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Thesis

Asset pricing models in an international context

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Contents

1. Introduction

As global asset allocation becomes more popular over the last decades, there has been a growing interest in understanding the cross sectional differences in different stock-market returns. The purpose of this thesis is to identify the prices of beta risk associated with world market and world consumption in average excess returns for a set of OECD national stock index portfolios within the international capital asset pricing model; the consumption based international asset-pricing framework, and a combination of both for two samples of data.

The first one includes available cross-sectional stock-market returns from 1988 to 2002 for 23 countries and the second one is an extended one including observations from the first panel (1988-2002) and cross sectional stock-market returns for the 17 (out of the 23) countries during the period 1970-1988. The third one comprises of 21 observations (out of the 39 observations) with the lowest stock market volatility.

The thesis proceeds as follows. Section 1 introduces the theme, which is necessary for the reader to understand the discussion. Section 2 makes a review of the literature of asset pricing models including the static international capital asset pricing model and the classic consumption capital asset pricing model and the implications for international asset pricing. Section 3 contains the empirical work on the subject, which includes data manipulation and evaluation of the regressions. Section 4 provides for the conclusion of the thesis while Section 5 includes all references and bibliography.

I would like to thank my supervisor, Professor Gikas Hardouvelis and his Ph.D. student Mr. Koumpouros for their assistance and guidance.

2. Short Review of the literature on ICAPM and CCAPM Asset Pricing Models

2.1 International Capital Asset Pricing Model-ICAPM

Sharpe (1964) and Lintner (1965) were the first ones to develop the Capital Asset Pricing Model (CAPM), which and was extended by Black (1972). The Sharpe-Lintner model is the extension of the one period mean-variance portfolio models of Markowitz (1959) and Tobin (1958), which in turn are built on the expected utility model of von Nuemann and Morgenstern (1953).

The Markowitz mean variance analysis are concerned with how the consumer-investor should allocate his wealth among the various assets available in the market, given that he is one-period utility maximiser. The Sharpe-Lintner asset-pricing model then uses the characteristics of the consumer wealth allocation decision to derive the equilibrium relationship between risk and expected return for assets and portfolios.

In the development of capital asset pricing model simplifying assumptions about the real world are used in order to define the relationship between risk and return that determines security prices.

These **assumptions** are:

(a) All investors are risk-averse individuals, who maximize the expected utility of their end of period wealth,

(b) The investors are price takers and have homogenous expectations about asset returns that have joint normal distribution,

(c) A risk-free asset exist such that investor may borrow or lend unlimited amounts at the risk-free rate,

(d) The quantities of asset are fixed; also all assets are marketable and divisible,

(e) Asset markets are frictionless and information is costless and simultaneously available to all investors, and

(f) There are no market imperfections such as taxes, regulations, or restrictions on other sellings.

Sharpe and Lintner thus making a number of assumptions extended Markowitz's mean variance framework to develop a relation for expected return. The traditional formula of the CAPM:

$$E(R_i) = R_f + b \cdot [E(R_m) - R_f)]$$

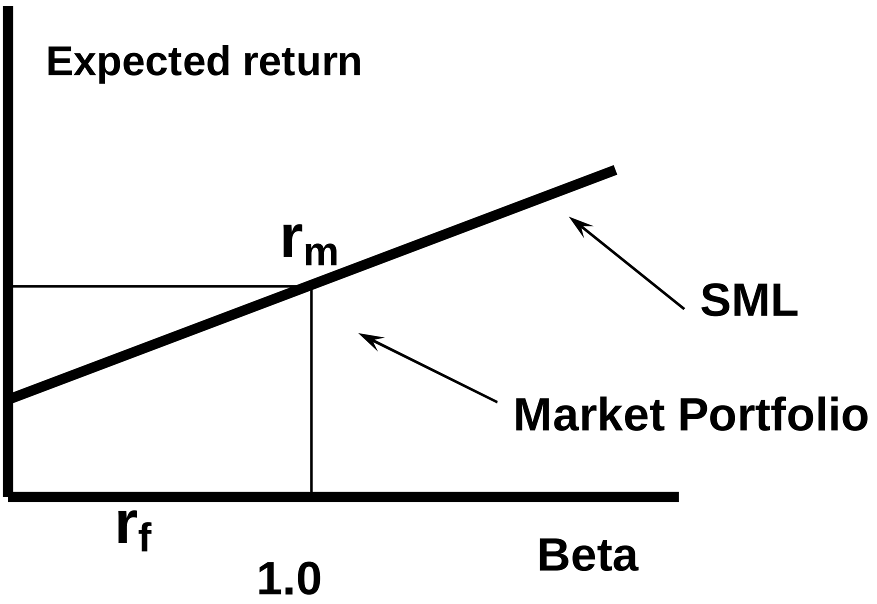
Where $E(R_i)$ is the expected return of asset *i* in period t, $E(R_m)$ is the realized the return on the Market portfolio in period t, R_f is the return on the risk-free asset and b is the beta co-efficient of the risky asset i with the Market portfolio.

The CAPM relies on the covariance of the asset's return with the "market return" to quantify asset risk. The market return is the return on all invested wealth, which, in empirical studies, is often proxied by the return on a diversified portfolio of common stocks.

The relation between an asset's risk premium and its market beta is called the "Security Market Line"(SML), which is displayed in the following graph.

Security Market Line

SML/CAPM: $E[r_i] = r_f + b_i (E[r_m] - r_f)$



Implications for the CAPM

- The market portfolio is the tangent portfolio.
- Combining the risk-free asset and the market portfolio gives the portfolio frontier.
- The risk of an individual asset is characterized by its covariability with the market portfolio.
- The part of the risk that is correlated with the market portfolio, the systematic risk, cannot be diversied away.
- Bearing systematic risk needs to be rewarded.
- The part of an asset's risk that is not correlated with the market portfolio, the non-systematic risk, can be diversied away by holding a frontier portfolio. •
- Bearing nonsystematic risk need not be rewarded.

The **international CAPM**[1] is based on the traditional CAPM model with a few additional assumptions that arise from the fact that investors are concerned about the real return of the financial assets per unit of risk rather than the nominal return in the currency of their country.

First, the international financial market is assumed perfect and frictionless (No barriers exist).

Second, joint log normality of the asset prices and exchange rates is assumed.

Third, the asset in country j with a risk-free nominal return in currency j has a beta equal to zero.

Fourth, the rate of growth of the price of the consumption good in currency j is uncorrelated with nominal asset returns in that currency.

Finally, we assume that a risk less asset exists. Investors can freely lend and borrow in units of the numeraire consumption good (see Stulz, 1995).

In an international context, the CAPM states that expected excess returns on all assets are proportional to the expected excess return on the world market portfolio, with beta as the proportionality factor.

International CAPM implies that if international markets are fully integrated then the World market risk is the only relevant pricing factor, and the assets with the same risk have identical expected return irrespective of the market.

The international CAPM implies the following relation for the nominal excess returns

$$E(R_i) = b_i \cdot [E(R_m)]$$

[1] Mika, Vaihekoski: Unconditional international asset pricing models, February 2000. Helsinki School of Economics and Business Administration.

where $E(R_i)$ are expected returns on asset i and $E(R_m)$ the global market portfolio in excess of the risk less rate of return R_f.

The global market portfolio comprises all securities in the world in proportion to their capitalization relative to world wealth (see Stulz, 1995).

This single-factor world CAPM is appropriate when capital markets around the world are integrated and purchasing power parity holds. In this particular case, exchange rate risk is not priced, since all changes in exchange rates merely reflect differences in inflation rates in different countries. That is, the real exchange rate is constant.

However, the rate of return on default-free asset is not strictly risk less in real terms. In this case we can use Black's (1972) zero-beta version of the international CAPM. It implies the following relationship for real returns (i.e., nominal returns in excess of the inflation rate).

$$\mathrm{E}(R_i) = l_o + b_i \cdot [E(R_M) - l_o]$$

where l_o is the expected return on the zero-beta portfolio. This is the expected return of any security that is uncorrelated with the market return.

International asset pricing models have been under the scrutiny of empirical research several times before. Overall, the results in the literature suggest that an international asset-pricing model with or without foreign exchange risk captures national market returns fairly well.

Adler and Dumas (1983) show that a single-factor model, with the world market portfolio as the only factor, is appropriate only if global capital markets are integrated and there are no deviations from purchasing power parity (PPP). In this case, investors are not concerned about exchange rate risk since all changes in exchange rates are purely nominal. However, if there are deviations from PPP, investors want to hedge against foreign exchange risk. Exchange risk factors must then be included in the international CAPM.

In an inter-national context, Harvey (1991), Chan, Karolyi, and Stulz (1992), and De Santis and Gerard (1997) find that a conditional CAPM works better than an unconditional CAPM in explaining the time variation in returns on international equity markets.

Tests of the CAPM in an international setting have been conducted in two ways[2].

First, there have been tests of the CAPM using country portfolios. These tests have been surprisingly supportive of versions of the CAPM that allow for a time-varying risk premium. In particular, Harvey (1991) provides evidence that is consistent with the CAPM holding internationally using a large number of countries. He finds, however, that the return of the Japanese portfolio is inconsistent with the CAPM over his sample period because of the extremely large return of Japanese stocks in the 1980s.

