolios are formed as follows Table 1.

Table 2, includes other variables used and their calculation method.

4. ESTIMATING MODELS

4.1. Estimation Euler Equations by GMM

At this section we use Hansen and Singleton's (1982) GMM methodology to estimate parameters of equation 32. In this study, based on Cohen et al. (2003) and Yogo (2006), variables of SMB_t, HML_t WML_t, $Growth_{t+1}$, and e^n_{t-1} are used as instrumental variables. Although GMM does not need many assumptions about the research data, however, examining the stationary of the variables is of special importance, thus firstly, the unit root test has been performed for the used variables; as Table 3 shows, according to the Augmented Dickey-Fuller test and Phillips-Perron test, the hypothesis H_0, that is, the existence of a unit root is rejected and it can be concluded that all the variables are stationary.

Euler equations related to the adjusted CCAPM (equation 32) are estimated using GMM and displayed in Table 4, in this table in addition to the estimated values for the parameters, the last line of Table 4 the Hansen statistics (1982) or J-statistic is given, that this statistic is offered for too restrictive so as to measure the closeness to zero of the sample moment condition and it is stated as follows:

$$nJ_n(\Theta_{GMM})\rightarrow\chi^2_{r-1} \quad (50)$$

Where Θ_{GMM} is the value which minimizes the target function. Under the zero hypothesis, test statistic of $E[h(x_t;\Theta_{GMM},Z_t)]=0$ has a chi-square distribution with r−1 degrees of freedom (Roshan et al., 2013).

According to the estimation results of equation 32 in the Table 4, it can be observed that all the parameters are significant. Parameter β (subjective time discount factor) is =0.539, which indicates agents

Table 1: Portfolio used in the model

Portfolio content	Portfolio symbol	Portfolio number
Big size, high B/M, winners	BHW	1
Big size, low B/M, winners	BLW	2
Big size, low B/M, losers	BLL	3
Big size, high B/M, losers	BHL	4
Small size, high B/M, winners	SHW	5
Small size, low B/M, winners	SLW	6
Small size, high B/M, losers	SHL	7
Small size, low B/M, losers	SLL	8

1 Scope of the study has been all companies accepted in the exchange, but among all of them, only 47 companies are chosen according to the following criteria: (1) To be accepted in the exchange before financial year of 2003 and not to be exited until the end of financial year of 2014, (2) their financial year ends at the end of Esfand (in Persian calendar, which is the middle of March), (3) not to be one of investor companies and financial intermediaries, (4) the book value of the companies is not negative, (5) without trading halt more than 3 months.

Table 2: Information of the variables used in forming the portfolio and estimating the model GMM

Variable's	Calculation method
$R_{j,t}$	Return of any of the portfolios comprising Table 1
$R_{W,t}$	Market returns according to the weighted index of portfolios comprising Table 1
SMB_t	Size factor: SMB=1/4×(SHW-BHW)×(SHL-BHL)×(SLW-BLW)×(SLL-BLL)
HML_t	Value factor: HML=1/4×(SHW-SLW)×(SHL-SLL)×(BHW-BLW)×(BHL-BLL)
WML_t	Momentum factor: WML=1/4×(SHW-SHL)×(SLW-SLL)×(BHW-BHL)×(BLW-BLL)
$R_{f,t}$	Interest rate of participation bonds as risk-free return, which is seasonally available; the monthly rate of risk-free return can be calculated as follows: $R_{f,t}=\left[(1+\frac{i}{4})^4-1\right]\div 12$
C_t^d	Consumption expenditure per capita of nondurable goods and services (million rials) to Constant Prices 1997, and this data is seasonally available, so in order to estimate the model, the series becomes monthly, which uses the Denton method (1970) according to the seasonal collectiveness, and uses the total consumption as the indicator
C_t^f	Imported consumer goods per capita (million rials) to Constant Prices 1997, and this data is annually available, so in order to estimate the model, this series becomes monthly, which uses the Denton method (1970) according to the yearly collectiveness, and uses the total imports as the indicator
$Growth_t$	The growth of domestic consumption; the sum of the growth of consumption expenditure per capita of nondurable goods and services and the imported consumer goods per capita
$CPIO_t$	Consumer price index in OECD member countries to constant prices 1997
$CPII_t$	Consumer price index in Iran to constant prices 1997
e_t^n	Nominal exchange rate
e_t	Real exchange rate
π_t	The ratio of $\frac{CpiI_t}{CpiI_{t+1}}$ is used as an indicator of inflation