Using a different approach, DeSantis and Gerard (1997) also find results supportive of the international CAPM. Chan, Karolyi and Stulz (1992) conduct a study where they consider the U.S., Japanese and the Morgan Stanley Europe, Asia and Far East indices. In that study, they find evidence supportive of the CAPM as well. They show that the risk premium on the U.S. portfolio depends on the covariance of the return of that portfolio with the return on the foreign index. In other words, the risk premium on the U.S. market portfolio depends on how the U.S. portfolio is correlated with foreign stocks. One would expect such a result if the CAPM holds for Japan and the U.S. jointly since in this case the beta of the U.S. market portfolio with the world market portfolio would depend on its covariance with the return of the Japanese portfolio.

Fama and French (1998) document a statistically and economically important global value effect, and provide evidence against the international capital asset pricing model

[2] Stulz, Rene: Globalization of Equity Markets and the Cost of Capital, March 1999

(CAPM). Building on their work on the U.S. market (Fama and French, 1993, 1996), they propose a model with a world market portfolio and a zero-cost portfolio that captures value versus growth effects. They find that the model captures the time-series variation of returns in developed and emerging markets over and above the international CAPM. They also show that pricing errors across portfolios are smaller with their model.

However, Fama and French (1998) consider an unconditional single-factor version in the time series, and do not evaluate their proposed model against an international CAPM with additional economic risk sources. Further, they consider portfolios of primarily large firms, and for this reason, do not study the size effect.

Dahlquist and Sallstrom[3] assess the ability of international asset pricing models to explain the cross-sectional variation in expected returns. All the models considered seem to capture national market returns fairly well. However, global portfolios, sorted on earnings-price ratio and market value, pose a special challenge. We find that an unconditional inter-national CAPM cannot explain the cross-sectional variation in these portfolio returns. Interestingly, a conditional international asset-pricing model that includes foreign ex-change risk factors is able to explain a large part of the variation in average returns. Dahlquist and Sallstrom suggest that this model has the same explanatory ability as an inter-national three-factor model, where zero-cost portfolios based on earnings-price ratios and market values are used in addition to the world market portfolio.

Dahlquist and Sallstrom conclude that the international CAPM cannot explain the cross-section of returns on the characteristic-sorted portfolios. This result is in line with the results in Fama and French (1998), but differs from the results in Harvey (1991), and Ferson and Harvey (1993) who document a good fit with the CAPM. However, their analysis is in the time series, while it is in the cross-section. Further, they consider national market indices, whereas Dahlquist and Sallstrom use characteristic-

[3] Dahlquist and Sallstrom : An Evaluation of International Asset Pricing Models, May 2002. Fuqua School of Business and Stockholm School of Economics.

sorted industry portfolios as test assets. As noted above, the CAPM does a reasonable job when national market indices are used as test assets.

There are many possible sources of statistical rejection of the CAPM, and the ICAPM, in particular. Among these, we may single out four. First, the fundamental assumptions that provide the building blocks for this model, such as utility specification, information environment, or distributional assumptions, could be violated. Second, the benchmark portfolio that is used to measure risk could be improperly specified. Third, there could be problems with the returns data caused by infrequent trading of the component stocks. Fourth, capital markets may not be integrated[4].

[4] Maria Kasch-Haroutounian and Simon Price: International CAPM and the Integration of the Transition Markets of Central Europe into Global Capital Markets, City University of London, March 2000

2.2 The traditional Consumption Asset Pricing Model-CCAPM

The capital asset pricing model (CAPM) of Sharpe (1964) and Lintner (1965), the most well known model, is based on a single period assumption, although is often assumed to hold intertemporally[5] This is clearly an unrealistic assumption since investors can and do rebalance their portfolios on a regular basis.

Moreover, daily movements in the prices of many assets cannot be explained by the ordinary CAPM. This limitation of the CAPM was well understood and by the late 1960s, researchers were trying to determine whether the ordinary CAPM would hold in a dynamic setting. Early examples of this are the intertemporal portfolio choice and asset pricing models of Samuelson (1969), Hakansson (1970) and Fama (1970), which assume that agents make portfolio and consumption decisions at discrete time periods.[6]

In order to construct a framework that is both more realistic and at same time, more tractable than the discrete time model, **Merton (1973)** developed an Intertemporal CAPM (ICAPM) by assuming that time flows continuously. The framework of continuous time turns out to be one of the major developments of modern finance, in both equilibrium asset pricing and derivative valuation[7].

Merton (1973) argues that the assumption that the CAPM holds intertemporally is faulty when agents, instead of facing a constant investment opportunity set, face a changing one. In this case, the CAPM no longer holds intertemporally. Instead, Merton builds an intertemporal CAPM (ICAPM) where asset risk is measured as the covariance between the asset's return and the marginal utility of investors. By deriving the model in an intertemporal setting, innovations in the marginal utility of investors

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[5] Anne-Sofie, Rasmussen: Estimating the Consumption-Capital Asset Pricing Model without Consumption Data: Evidence from Denmark, Aarhus School of Business, March 2004.

[6]

[7] Three Centuries of Asset Pricing: Elroy Dimson and Massoud Mussavian, London Business School and Salomon Brothers International, January 2000.

are driven by shocks to wealth itself, but also by changes in the expected future returns to wealth.

Merton's ICAPM can be viewed as a multi-beta version of the CAPM. It requires all state variables needed to describe the characteristics of the investment opportunity set to be identifiable. Considering this, empirical testing of the ICAPM quickly becomes difficult, due to the multitude of state variables needed. This problem can be solved by collapsing Merton's multi-beta pricing equation into a single-beta pricing equation.

Although a major breakthrough, Merton's analysis was at the same time disconcerting because it runs counter to the basic intuition of the CAPM, that an asset has greater value if its marginal contribution to wealth is greater. **Breeden (1979**), however, reconciled Merton's ICAPM with the classical CAPM by highlighting the dichotomy between wealth and consumption.

In an intertemporal setting, Breeden showed that agents' preferences must be defined over consumption and thus *"always, when the value of an additional dollar payoff in a state is high, consumption is low in that state, and when the value of additional investment is low, optimal consumption is high. This is not always true for wealth, when investment opportunities are uncertain".* The implication is that assets are valued by their marginal contribution to future consumption and not wealth.

Breeden's model, which became known as the Consumption CAPM (CCAPM), allows assets to be priced with a single beta as in the traditional CAPM. In contrast to the latter the CCAPM's beta is measured not with respect to aggregate market wealth, but with respect to an aggregate consumption flow and, as Breeden states, *"the higher that an asset's beta with respect to consumption is, the higher its equilibrium expected rate of return*".

The derivation of the consumption-based capital asset pricing model (C-CAPM) introduced and investigated by Lucas (1978). Breeden (1979) established the classic form of this model, and Grossman and Shiller (1981) developed it further. Ever since, intertemporal substitution channel of consumption has been used to explain return on risk free asset and risky asset in a large volume of literature. In the last two decades, the development of this theory has been marked as a major achievement in the field of financial economics (Campbell and Cochrane 2000).

This chapter functions as an introduction to the traditional consumption asset-pricing model. **The rate of growth in consumption of nondurables and services represents the only pricing factor behind the consumption-based capital asset pricing model (C-CAPM)**.

The usual assumptions in the Consumption Capital Asset Pricing Model (CCAPM)[8] field are that there is a representative individual with an infinite life span. Individuals have identical beliefs, which are rational. Rationality is defined as perceiving and acting accordingly to the true state dependent probabilities. There is no asymmetry of information or any form of friction.

The principal goal of the consumption CAPM is to explain the returns and prices of risky assets in terms of economic fundamentals, things that economic agents should care dearly about[9].

An investor must decide how much to save and how much to consume, and what portfolio of assets to hold. The most basic pricing equation comes from the .first-order condition for that decision[10]. The pricing formula that describes the above first order condition is

$$p_t = E_t \cdot \left[b \cdot \frac{u'(c_{t+1})}{u'(c_t)} x_{t+1} \right]$$

This formula is the central asset pricing formula. Given the payoff x_{t+1} and given the investor's consumption choice, it tells what market price for the asset to expect. Its

[8] Galy Sebastian: CAPM: Living dead and loving it, July 2001. Concordia University.

[9] Bishop, Thomas: An empirical test of the consumption capital asset pricing model with labor choice, August 2001. University of Michigan.

[10] Cochrane John: Asset Pricing, 2001. Princeton University.

economic content is simply the first-order conditions for optimal consumption and portfolio formation.

The marginal utility loss of consuming a little less today and buying a little more of the asset should equal the marginal utility gain of consuming a little more of the asset 's payoff in the future. If the price and payoff do not satisfy this relation, the investor should buy more or less of the asset. It follows that the asset's price should equal the expected discounted value of the asset's payoff, using the investor's marginal utility to discount the payoff.

The consumption CAPM uses marginal utility of consumption to measure the effect of risk on the returns of assets rather than relying on an indirect measure of risk, like the covariance of stock returns with the market index return. According to the C-CAPM, investors are willing to pay to hedge against a future decline in consumption. Stocks more correlated with consumption are "riskier", because they require a higher return in order to make an investor want to hold them.

A simplified beta version formula for the CCAPM given power utility for the preferences of the consumer is

$$E(R_{i,t+1}) = R_{f,t} + b_{i,\Delta C} \cdot g \cdot \mathrm{var}(\Delta C_{t+1})$$

The formula states that returns are positively related to their covariance with consumption growth and the price of risk is positively related to the degree of relative risk aversion, γ , and volatility of consumption.

Empirical tests of the C-CAPM have led to rejection of the model as well as unrealistic parameter estimates resulting in the establishment of the so-called "equity premium puzzle" (Hansen and Singleton (1983), Mehra and Prescott (1985), Kocherlakota (1996)).

The model is outperformed by the static CAPM (Mankiw and Shapiro (1986)) and unrestricted multifactor models[11]. They regressed the average returns of the 464 stocks that were continuously traded from 1959 to 1982 on their market betas, on consumption growth betas and on both. They found that market betas are more strongly and more robustly associated with the cross-section of average returns and they find that market betas drive out consumption betas in multiple regressions.

Breeden, Gibbons and Litzenberger (1989) study industry and bond portfolios, finding roughly comparable performance of the CAPM and a model that uses mimicking portfolio for consumption growth as a single factor, after adjusting the consumption-based model for measurement problems in consumption. Cochrane (1996) finds that the traditional CAPM substantially outperforms the canonical consumption-based model in pricing size portfolios.

Research involving the C-CAPM continues, despite the lack of empirical support for the model. This is in part because the C-CAPM contains asset-pricing models such as the CAPM and APT as special cases, as pointed out by Cochrane (2001).

Because of its poor empirical performance, some authors have modified the consumption CAPM to make it in the hope of making the revised model perform better empirically. Campbell and Cochrane (1995) introduce a habit in consumption, where optimal consumption depends on aggregate consumption, to modify the optimal choices of consumption over time. Barberis Huang and Santos (2001) introduce prospect theory into the intertemporal optimization problem by modeling utility to be dependent upon the volatility of the representative investor’s portfolio. Eichenbaum Hansen and Singleton (1988) introduce labor choice into the agent’s intertemporal optimization problem and test the empirical performance of the model in explaining interest rates over time.

The cause of the poor empirical performance of the C-CAPM may be inherent in the consumption data used to test the model. Firstly, aggregate consumption data are

[11] Campbell and Cochrane: Explaining the poor performance of consumption-based asset pricing models, July 1999. NBER

measured with error and are time-aggregated (Grossman (1987), Wheatley (1988), and Breeden et al. (1989)).

Consumption data is less frequent than financial data. It is published with a delay and measured with a non-negligible error. In addition, part of the consumption is durable and difficult to distinguish with an investment. Moreover, the consumption of asset-market participants may be poorly proxied by aggregate consumption (Mankiw and Zeldes (1991)).

3. Empirical Study

3.1 Hypothesis-Objective

The purpose of this study is to identify the prices of beta risk associated with world market and world consumption in average excess returns for a set of OECD national stock index portfolios. The competing models tested in this study are (a) the international static CAPM, (b) the international C-CAPM, and finally (c) an international discrete version of Merton’s (1973) I-CAPM recently developed by Campbell (1996).

If we think of the world as a closed economy without exchange rate risk, a representative world investor-consumer has the ability to invest in the assets of the various countries. The stock-market indices of the countries can be considered as representative stock-market portfolios of those countries. The hypothesis I am going to test is that the higher the beta coefficients of the countries are, the higher the risk premium they command. I am going to test this hypothesis in the context of the ICAPM and the CCAPM model respectively. Moreover, I am testing the hypothesis with the use of aggregate world consumption growth for S=1 to S=7 quarters ahead.

Additionally, I try to implement the same methodology within an international discrete version of Merton’s (1973) intertemporal model including both consumption growth and world market portfolio returns.

3.2 Methodology and Cross-Sectional Regressions Presentation

According to the international static CAPM the world market beta (or world total wealth beta) is a sufficient measure of aggregate risk and differences in market betas must be able to capture all the cross-sectional differences in average excess returns. The model takes the following form:

(1) $$E(R_i) - R_f = g_W b_{iW}$$

where, R_f is the risk free rate of return, $g_W = E(R_W) - R_f$ is the global risk premium and $b_{iW} = Cov(R_{i,} R_W)/Var(R_W)$ is the beta coefficient of asset *i*. Equation (1) states that the risk premium on any asset *i* is determined by the quantity of risk of the asset (b_{iW}) times the price of beta risk (g_W) which represents the reward investors require in order to hold the asset in equilibrium. Since the price of market beta risk is common across assets any variation in average return must come from differences in world market betas.

On the other hand, the C-CAPM predicts that the main source of risk is the covariance of asset returns with real consumption. In an international setting, an asset whose covariance (and thus beta) with the world consumption growth is large and positive tends to have high returns when consumption is high, that is, when marginal utility is low. In equilibrium, such an asset must have a high excess return for the investor to be compensated for its tendency to do poorly in states of the world where wealth is particularly valuable to investors. The model takes the form:

(2) $$E(R_i) - R_f = g_C b_{iC,s}; \qquad \forall s = 0,...,7$$

where now $b_{iC,s} = Cov(R_i, \Delta c_{t+1+s})/Var(\Delta c_{t+1+s})$ is the consumption beta and g_C is the price of consumption beta risk. Equation (2) introduces two measures of risk. The first measure is the contemporaneous beta (for $s=0$) usually employed in asset pricing tests that use consumption as a risk factor. In addition, we use a measure of long-run risk (as in Parker (2003)) which is defined as the sensitivity or returns on longer movements in consumption up to two years ($s=1,...7$). This specification enables us to test whether long-run consumption risk can improve the ability of the standard C-CAPM to capture the cross-sectional variation in excess returns across countries.

Finally, the two-factor international I-CAPM places both world market and consumption as risk factors:

(3) $$E(R_i)-R_f = g_W b_{iW} + g_C b_{iC,s}; \qquad \forall s = 0,...,7$$

which again is tested using contemporaneous ($s=0$) and long-run ($s=1,...7$) consumption risk.

In order to estimate the prices of beta risk we use two-step procedure. First, unconditional market and consumption betas, b_{iW} and $b_{iC,s}$, are estimated using a set of linear regressions of real returns on factors (real world market portfolio return and real consumption growth). Second, the beta risk premia are estimated running a cross-sectional regression of average excess returns on a constant and the estimated betas.

In the first step, market and consumption betas are estimated by running the following set of OLS regressions for each asset *i*:

(4) $$r_{i,t+1} = b_{i0} + b_{iW} r_{W,t+1} + e_{i,t+1}; \qquad \forall i = 1,..., N,$$

and:

(5) $$r_{i,t+1} = b_{i0} + b_{iC} \Delta c_{t+1+s} + e_{i,t+1}; \qquad \forall i = 1,..., N, \quad \forall s = 0,...,7,$$

where in all regressions $r_{i,t+1}$ denotes the continuously compounded real return on asset *i* defined as $r_{i,t+1} = \ln(P_{i,t+1} + D_{i,t+1}) - \ln(P_{i,t})$, with $P_{i,t+1}$ and $D_{i,t+1}$ being the real price and real dividend respectively at the end of period *t*+1. Also, Δc_{t+1+s} is the *s*-period continuously compounded growth in real consumption defined as the log difference between current real consumption and real consumption *s* periods ahead, $\Delta c_{t+1+s} = \ln(C_{t+1+s} / C_t)$.

In the second step, we ask whether these measures of global systematic risk can describe the spread in average country returns by running a single cross-sectional OLS regression of average simple excess real returns ($\overline{R}_i^e = \overline{R}_i - \overline{R}_f$) on the estimated market and consumption betas, $\hat{b}_{iW}$ and $\hat{b}_{iC,s}$. The cross-sectional regressions for our international versions of the CAPM, the C-CAPM and the I-CAPM take the following form respectively:

(6) $\overline{R}_i^e = g_0 + g_W \hat{b}_{iW} + u$, (CAPM),

(7) $\overline{R}_i^e = g_0 + g_C \hat{b}_{iC,s} + u$; $\forall s = 0,...,7$, (C-CAPM), and,

(8) $\overline{R}_i^e = g_0 + g_W \hat{b}_{iW} + g_C \hat{b}_{iC,s} + u$; $\forall s = 0,...,7$, (I-CAPM)

If the models in (6) to (8) are correctly specified the pricing error g_0 (the difference between average returns and the model prediction) must be equal to zero and the prices of world total wealth and consumption risk, g_W and g_C, must strictly positive as the theory predicts.

3.3 Dataset Description

The dataset comprises of Morgan Stanley Capital International (MSCI) quarterly returns (dividends reinvestment included) denominated in US currency for 23 members of the OECD group and the MSCI World Market Portfolio which serves as the world market (total wealth) portfolio. Our sample covers the period 1970 to 2003 for the 16 of the 23 countries and the period from 1988 to 2003 for the rest of them.[12] Moreover, we use OECD Private Consumption (in current prices and in US dollars), US CPI and the returns of 3-Month US Treasury Bills.

We calculate quarterly continuously compounded nominal returns of the national MSCI Indices as:

$$z_{i,t+1} = \ln\left(MSI_{i,t+1} / MSI_{i,t}\right),$$

and then we calculate the quarterly real returns of each asset, subtracting the log difference of the US quarter over quarter CPI:

$$r_{i,t+1} = z_{i,t+1} - \ln\left(CPI_{t+1} / CPI_t\right)$$

The same procedure is followed to obtain the US real risk free rate from 1970: Q2 to 2002: Q1.

Since consumption data are in current prices, I use the US CPI to deflate nominal consumption data and obtain the real continuously compounded consumption growth. Equivalently, I present my calculations for aggregate real consumption growth for longer periods, from $s=1$ to $s=7$, that is 8 quarters ahead:

$$\Delta c_{t+1+s} = \ln\left(\left(\mathrm{Nom\,Con}\right)_{t+1+s} / \left(\mathrm{Nom\,Con}\right)_t\right) - \ln\left(CPI_{t+1+s} / CPI_t\right)$$

I will be using two samples of data:

[12] MSCI international doesn't provide any or sufficient MSCI Index data for Slovak Republic, Greece and Hungary.