GMM: Generalized method of moments

Table 3: ADF and PP test over model variables

Variable	Include in test equation	Test ADF*	Test PP*
$\frac{C_t^d}{C_{t-1}^d}$	Trend and intercept	11.8	11.8
π_t	Trend and intercept	−7.3	−7.5
$R_{1,t}$	Trend and intercept	−9.7	−9.5
$R^{2,\tau}$	Trend and intercept	−8.4	−8.5
$R_{3,t}$	Trend and intercept	−8.8	−8.9
$R_{4,t}$	Trend and intercept	−9.6	−9.6
$R_{5,t}$	Trend and intercept	−9.1	−9.3
$R_{6,t}$	Trend and intercept	−8.6	−8.5
$R_{7,t}$	Trend and intercept	−9.7	−9.5
$R_{8,t}$	Trend and intercept	−11.4	−11.4
$R_{f,t}$	Trend and intercept	−9.7	−6.3
$R_{W,t}$	Trend and intercept	−7.9	−7.9
SMB_t	Trend and intercept	−9.1	−8.8
HML_t	Trend and intercept	−10.2	−10.7
WML_t	Trend and intercept	−10.7	−10.7
$Growth^{\tau}$	Trend and intercept	−8.6	−8.7

*Mackinnon test at 1% is equal to−3.50, ADF: Augmented Dickey-Fuller, PP: Phillips-Perron

Table 4: Estimation of GMM

Parameter	Value	Standard errors	t-student*
β	0.539	0.122	4.39
α	0.076	0.019	3.84
ρ	−0.05	0.028	−1.76
γ	−0.127	0.067	−1.86
σ	−0.206	0.101	−2.03

J-Static=9.89, GMM: Generalized moments model, *denote the significance level at 5%

are patient and preference for the consumption in the future. The parameter α equals 0.076, which shows higher preference of investors towards the domestic goods than the foreign goods. Parameter ρ will be equal to −0.05 and ES will be =0.95, so there's a low substitution effect between domestic goods and imported goods. Decline in the real exchange rate (the appreciation of the domestic currency) leads to a reduction in B_t^{γ} and marginal utility, and when the economy is in a bad state and recession, the results will be quite the opposite. In fact, in both states, the exchange rate will strengthen the negative relationship between asset return and marginal utility, thus leading to an increase in risk of investors. According to equation 16, when the real exchange rate is reduced, the value of domestic goods will increase to the total consumption, which is due to the low substitution effect between imported and domestic goods. Therefore, the increasing value in the domestic goods (income effect) dominates the decreasing effect (substitution effect), and eventually, the increasing value in domestic goods would induce an increasing proportional value of domestic goods in total expenditure. Parameter γ equals to −0.127. Therefore, the relative risk aversion coefficient equals 1.127 = 1-γ which indicates agent's relatively high relative risk aversion; σ parameter equals −0.206 and the elasticity of intertemporal substitution, $EIS=\frac{1}{1-\sigma}$ will be 0.83 and suggests that agent's participate in the asset market along with planning their own consumption program, and if appropriate conditions is provided in the market, then agents intend to transfer some of their consumption to future periods and invest in assets. Overall results indicate that γ<0 and σ<ρ<0 imply that EIS<ES<1, which is in accordance with the results of experimental findings in literature related to equity premium (the study by Mehra and Prescott, 2003).

4.2. Estimating Pricing Equation by using Fama-MacBeth Two Pass Regression Method

In order to estimate the linear pricing of assets (equation 48) the Fama-MacBeth two pass regression method (1973) is used. So equation 48 can be stated as asset returns equation with sensitivity coefficient of the assets (beta) as:

$$E[R_{j,t} - R_{f,t}] = \beta_j'\lambda \qquad (51)$$

$\beta_{j,k} = \dfrac{\mathrm{cov}(f_{k,t}, R_{j,t} - R_{f,t})}{\mathrm{var}(f_{k,t})}$ Captures the risk exposure of the asset j to the k factor. In this beta relation, $\lambda_k = b_k \mathrm{var}(f_{k,t})$ is usually called the risk premium or risk price associated with factor k. At equilibrium, the difference in the expected asset returns is explained by the difference of the amount of risk assets, which is stated by exchange rate beta and other factors. Results of estimating equation 51, is provided in the Table 5.