Sample A includes MSCI data for 23 countries from Q2:1988 through Q1:2002. Those countries are Australia, Austria, Belgium, Canada, France, Germany, Italy, Japan, Netherlands, Norway, Spain, Sweden, Switzerland, and USA.

Sample B includes MSCI data for an extended number of observations including the first panel and data for the first 16 countries of the 23 for the sample period Q2:1970 through Q1:1988. Panel B comprises of 39 observations.

Sample C comprises of 21 observations (out of the 39 observations) with the lowest stock market volatility. The lowest stock market volatility observations are presented in Table 10. I have divided the extended sample of 39 observations into two subgroups: one with 21 observations with the lowest stock market volatility and one with the rest 18 with the highest stock market volatility.

Then, I calculate the beta coefficients of the real returns of the assets of the countries with the benchmark world market portfolio real returns. Next, I obtain the beta coefficients of the real returns of the assets of the countries with the real consumption growth (from S=0-7 quarters ahead). The beta coefficients of the assets of the countries with world consumption growth (contemporaneous) and aggregate consumption growth represent consumption risk. (Parker 2004)[13] has presented this idea in a working paper and I am going to test whether this improves my results.

The results of the beta co-efficient calculations are presented in Table 1 and Table 2 respectively. Then I present my calculations for the mean real excess returns for every country for the two periods respectively.

[13] Parker, Jonathan and Christian Julliard: Consumption Risk and Expected Stock Returns, March 2004. Princeton University and NBER

3.4 Empirical Findings and Further Discussion

The empirical findings for each sample and each equation tested are presented in section 5 of the tables:

Table 4 presents the evidence for the period 1988-2002.

Table 4a shows that the International CAPM performs better than the consumption based international asset pricing model. The top row of table 4a contains estimates of the International CAPM. Observe that the sign of $\hat{g}_w$ is positive and statistically significant, implying a positive relationship between betas and excess mean returns: Higher (lower) betas with the world portfolio command a higher (lower) risk-premium. About 11% of the cross-sectional variation in country excess returns is explained by those betas, as evidenced by the adjusted R^2. Note also that the intercept $\hat{g}_o$ is not statistically different from zero, suggesting no apparent misspecification.

The second regression in table 4a provides a test of the Consumption CAPM. Here the country average excess returns are regressed on their contemporaneous consumption betas. The model fails to explain any of the cross-country variation in these excess returns. The slope coefficient $\hat{g}_c$ is insignificantly different from zero, while the adjusted R^2 is negative.

The third regression in Table 4a can be viewed as a test of the intertemporal CAPM, a two-factor model that claims that both the world market beta and the consumption beta ought to be rewarded with a positive risk premium. Alternatively, the regression can be viewed as a contest between the world market beta and the consumption beta. Given the results of the earlier single variable regressions, it is no surprise that the consumption beta has no marginal explanatory power.

Table 4b presents a test of the Consumption CAPM, as suggested by Parker [2004]. Here the consumption betas are generated from regressions of this quarter's excess country stock returns on subsequent multi-period growths in consumption (see Table1 and Table 2). The results are disappointing. The slope coefficient $\hat{g}_c$ is insignificant in all the horizons S, and often takes a negative value. The CCAPM with long-term consumption risk cannot explain any of cross-country variation in mean excess returns.

Table 4c adds the world portfolio betas to the betas of CCAPM in the cross-sectional regressions. In this two-factor model, the betas with the world portfolio continue to command a risk premium. The coefficient $\hat{g}_w$ continues to be positive and statistically significant. On the other hand, $\hat{g}_c$ is statistically insignificant and negative for most of the horizons.

Table 5 presents the evidence for the extended sample, which includes the countries for the period 1988-2002 and the rest of the countries for the period 1970-1988. The picture is not much different.

Table 5a reports estimates of the International CAPM for the extended sample. International CAPM outperforms the consumption based international asset pricing model. $\hat{g}_w$ is still positive and statistically significant, implying a positive relationship between betas and excess mean returns, though if we take a closer look we observe in this case a smaller than the previous sample adjusted R^2

Consumption CAPM still fails to explain the cross-sectional variation of excess returns of the extended sample. The slope coefficient $\hat{g}_c$ is insignificantly different from zero, while the adjusted R^2 is still negative, although it is much smaller than the regular sample.

The CCAPM with long-term consumption risk for the extended sample as presented in **table 5b** cannot explain any of cross-country variation in mean excess returns. The slope coefficient $\hat{g}_c$ is insignificant in all the horizons S, and often takes a negative value, which contradicts the theory.

Concerning the two factors model results for the extended sample, as presented in the table 5c, the coefficient $\hat{g}_w$ continues to be positive for most of the cases statistically significant. On the other hand, $\hat{g}_c$ is statistically insignificant and negative for most of the quarters ahead. It is notable though that the adjusted R^2 increases as the horizon increases and takes the maximum value for S=5 in the two factors model.

In the low volatility sub sample, <u>we notice a completely different picture</u>. **Table 6** presents the evidence for the low stock market volatility observations of the extended sample, which includes the countries for the period 1988-2002 and the rest of the countries for the period 1970-1988.

The International CAPM does not explain mean excess cross-sectional returns at all. $\hat{g}_w$ is still positive but this time is statistically insignificant, whereas the adjusted R^2 is negative. The contemporaneous Consumption CAPM still fails to explain the cross-sectional variation of excess returns of the extended low volatility countries sub sample. The slope coefficient $\hat{g}_c$ is insignificantly different from zero, while the adjusted R^2 is still negative, although it is much smaller than that of the International CAPM.

The CCAPM with long-term consumption risk for the extended low volatility sample as presented in **table 6b** can explain some of cross-country variation in mean excess returns for horizons S, extending from S=4 to S=7. The slope coefficient $\hat{g}_c$ is significant for those horizons S, and takes a positive value, which is consistent with the theory. The adjusted R^2 is positive and takes the maximum value for S=5, which is approximately 26%. We have to point out though that the intercept $\hat{g}_o$ is statistically different from zero for all horizons from S=0 through S=7.

4. Conclusion

I conclude that CCAPM does not explain international mean excess cross-sectional returns. Moreover, CCAPM with long-term consumption risk cannot explain much better mean excess cross-sectional returns than with contemporaneous. Additionally, the International CAPM outperforms the CCAPM in explaining mean excess cross-sectional returns. In the low-volatility countries sub-sample, CCAPM with long-term consumption growth seems to explain cross-sectional returns better than with the contemporaneous, and outperforms the International CAPM.

5. Tables

Table 1: Beta Coefficients of the countries for the period Q2:1970-Q1:1988

Country	Biw	Bis	Bis	Bis	Bis	Bis	Bis	Bis	Bis
70-88	r1	rcons0	rcons1	rcons2	rcons3	rcons4	rcons5	rcons6	rcons7
Australia	1.145	3.971	2.119	0.536	0.311	-0.200	-0.247	-0.399	-0.470
	[0.000]	[0.139]	[0.163]	[0.560]	[0.654]	[0.696]	[0.520]	[0.224]	[0.118]
Austria	0.466	4.375	1.602	0.797	0.849	0.638	0.363	0.131	0.120
	[0.000]	[0.003]	[0.097]	[0.234]	[0.143]	[0.191]	[0.357]	[0.684]	[0.642]
Belgium	0.914	6.694	3.237	1.983	1.722	1.084	0.731	0.576	0.468
	[0.000]	[0.001]	[0.003]	[0.033]	[0.027]	[0.082]	[0.144]	[0.177]	[0.155]
Canada	0.913	4.045	1.926	0.837	0.454	-0.007	0.005	-0.033	-0.104
	[0.000]	[0.052]	[0.092]	[0.274]	[0.470]	[0.987]	[0.989]	[0.916]	[0.713]
Denmark	0.562	6.083	2.957	1.677	1.065	0.545	0.371	0.181	0.074
	[0.000]	[0.000]	[0.002]	[0.025]	[0.075]	[0.288]	[0.427]	[0.678]	[0.861]
France	1.024	6.284	3.096	1.523	1.053	0.779	0.284	0.014	-0.047
	[0.000]	[0.018]	[0.053]	[0.196]	[0.265]	[0.286]	[0.563]	[0.975]	[0.903]
Germany	0.822	5.335	2.446	1.847	1.610	1.085	0.762	0.556	0.436
	[0.000]	[0.000]	[0.004]	[0.005]	[0.004]	[0.011]	[0.047]	[0.153]	[0.205]
Italy	0.939	4.030	0.709	-0.600	-0.583	-0.710	-0.911	-1.014	-0.804
	[0.000]	[0.019]	[0.580]	[0.483]	[0.388]	[0.188]	[0.059]	[0.015]	[0.025]
Japan	0.996	6.881	3.375	2.122	1.709	0.980	0.647	0.453	0.223
	[0.000]	[0.000]	[0.031]	[0.002]	[0.002]	[0.045]	[0.148]	[0.281]	[0.594]
Netherlands	0.986	5.238	2.160	1.412	1.276	0.643	0.431	0.302	0.230
	[0.000]	[0.004]	[0.031]	[0.050]	[0.056]	[0.170]	[0.220]	[0.329]	[0.382]
Norway	0.881	2.351	0.349	-0.574	-0.969	-0.808	-0.516	-0.564	-0.495
	[0.000]	[0.494]	[0.864]	[0.707]	[0.453]	[0.422]	[0.548]	[0.461]	[0.461]
Spain	0.653	2.031	1.124	0.726	0.514	0.009	0.115	-0.009	0.069
	[0.001]	[0.364]	[0.306]	[0.379]	[0.372]	[0.986]	[0.777]	[0.981]	[0.840]
Sweden	0.815	2.955	1.235	0.664	0.924	0.475	0.294	0.251	0.293
	[0.000]	[0.065]	[0.224]	[0.329]	[0.049]	[0.236]	[0.412]	[0.430]	[0.345]
Swiss	0.974	7.470	3.208	1.822	1.558	1.004	0.694	0.490	0.333
	[0.000]	[0.000]	[0.001]	[0.013]	[0.011]	[0.029]	[0.071]	[0.186]	[0.284]
UK	1.088	4.948	2.489	1.862	1.715	0.865	0.595	0.555	0.335
	[0.000]	[0.025]	[0.042]	[0.037]	[0.030]	[0.157]	[0.187]	[0.206]	[0.342]
USA	0.999	4.879	2.412	1.510	1.172	0.662	0.602	0.532	0.440
	[0.000]	[0.001]	[0.002]	[0.009]	[0.013]	[0.033]	[0.016]	[0.034]	[0.054]

Table 2: Betas of the countries for the period Q2:1988- Q1:2002

Country	Biw r1	Bis rcons0	Bis rcons1	Bis rcons2	Bis rcons3	Bis rcons4	Bis rcons5	Bis rcons6	Bis rcons7
Australia	0.625	0.939	1.120	1.953	1.711	0.112	0.107	0.421	0.232
	[0.000]	[0.755]	[0.465]	[0.202]	[0.149]	[0.912]	[0.907]	[0.603]	[0.756]
Austria	0.392	8.758	4.014	1.028	-0.073	-0.835	-1.757	-1.356	-1.096
	[0.124]	[0.093]	[0.151]	[0.640]	[0.975]	[0.727]	[0.407]	[0.471]	[0.530]
Belgium	0.640	9.285	4.684	2.953	3.663	2.306	2.123	2.409	2.145
	[0.000]	[0.001]	[0.029]	[0.043]	[0.017]	[0.058]	[0.044]	[0.010]	[0.018]
Canada	0.878	4.182	2.231	2.799	2.258	0.895	0.700	1.125	1.147
	[0.000]	[0.199]	[0.279]	[0.035]	[0.053]	[0.501]	[0.596]	[0.265]	[0.148]
Denmark	0.275	8.055	5.099	3.290	2.348	1.803	1.090	0.970	0.877
	[0.000]	[0.013]	[0.003]	[0.038]	[0.145]	[0.161]	[0.345]	[0.343]	[0.326]
France	0.554	5.967	3.332	2.379	1.953	0.760	0.318	1.094	1.183
	[0.000]	[0.150]	[0.092]	[0.065]	[0.123]	[0.537]]	[0.734]	[0.209]	[0.172]
Germany	0.878	6.869	4.797	2.295	1.644	0.411	-0.101	0.830	0.436
	[0.000]	[0.197]	[0.053]	[0.191]	[0.370]	[0.808]	[0.941]	[0.489]	[0.205]
Italy	0.870	7.612	4.380	3.712	3.535	2.266	1.731	2.115	1.995
	[0.000]	[0.067]	[0.078]	[0.092]	[0.039]	[0.149]	[0.182]	[0.070]	[0.098]
Japan	1.330	6.343	4.835	4.253	3.472	1.913	1.379	1.097	-0.183
	[0.000]	[0.147]	[0.052]	[0.223]	[0.175]	[0.363]	[0.416]	[0.487]	[0.884]
Netherlands	0.789	3.164	2.162	1.264	1.581	0.735	0.590	0.996	1.015
	[0.000]	[0.307]	[0.189]	[0.319]	[0.112]	[0.463]	[0.513]	[0.187]	[0.150]
Norway	0.490	-1.303	-0.573	0.120	0.170	-0.494	-0.747	-0.937	-0.965
	[0.040]	[0.756]	[0.819]	[0.949]	[0.920]	[0.755]	[0.643]	[0.530]	[0.506]
Spain	1.196	6.586	3.286	5.025	5.093	3.404	2.366	3.474	3.220
	[0.000]	[0.128]	[0.228]	[0.013]	[0.000]	[0.011]	[0.040]	[0.000]	[0.000]
Sweden	1.427	6.211	3.661	3.187	3.120	0.971	0.576	1.349	1.399
	[0.000]	[0.294]	[0.224]	[0.110]	[0.047]	[0.524]	[0.677]	[0.236]	[0.185]
Swiss	0.793	6.537	2.205	0.904	2.090	0.966	0.314	0.887	1.030
	[0.000]	[0.032]	[0.279]	[0.615]	[0.085]	[0.391]	[0.768]	[0.344]	[0.245]
UK	0.740	2.868	1.727	1.158	2.239	1.751	0.955	1.200	1.282
	[0.000]	[0.269]	[0.319]	[0.334]	[0.031]	[0.084]	[0.271]	[0.105]	[0.086]
USA	0.816	4.712	3.048	2.925	3.018	2.172	1.486	1.846	1.838
	[0.000]	[0.171]	[0.082]	[0.005]	[0.000]	[0.010]	[0.058]	[0.011]	[0.004]
Finland	1.553	7.600	5.153	4.786	5.165	3.417	2.942	3.028	3.248
	[0.000]	[0.326]	[0.211]	[0.143]	[0.030]	[0.159]	[0.149]	[0.088]	[0.041]
Ireland	0.879	4.440	3.441	2.895	3.003	1.842	1.170	1.735	1.732
	[0.000]	[0.380]	[0.184]	[0.093]	[0.090]	[0.251]	[0.296]	[0.099]	[0.093]
Portugal	0.851	5.805	1.787	2.892	3.081	1.028	0.828	1.879	2.139
	[0.000]	[0.089]	[0.560]	[0.236]	[0.107]	[0.638]	[0.670]	[0.241]	[0.153]
Turkey	1.628	2.982	0.970	-1.175	1.654	-3.837	-5.044	-3.120	-2.171
	[0.041]	[0.805]	[0.879]	[0.815]	[0.759]	[0.507]	[0.371]	[0.513]	[0.595]
Mexico	0.765	8.126	2.992	3.919	3.444	-0.145	-1.261	-0.922	-0.910
	[0.018]	[0.401]	[0.578]	[0.340]	[0.243]	[0.952]	[0.650]	[0.684]	[0.606]
Korea	1.599	0.342	3.176	3.160	1.109	1.668	-0.835	-1.987	-2.716
	[0.000]	[0.972]	[0.613]	[0.613]	[0.833]	[0.694]	[0.823]	[0.513]	[0.347]
New Zealand	0.717	-0.149	-1.595	1.059	1.626	-0.583	-1.112	-0.581	-0.543
	[0.000]	[0.971]	[0.510]	[0.650]	[0.412]	[0.727]	[0.479]	[0.693]	[0.670]

Table 3: Excess Real Return Calculations

Country	Mean (ri)	Mean (real rf)	st dev (ri)	var(ri)	0,5 var(ri)	Excess Real Return
	Q2:70-Q1:88					ri-rf+0.5var(i)
	w ,s=0-7					
Australia	0.002	0.003	0.151	0.023	0.011	**0.0104**
Austria	0.014	0.003	0.105	0.011	0.005	**0.0166**
Belgium	0.020	0.003	0.115	0.013	0.007	**0.0236**
Canada	0.009	0.003	0.103	0.011	0.005	**0.0110**
Denmark	0.016	0.003	0.105	0.011	0.006	**0.0178**
France	0.012	0.003	0.145	0.021	0.011	**0.0189**
Germany	0.011	0.003	0.112	0.013	0.006	**0.0144**
Italy	0.001	0.003	0.157	0.025	0.012	**0.0102**
Japan	0.037	0.003	0.119	0.014	0.007	**0.0411**
Netherlands	0.020	0.003	0.107	0.011	0.006	**0.0223**
Norway	0.015	0.003	0.174	0.030	0.015	**0.0264**
Spain	0.007	0.003	0.134	0.018	0.009	**0.0128**
Sweden	0.020	0.003	0.113	0.013	0.006	**0.0232**
Switzerland	0.013	0.003	0.115	0.013	0.007	**0.0162**
UK	0.017	0.003	0.137	0.019	0.009	**0.0225**
USA	0.007	0.003	0.096	0.009	0.005	**0.0082**