The results of the model estimations indicate that the coefficient of exchange rate beta equals 0.81, which means that there is a significantly positive relationship between exchange rate risk premium and asset returns. In equation 46 and 48, assets with a high beta exchange rate beta $\dfrac{\mathrm{cov}(-\Delta\log(e_t), R_{j,t} - R_{f,t})}{\mathrm{var}(-\Delta\log(e_t))}$ should have a higher return, when $b_1>0$, since $b_1 = -\alpha\gamma$, when $\gamma<0$, the exchange rate risk premium $\lambda_1 = \mathrm{var}(-\Delta\log(et))$ will be positive. In the boom state or when the real exchange rate decreases ($-\Delta\log(et)>0$) the asset returns and the exchange rate beta will be high, and when economy is in bad state and recession, the asset returns will be low. The inflation rate beta equals 0.25. Despite the unexpected inflation, the asset returns is under the effect of the fluctuation risk of the inflation rate, and the shareholders and creditors want further return premium to adopt the decreased purchasing power of money (Sitkin and Weingart, 1995). The market returns beta is 0.65, which indicates a positive relationship between market premium and asset returns premium. This means that with an increase in risk markets, investors want more returns for each share so as to invest in it. The consumption growth beta is also positive, however, it's not statistically significant. The coefficient of determination (R^2) is also high, and statistics shows a high explanatory power of asset premium by the introduced independent variables.

5. CONCLUSION AND SUGGESTIONS

In recent years economists have introduced new models in the field of financial economics and asset pricing; one of them is the consumption based capital assets pricing model (CCAPM) which has faced with failure and criticism in most studies. The main reason for the failure of this model has been lack of attention to other variables effective on the asset returns. In this regard, this study develops CCAPM within the framework of an open economy and the arrival of imported goods and solved equilibrium model, to investigate the effect of some of macroeconomic variables on asset returns using GMM and Fama-MacBeth two pass regression (1973). The results of GMM, for the parameters show that the economic agents are somewhat patient and risk averse, yet they have not much preference in the current consumption relative to future consumption. ES between domestic consumption goods and imported consumption goods of goods is relatively low, and agents are willing to consume domestic goods. Also the results of Fama-MacBeth regression (1973), suggests that in order to bear more risk of effective factors (exchange rate risk, inflation risk and market risk) on return assets, every agent wants higher return than before. Therefore, in line with the results it is suggestsd that: (1) Considering the importance of clarifying the relationship between risk and return, asset pricing models be further attended to in the economy of the country, and efforts to achieve a suitable model in this field is essential, (2) investors, investing companies, analysts of capital market and other users of financial markets, should consider financial variables in addition to a special attention towards macroeconomic variables such as consumption expenditure, imports, exchange rate and inflation in order to investigate the factors influencing exchange returns, (3) given the variables used in this study, instead of consumption expenditure on nondurable goods and services, consumption expenditure on durable goods could be used, and instead of imported consumer goods, imported capital goods and Intermediate goods can be used and results can be compared with the influencing coefficients of variables in this study.

Table 5: Estimation result of Fama-MacBeth two pass regression

Variable	Value	Standard errors	T-student	P value
λ_1	0.81	0.166	4.901	0.016*
λ_2	0.53	0.365	1.458	0.24
λ_3	0.25	0.078	3.238	0.047*
λ_4	0.65	0.142	4.608	0.019*
		R^2=0.907		
		F - Static = 7.34 (p - value = 0.066)**		

Notes:*denote the significance level at 5% and ** denote the significance level at 10%.

REFERENCES

Aggarwal, R., Harper, J.T. (2010), Foreign Exchange Exposure of "Domestic" Corporations. Journal of International Money and Finance, 29(8), 1619-1636.

Antell, J., Vaihekoski, M. (2007), International asset pricing models and currency risk: Evidence from Finland 1970-2004. Journal of Banking and Finance, 31(9), 2571-2590.