Country	Mean (ri)	Mean (real rf)	st dev (ri)	var(ri)	0,5 var(ri)	Excess Real Return
	Q2:88-Q1:02					ri-rf+0.5var(i)
	w ,s=0-7					
Australia	0.013	0.005	0.083	0.007	0.003	**0.0118**
Austria	0.002	0.005	0.113	0.013	0.006	**0.0028**
Belgium	0.020	0.005	0.091	0.008	0.004	**0.0191**
Canada	0.013	0.005	0.093	0.009	0.004	**0.0123**
Denmark	0.023	0.005	0.085	0.007	0.004	**0.0217**
France	0.021	0.005	0.095	0.009	0.005	**0.0207**
Germany	0.017	0.005	0.105	0.011	0.005	**0.0173**
Italy	0.007	0.005	0.112	0.012	0.006	**0.0077**
Japan	-0.015	0.005	0.133	0.018	0.009	**-0.0114**
Netherlands	0.025	0.005	0.078	0.006	0.003	**0.0227**
Norway	0.012	0.005	0.106	0.011	0.006	**0.0124**
Spain	0.015	0.005	0.118	0.014	0.007	**0.0170**
Sweden	0.026	0.005	0.140	0.020	0.010	**0.0304**
Switzerland	0.023	0.005	0.091	0.008	0.004	**0.0225**
UK	0.016	0.005	0.076	0.006	0.003	**0.0136**
USA	0.026	0.005	0.073	0.005	0.003	**0.0238**
Finland	0.028	0.005	0.200	0.040	0.020	**0.0427**
Ireland	0.017	0.005	0.100	0.010	0.005	**0.0169**
Portugal	-0.001	0.005	0.120	0.014	0.007	**0.0009**
Turkey	0.013	0.005	0.346	0.120	0.060	**0.0679**
Mexico	0.047	0.005	0.190	0.036	0.018	**0.0604**
Korea	-0.002	0.005	0.257	0.066	0.033	**0.0263**
New Zealand	-0.005	0.005	0.110	0.012	0.006	**-0.0035**

Table 4: Sample 1988-2002

The sample contains 23 cross sectional observations, representing the 23 countries listed in Table 2: Australia, Austria, Belgium, Canada, France, Germany, Italy, Japan, Netherlands, Norway, Spain, Sweden, Switzerland, and US. Cross-sectional regressions are performed in the following forms:

$$\overline{R}_i^e = g_0 + g_W \hat{b}_{iW} + u$$ **(ICAPM)**

$$\overline{R}_i^e = g_0 + g_C \hat{b}_{iC,s} + u \quad \forall s = 0,...,7$$ **(C-CAPM)**

$$\overline{R}_i^e = g_0 + g_W \hat{b}_{iW} + g_C \hat{b}_{iC,s} + u \quad \forall s = 0,...,7$$ **(Intertemporal CAPM)**

The dependent variable is mean excess returns of the MSCI indices of the countries, defined in percentage form. The independent variables are betas, constructed from earlier time series regressions over the quarterly sample 1988:II - 2002:I (see Table 2). Adj-R^2 is the adjusted coefficient of determination. Numbers in brackets are significance levels. $X^2(2)$ is a chi-squared test statistic (with two degrees of freedom) of the null hypothesis that $\hat{g}_w = \hat{g}_c = 0$. Av asterisk next to $\hat{g}_w$ or $\hat{g}_c$ denotes statistical significance at the 5% level in a one-tailed test (against the alternative hypothesis that γ > 0).

Table 4a

Model	$\hat{g}_o$	$\hat{g}_w$	$\hat{g}_c$	Adj-R^2	$\chi^2(2)$
ICAPM	**0.323** [0.666]	**1.843** [0.080]*		***10.95***	
C-CAPM	**1.644** [0.007]***		**0.067** [0.501]	***-3.48***	
Intertemporal CAPM	**-0.169** [0.876]	**1.901** [0.101]	**0.087** [0.456]	***8.77***	**2.977** [0.226]

Table 4b

Model	$\hat{g}_o$	$\hat{g}_w$	$\hat{g}_c$	Adj-R^2	$\chi^2(2)$
C-CAPM					
S=1	**1.791** [0.043]**		**0.066** [0.786]	***-4.32***	
S=2	**2.269** [0.043]**		**-0.116** [0.747]	***-3.77***	
s=3	**1.432** [0.047]**		**0.222** [0.354]	***-2.07***	
s=4	**2.320** [0.002]***		**-0.346** [0.411]	***4.53***	
s=5	**2.124** [0.000]***		**-0.418** [0.275]	***10.82***	
s=6	**2.242** [0.001]***		**-0.340** [0.400]	***4.69***	
s=7	**2.127** [0.002]***		**-0.204** [0.608]	***-1.49***	

Table 4c

Model	$\hat{g}_o$	$\hat{g}_w$	$\hat{g}_c$	Adj-R^2	$\chi^2(2)$
Intertemporal CAPM					
s=1	**0.299**	**1.836**	**0.010**	***6.51***	3.220
	[0.739]	[0.096]*	[0.965]		[0.200]
s=2	**0.712**	**2.062**	**-0.237**	***10.57***	4.744
	[0.379]	[0.042]**	[0.386]		[0.093]
s=3	**0.303**	**1.822**	**0.016**	***6.51***	3.319
	[0.689]	[0.128]	[0.954]		[0.190]
s=4	**0.601**	**1.945**	**-0.377**	***18.05***	7.066
	[0.471]	[0.037]*	[0.188]		[0.029]
s=5	**0.570**	**1.716**	**-0.389**	***20.58***	8.754
	[0.505]	[0.077]*	[0.176]		[0.013]
s=6	**0.628**	**1.776**	**-0.319**	***15.21***	4.743
	[0.457]	[0.072]*	[0.289]		[0.093]
s=7	**0.493**	**1.791**	**-0.172**	***8.93***	3.505
	[0.514]	[0.077]*	[0.569]		[0.173]

Table 5: Extended Sample 1988-2002 & 1970&1988

The sample contains 39 cross sectional observations, representing the 23 countries listed in Table 2, and the 16 countries listed in Table 1. Cross-sectional regressions are performed in the following forms:

$$\overline{R}_i^e = g_0 + g_W \hat{b}_{iW} + u \quad \textbf{(ICAPM)}$$

$$\overline{R}_i^e = g_0 + g_C \hat{b}_{iC,s} + u \quad \forall s = 0,...,7 \quad \textbf{(C-CAPM)}$$

$$\overline{R}_i^e = g_0 + g_W \hat{b}_{iW} + g_C \hat{b}_{iC,s} + u \quad \forall s = 0,...,7 \quad \textbf{(Intertemporal CAPM)}$$

The dependent variable is mean excess returns of the MSCI indices of the countries, defined in percentage form. The independent variables are betas, constructed from earlier time series regressions over the quarterly sample 1988:II - 2002:I for the 23 countries (see Table 2) and over the quarterly sample 1970:I-1988:I for the 16 countries (see Table 1). Adj-R^2 is the adjusted coefficient of determination. Numbers in brackets are significance levels. $X^2(2)$ is a chi-squared test statistic (with two degrees of freedom) of the null hypothesis that $\hat{g}_w = \hat{g}_c = 0$. Av asterisk next to $\hat{g}_w$ or $\hat{g}_c$ denotes statistical significance at the 5% level in a one-tailed test (against the alternative hypothesis that γ > 0).

Table 5a

Model	$\hat{g}_o$	$\hat{g}_w$	$\hat{g}_c$	Adj-R^2	$\chi^2(2)$
CAPM	**0.457**	**1.643**		***9.77***	
	[0.520]	[0.090]*			
C-CAPM	**1.753**		**0.051**	***-1.50***	
	[0.000]***		[0.529]		
Intertemporal CAPM	**0.253**	**1.660**	**0.057**	***8.74***	2.99
	[0.781]	[0.099]*	[0.530]	[0.224]	[0.781]

Table 5b

	$\hat{g}_o$	$\hat{g}_w$	$\hat{g}_c$	Adj-R^2	$\chi^2(2)$
C-CAPM					
s=1	**1.674**		**0.010**	***-1.67***	
	[0.001]***		[0.575]		
s=2	**1.953**		**-0.014**	***-2.68***	
	[0.000]***		[0.946]		
s=3	**1.586**		**0.019**	***0.35***	
	[0.000]***		[0.253]		
s=4	**2.120**		**-0.252**	***2.21***	
	[0.000]***		[0.459]		
s=5	**2.040**		**-0.369**	***8.26***	
	[0.000]***		[0.286]		
s=6	**2.060**		**-0.265**	***2.82***	
	[0.000]***		[0.431]		
s=7	**1.990**		**-0.153**	***-0.96***	
	[0.000]***		[0.636]		

Table 5c

Model	$\hat{g}_o$	$\hat{g}_w$	$\hat{g}_c$	Adj-R^2	$\chi^2(2)$
Intertemporal CAPM					
s=1	**0.371**	**1.610**	**0.045**	***7.49***	2.899
	[0.646]	[0.104]	[0.795]		[0.235]
s=2	**0.555**	**1.724**	**-0.088**	***8.01***	3.268
	[0.430]	[0.079]*	[0.655]		[0.195]
s=3	**0.397**	**1.536**	**0.085**	***7.86***	2.879
	[0.602]	[0.109]	[0.612]		[0.237]
s=4	**0.605**	**1.714**	**-0.278**	***13.37***	4.298
	[0.360]	[0.054]*	[0.006]***		[0.117]
s=5	**0.653**	**1.542**	**-0.342**	***16.96***	6.142
	[0.341]	[0.069]*	[0.205]		[0.046]
s=6	**0.620**	**1.603**	**-0.250**	***12.30***	3.823
	[0.364]	[0.075]*	[0.332]		[0.148]
s=7	**0.543**	**1.610**	**-0.126**	***8.48***	3.190
	[0.415]	[0.085]*	[0.604]		[0.203]

Table 6: Extended Sample 1988-2002 & 1970&1988 (Low Volatility)

The sample contains 21 cross sectional observations, out of the 39 observations (representing the 23 countries listed in Table 2, and the 16 countries listed in Table 1) with the lowest total stock market volatility. Cross-sectional regressions are performed in the following forms:

$$\overline{R}_i^e = g_0 + g_W \hat{b}_{iW} + u \quad \textbf{(ICAPM)}$$

$$\overline{R}_i^e = g_0 + g_C \hat{b}_{iC,s} + u \quad \forall s = 0,...,7 \quad \textbf{(C-CAPM)}$$

$$\overline{R}_i^e = g_0 + g_W \hat{b}_{iW} + g_C \hat{b}_{iC,s} + u \quad \forall s = 0,...,7 \quad \textbf{(Intertemporal CAPM)}$$

The dependent variable is mean excess returns of the MSCI indices of the countries, defined in percentage form. The independent variables are betas, constructed from earlier time series regressions over the quarterly sample 1988:II - 2002:I for the 23 countries (see Table 2) and over the quarterly sample 1970:I-1988:I for the 16 countries (see Table 1). Adj-R^2 is the adjusted coefficient of determination. Numbers in brackets are significance levels. $X^2(2)$ is a chi-squared test statistic (with two degrees of freedom) of the null hypothesis that $\hat{g}_w = \hat{g}_c = 0$. Av asterisk next to $\hat{g}_w$ or $\hat{g}_c$ denotes statistical significance at the 5% level in a one-tailed test (against the alternative hypothesis that γ > 0).