Aquino, R.Q. (2002), Informational Efficiency Characteristics of the Philippine Stock Market. U. P. College of Business Administration Discussion Paper.

Aydemir, O., Demirhan, E. (2009), The relationship between stock prices and exchange rates evidence from Turkey. International Research Journal of Finance and Economics, 23, 209.

Bach, C., Moller, S. (2011), Habit based asset pricing with limited participation consumption. Journal of Banking and Finance, 35(11), 2891-2901.

Barakat, M.R., Elgazzar, S.H., Hanafy, K.M. (2015), Impact of macroeconomic variables on stock markets: Evidence from emerging markets. International Journal of Economics and Finance, 8(1), 195-207.

Buyuksalvarci, A. (2010), The effects of macroeconomics variables on stock from Turkey. European Journal of Social Sciences, 14(3), 70-83.

Campbell, J.Y., Cochrane, J.H. (2000), Explaining the poor performance of consumption-based asset pricing models. Journal of Finance, American Finance Association, 55(6), 2863-2878.

Carhart, M.M. (1997), On persistence in mutual fund performance. Journal of Finance, 52(1), 57-82.

Chkili, W., Nguyen, D.K.H. (2014), Exchange rate movements and stock market returns in a regime-switching environment: Evidence for BRICS countries. Research in International Business and Finance, 31, 46-56.

Cochrane, J.H. (1996), A cross-sectional test of an investment-based asset pricing model. Journal of Political Economy, 104(3), 572-621.

Cohen, R.B., Polk, C., Vuolteenaho, T. (2003), The value spread. Journal of Finance, 58(2), 609-641.

Das, A. (2017), An association of macroeconomic variables and stock index, India: An empirical evidence. MERC Global's International Journal of Management, 5(1), 1-7.

Dreyer, J.K., Schneider, J., Smith, W.T. (2013), Saving based asset pricing. Journal of Banking and Finance, 37(9), 3704-3715.

Dunn, K.B., Singleton, K.J. (1986), Modeling the term structure of interest rates under non-separable utility and durability of goods. Journal of Financial Economics, 17(1), 27-55.

Epstein, L., Zin, S. (1989), Substitution risk aversion and the temporal behavior of consumption and asset returns: A theoretical framework. Journal of Econometrica, 57, 937-968.

Epstein, L., Zin, S. (1991), Substitution, risk aversion and the temporal behavior of consumption and asset returns: An empirical investigation. Journal of Political Economy, 99(2), 263-286.

Fama, E.F., French, K.R. (1992), The cross-section of expected stock returns. Journal of Finance, 47(2), 427-465.

Fama, E.F., French, K.R. (1993), Common risk factors in the returns on stocks and bonds. Journal of Finance, 33(1), 3-56.

Gowriah, S., Seetanah, B., John, L.M., Keshav, S. (2014), The effects of monetary and fiscal policies on the stock exchange: Evidence from an Island economy. Journal of Business and Management Review, 4(4), 321-332.

Gutierrez, C.E.C., Issler, J.V. (2015), Evaluating the Effectiveness of Common-Factor Portfolios. MPRA Paper No. 66077.

Hansen, L.P. (1982), Large sample properties of generalized method of moments estimators. Journal of Econometrica, 50(4), 1029-1054.

Jamaludin, N., Ismail, S., Manaf, S.A. (2017), Macroeconomic variables and stock market returns: Panel analysis from selected ASEAN countries. International Journal of Economics and Financial Issues, 7(1), 37-45.

Khalid, M. (2012), Long-run relationship between macroeconomic variables and stock return: Evidence from Karachi stock exchange (KSE). School of Doctoral Studies (European Union) Journal, 4(1), 384-389.

Kpanie, A.F., Vivian, S., Sare, Y.A. (2014), Relationship between Stock market performance and macroeconomic variables in Ghana. Issues in Business Management and Economics, 2(3), 46-53.

Kreps, D.M., Porteus, E.L. (1978), Temporal resolution of uncertainty and dynamic choice theory. Journal of Econometrica, 46(1), 185-200.

Kuwornu, J.K.M. (2012), Effect of macroeconomic variables on the Ghanaian stock market returns: A co-integration analysis. Agris on-Line Papers in Economics and Informatics, 4(2), 1-12.

Lettau, M., Ludvigson, S. (2001), Resurrecting the (C) CAPM: A cross-sectional test when risk Premia are time-varying. Journal of Political Economy, 109(6), 1238-1287.

Masuduzzaman, M. (2012), Impact of the macroeconomic variables on the stock market returns: The case of United Kingdom and Germany. Global Journal of Business and Management Research, 12(16), 23-34.

Mehra, R., Prescott, E.C. (1985), The equity premium: A puzzle. Journal of Monetary Economics, 15(2), 145-161.

Mehra, R., Prescott, E.C. (2003), The equity premium in retrospect. In: Constantinides, G.M., Harris, M., Stulz, R., editors. Handbook of the Economics of Finance. Amsterdam, Netherlands: North-Holland.

Mohammadzadeh, A., Tash, M.N.S., Roshan, R. (2015), Comparison of consumption based capital asset pricing (CCAPM) and housing CCAPM (HCCAPM) model in explaining stock returns in Iran. Quarterly Journal of Applied Theories of Economics, 2(3), 49-72.

Mouna, A., Jarboui, A.M. (2013), The impact of interest rate and exchange rate volatility on bank's returns and volatility: Evidence from Tunisia. International Journal of Information Business and Management, 5(4), 73-90.

Najafzadeh, B., Monjazeb, M.R., Mamipour, S. (2015), The analysis of real exchange rate volatility and stock exchange return with panel-GARCH approach (case study: D8 countries). Journal of Iranian Economic Review, 20(4), 525-550.

Ogaki, M., Carmen, M.R. (1998), Measuring intertemporal substitution: The role of durable goods. Journal of Political Economy, 106(5), 1078-1098.

Pepin, D. (2015), Intertemporal substitutability, Risk aversion and asset prices. Economics Bulletin, 35(4), 2233-2241.

Reilly, F.K., Keith, C. (2000), Investment Analysis and Portfolio Management. 6th ed. Orlando, FL: The Dryden Press.

Rjoub, H., Türsoy, T., Günsel, N. (2009), The effects of macroeconomic factors on stock returns: Istanbul stock market. Journal of Studies in Economics and Finance, 26(1), 36-45.

Roshan, R., Pahlavani, M., Shahiki, T.M.N. (2013), Investigation on importance of relative consumption and risk aversion in consumption expenditures of Iranian households by GMM approach. Quarterly Journal of Applied Economic Studies in Iran, 2(8), 13-31.

Samadi, S., Bayani, O., Ghalandari, M. (2012), The relationship between macroeconomic variables and stock returns in the Tehran stock exchange. International Journal of Academic Research in Business and Social Sciences, 2(6), 559-573.

Singh, T., Mehta, S., Varsha, M.S. (2011), Macroeconomic factors and stock returns: Evidence from Taiwan. Journal of Economics and International Finance, 2(4), 217-227.

Sitkin, S.B., Weingart, L.R. (1995), Determinants of risky of decision-making behavior: A test of the mediating role of risk perception and propensity. Academy of Management Journal, 8(6), 1573-1592.

Sohail, N., Hussain, Z. (2012), Macroeconomic policies and stock returns in Pakistan: A comparative analysis of three stock exchanges. Interdisciplinary Journal of Contemporary Research in Business, 3(10), 905-918.

Stillwagon, J.R. (2015), Can the consumption capital asset pricing model account for traders' expected currency returns? Review of International Economics, 23(5), 1044-1069.

Ullah, F., Hussain, I., Rauf, A. (2014), Impact of macreconomy on stock market: Evidence from Pakistan. International Journal of Management and Sustainability, 3(3), 140-146.

Weil, P. (1989), The equity premium puzzle and the risk-free rate puzzle. Journal of Monetary Economics, 24(3), 401-421.

Xiao, Y., Faff, R., Gharghori, P., Min, B. (2013), Pricing innovations in consumption growth: A re-evaluation of the recursive utility model. Journal of Banking and Finance, 37(11), 4465-4475.

Yogo, M. (2004), Essays on Consumption and Expected Returns. Ph.D. Thesis, Harvard University.

Yogo, M. (2006), A consumption-based explanation of expected stock returns. Journal of Finance, American Finance Association, 61(2), 539-580.