Table 6a

Model	$\hat{g}_o$	$\hat{g}_w$	$\hat{g}_c$	Adj-R^2	$\chi^2(2)$
CAPM	**1.478** [0.037]**	**0.011** [0.990]		***-5.26***	
C-CAPM	**1.317** [0.000]***		**0.046** [0.385]	***-0.40***	
ICAPM [0.781]	**1.198** [0.074]*	**0.157** [0.854]	**0.048** [0.224]	***-5.76***	1.127 [0.569]

Table 6b

	$\hat{g}_o$	$\hat{g}_w$	$\hat{g}_c$	Adj-R^2	$\chi^2(2)$
C-CAPM					
s=1	**1.038** [0.003]***		**0.175** [0.117]	***12.61***	
s=2	**1.166** [0.005]***		**0.173** [0.291]	***0.72***	
s=3	**1.106** [0.001]***		**0.214** [0.138]	***4.66***	
s=4	**1.153** [0.000]***		**0.396** [0.036]**	***22.99***	
s=5	**1.296** [0.000]***		**0.424** [0.002]***	***25.73***	
s=6	**1.228** [0.000]***		**0.375** [0.021]**	***21.65***	
s=7	**1.237** [0.000]***		**0.387** [0.024]**	***21.07***	

Table 6c

Model	$\hat{g}_o$	$\hat{g}_w$	$\hat{g}_c$	Adj-R^2	$\chi^2(2)$
ICAPM					
s=1	**0.958**	**0.108**	**0.176**	***7.86***	2.684
	[0.174]	[0.900]	[0.125]		[0.261]
s=2	**1.214**	**-0.071**	**0.175**	***-4.74***	1.154
	[0.082]*	[0.926]	[0.297]		[0.561]
s=3	**1.274**	**-0.264**	**0.227**	***-0.05***	2.717
	[0.041]**	[0.706]	[0.123]		[0.257]
s=4	**1.395**	**-0.355**	**0.411**	***19.81***	5.466
	[0.003]***	[0.522]	[0.035]**		[0.065]
s=5	**1.693**	**-0.576**	**0.460**	***24.34***	6.651
	[0.000]***	[0.299]	[0.020]**		[0.036]
s=6	**1.676**	**-0.670**	**0.423**	***20.87***	6.462
	[0.001]***	[0.327]	[0.020]**		[0.039]
s=7	**1.648**	**-0.611**	**0.430**	***19.70***	6.042
	[0.001]***	[0.001]***	[0.024]**		[0.048]

Table 7: SAMPLE 1970: II-1988:I SUMMARY STATISTICS

	World Market	Australia	Austria	Belgium	Canada	Denmark	France	Germany	Italy	Japan	Netherlands	Norway	Spain	Sweden
Mean	1.39%	0.23%	1.45%	2.03%	0.89%	1.55%	1.17%	1.14%	0.12%	3.73%	1.99%	1.45%	0.72%	2.01%
Median	2.31%	0.58%	1.47%	3.76%	2.00%	1.91%	1.39%	0.54%	-2.27%	3.91%	3.13%	-0.18%	0.12%	1.95%
Maximum	21.57%	25.55%	44.13%	28.40%	25.70%	36.94%	34.74%	30.38%	54.04%	33.82%	29.12%	42.92%	52.90%	31.07%
Minimum	-28.50%	-55.99%	-21.92%	-25.76%	-24.67%	-23.89%	-47.74%	-28.02%	-33.40%	-23.76%	-23.95%	-50.06%	-44.39%	-26.17%
Std. Dev.	8.97%	15.09%	10.46%	11.54%	10.33%	10.53%	14.53%	11.25%	15.71%	11.93%	10.67%	17.42%	13.41%	11.28%
Skewness	-0.576	-1.113	0.966	-0.227	-0.458	0.308	-0.285	0.177	0.525	-0.009	-0.172	-0.162	0.315	0.199
Kurtosis	4.230	5.389	6.002	3.078	3.593	4.122	4.030	3.026	3.659	3.142	3.001	3.641	6.430	3.004
Jarque-Bera	8.512	31.993	38.241	0.635	3.576	4.913	4.159	0.376	4.613	0.062	0.357	1.548	36.496	0.477
Probability	0.014	0.000	0.000	0.728	0.167	0.086	0.125	0.829	0.100	0.970	0.837	0.461	0.000	0.788
Sum	1.000	0.167	1.042	1.459	0.644	1.119	0.841	0.823	0.085	2.684	1.433	1.046	0.516	1.450
Sum Sq. Dev.	0.571	1.618	0.777	0.946	0.758	0.788	1.498	0.898	1.751	1.010	0.809	2.156	1.277	0.903
Observations	72	72	72	72	72	72	72	72	72	72	72	72	72	72

Table 8: SAMPLE 1970: II-1988:I SUMMARY STATISTICS

	Switzerland	UK	USA	RCONS0	RCONS1	RCONS2	RCONS3	RCONS4	RCONS5	RCONS6	RCONS7	INFL	RF	REARF
Mean	1.29%	1.65%	0.69%	0.68%	1.36%	2.05%	2.73%	3.41%	4.06%	4.71%	5.35%	1.55%	1.88%	0.33%
Median	0.90%	1.66%	1.67%	0.70%	1.44%	2.34%	3.17%	3.89%	4.59%	5.44%	6.08%	1.32%	1.75%	0.23%
Maximum	33.15%	58.52%	19.23%	2.33%	3.70%	5.10%	6.65%	8.20%	9.47%	11.02%	12.29%	3.84%	3.74%	2.37%
Minimum	-27.00%	-36.81%	-32.55%	-2.17%	-2.87%	-2.94%	-3.65%	-3.14%	-3.08%	-2.13%	-1.83%	-0.24%	0.86%	-1.14%
Std. Dev.	11.51%	13.66%	9.62%	0.76%	1.23%	1.62%	2.02%	2.41%	2.76%	3.06%	3.32%	0.89%	0.69%	0.83%
Skewness	-0.006	0.606	-0.789	-0.745	-0.671	-0.637	-0.656	-0.555	-0.521	-0.499	-0.481	0.527	0.969	0.268
Kurtosis	3.303	6.195	4.322	4.774	3.807	3.380	3.473	3.041	2.949	2.889	2.948	2.673	3.372	2.409
Jarque-Bera	0.275	35.036	12.714	16.100	7.359	5.298	5.836	3.706	3.270	3.022	2.784	3.659	11.677	1.909
Probability	0.872	0.000	0.002	0.000	0.025	0.071	0.054	0.157	0.195	0.221	0.249	0.161	0.003	0.385
Sum	0.926	1.189	0.495	0.489	0.982	1.473	1.964	2.454	2.924	3.393	3.853	1.116	1.355	0.239
Sum Sq. Dev.	0.940	1.324	0.657	0.004	0.011	0.019	0.029	0.041	0.054	0.067	0.078	0.006	0.003	0.005
Observations	72	72	72	72	72	72	72	72	72	72	72	72	72	72

Table 8a: SAMPLE 1988: II-2002: I SUMMARY STATISTICS

	World Market	Australia	Austria	Belgium	Canada	Denmark	France	Germany	Italy	Japan	Netherlands	Norway	Spain	Sweden
Mean	1.35%	1.35%	0.15%	2.01%	1.31%	2.31%	2.13%	1.69%	0.66%	-1.52%	2.47%	1.19%	1.52%	2.57%
Median	2.11%	1.09%	-0.09%	2.50%	3.04%	3.26%	2.48%	2.75%	0.55%	-0.62%	3.91%	2.29%	0.20%	4.28%
Maximum	18.84%	15.80%	36.67%	29.02%	23.08%	24.83%	21.69%	22.90%	30.35%	23.41%	18.61%	22.48%	31.85%	37.10%
Minimum	-21.62%	-15.33%	-35.77%	-25.69%	-29.64%	-15.82%	-25.41%	-30.02%	-28.78%	-39.68%	-19.62%	-35.25%	-30.51%	-38.23%
Std. Dev.	7.82%	8.34%	11.25%	9.07%	9.25%	8.53%	9.52%	10.48%	11.16%	13.33%	7.83%	10.59%	11.76%	13.99%
Skewness	-0.735	-0.157	0.282	-0.014	-0.881	-0.256	-0.513	-0.724	-0.054	-0.399	-0.990	-0.671	-0.087	-0.817
Kurtosis	4.087	2.269	6.852	4.621	4.687	3.262	3.715	3.934	4.017	3.051	4.120	4.348	3.644	4.313
Jarque-Bera	7.804	1.477	35.367	6.133	13.889	0.770	3.652	6.935	2.439	1.490	12.076	8.438	1.039	10.257
Probability	0.020	0.478	0.000	0.047	0.001	0.680	0.161	0.031	0.295	0.475	0.002	0.015	0.595	0.006
Sum	0.757	0.754	0.086	1.123	0.733	1.296	1.192	0.948	0.370	-0.850	1.383	0.669	0.850	1.439
Sum Sq. Dev.	0.336	0.382	0.697	0.452	0.471	0.400	0.499	0.605	0.685	0.977	0.338	0.617	0.761	1.076
Observations	56	56	56	56	56	56	56	56	56	56	56	56	56	56

Table 9: SAMPLE 1988: II-2002: I SUMMARY STATISTICS

	Switzerland	UK	USA	Finland	Ireland	Portugal	Turkey	Mexico	Korea	New Zealand
Mean	2.35%	1.58%	2.63%	2.78%	1.70%	-0.12%	1.30%	4.74%	-0.16%	-0.45%
Median	3.21%	1.80%	3.55%	4.83%	2.04%	0.19%	5.89%	5.02%	-2.54%	0.79%
Maximum	21.26%	16.59%	19.39%	62.80%	20.61%	39.05%	80.06%	36.46%	75.86%	23.00%
Minimum	-23.79%	-14.55%	-16.75%	-55.88%	-28.79%	-24.65%	-97.08%	-50.97%	-103.69%	-27.02%
Std. Dev.	9.12%	7.59%	7.26%	20.01%	10.01%	12.02%	34.65%	19.03%	25.68%	11.02%
Skewness	-0.712	-0.095	-0.611	-0.086	-0.494	0.431	-0.294	-0.748	-0.512	-0.264
Kurtosis	3.797	2.338	3.895	4.365	3.619	3.983	3.316	3.637	7.326	2.668
Jarque-Bera	6.211	1.108	5.360	4.415	3.168	3.987	1.037	6.173	46.115	0.906
Probability	0.045	0.575	0.069	0.110	0.205	0.136	0.595	0.046	0.000	0.636
Sum	1.316	0.886	1.472	1.555	0.955	-0.069	0.728	2.654	-0.088	-0.252
Sum Sq. Dev.	0.458	0.316	0.290	2.201	0.551	0.795	6.602	1.992	3.626	0.668
Observations	56	56	56	56	56	56	56	56	56	56

Table 9a: SAMPLE 1988: II-2002: I SUMMARY STATISTICS

	RCONS0	RCONS1	RCONS2	RCONS3	RCONS4	RCONS5	RCONS6	RCONS7	INFL	RF	REARF
Mean	0.53%	1.06%	1.58%	2.10%	2.60%	3.11%	3.62%	4.14%	0.76%	1.27%	0.51%
Median	0.61%	1.15%	1.61%	2.17%	2.61%	3.00%	3.35%	3.75%	0.75%	1.26%	0.54%
Maximum	1.30%	2.08%	3.02%	3.68%	4.60%	5.40%	6.19%	6.55%	1.71%	2.13%	1.12%
Minimum	-0.56%	-0.68%	-0.31%	0.43%	0.85%	1.26%	1.84%	2.21%	-0.30%	0.43%	-0.11%
Std. Dev.	0.37%	0.55%	0.66%	0.78%	0.88%	0.99%	1.07%	1.14%	0.38%	0.40%	0.33%
Skewness	-0.562	-0.696	-0.416	-0.177	0.062	0.374	0.597	0.702	0.460	0.218	-0.083
Kurtosis	3.274	3.693	3.176	2.455	2.487	2.415	2.524	2.555	4.157	2.708	1.881
Jarque-Bera	3.125	5.643	1.687	0.985	0.650	2.104	3.851	5.058	5.097	0.644	2.984
Probability	0.210	0.060	0.430	0.611	0.722	0.349	0.146	0.080	0.078	0.725	0.225
Sum	0.299	0.594	0.886	1.176	1.456	1.741	2.028	2.316	0.427	0.713	0.286
Sum Sq. Dev.	0.001	0.002	0.002	0.003	0.004	0.005	0.006	0.007	0.001	0.001	0.001
Observations	56	56	56	56	56	56	56	56	56	56	56

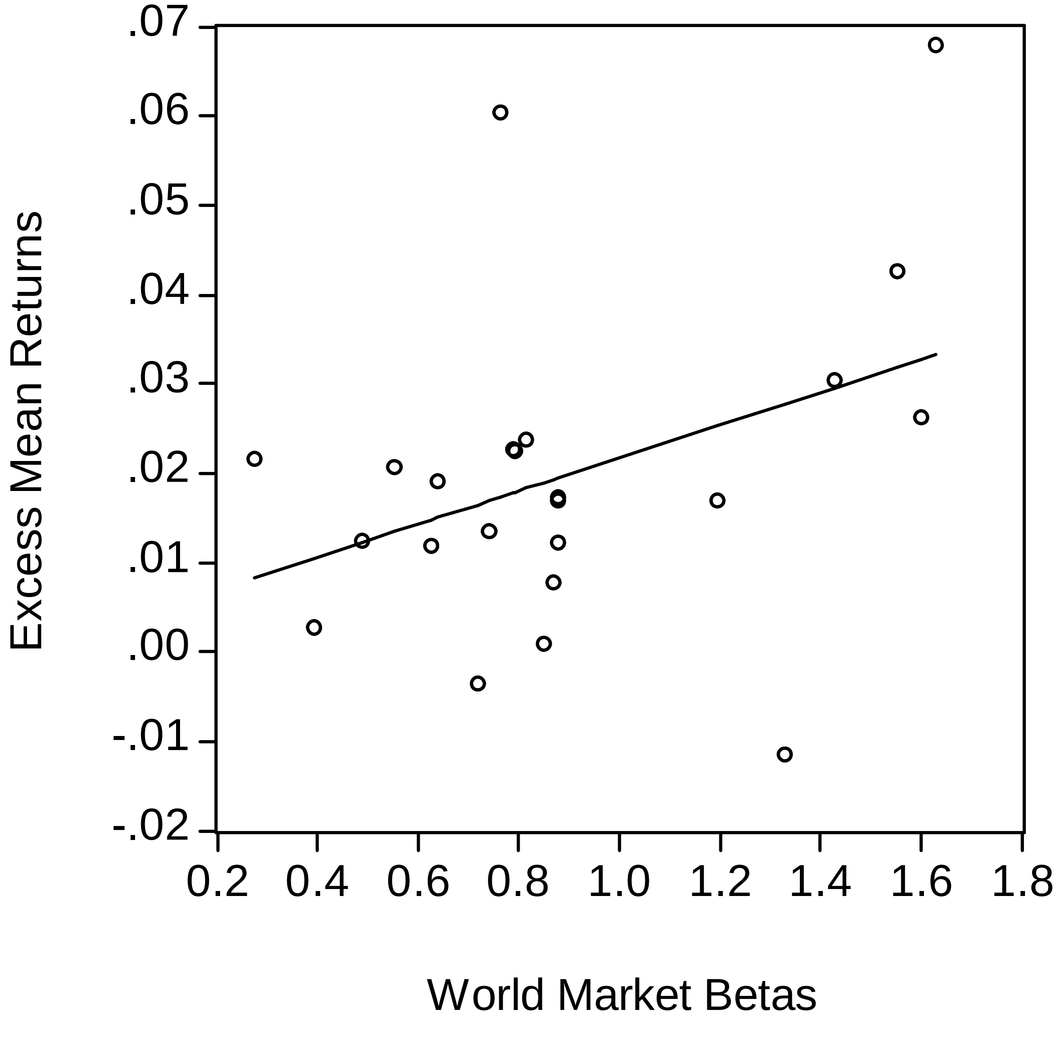
Table 10: Stock Market Volatility

Turkey	34.65%
Korea	25.68%
Finland	20.01%
Mexico	19.03%
Norway 70_88	17.42%
Italy 70_88	15.71%
Australia 70_88	15.09%
France 70_88	14.53%
Sweden 88_02	13.99%
UK 70_88	13.66%
Spain 70_88	13.41%
Japan 88_02	13.33%
Portugal	12.02%
Japan 70_88	11.93%
Spain 88_02	11.76%
Belgium 70_88	11.54%
Swiss 70_88	11.51%
Sweden 70_88	11.28%
Austria 88_02	11.25%
Germany 70_88	11.25%
Italy 88_02	11.16%
New Zealand	11.02%
Netherlands 70_88	10.67%
Norway 88_02	10.59%
Denmark 70_88	10.53%
Germany 88_02	10.48%
Austria 70_88	10.46%
Canada 70_88	10.33%
Ireland	10.01%
USA 70_88	9.62%
France 88_02	9.52%
Canada 88_02	9.25%
Swiss 88_02	9.12%
Belgium 88_02	9.07%
Denmark 88_02	8.53%
Australia 88_02	8.34%
Netherlands 88_02	7.83%
UK 88_02	7.59%
USA 88_02	7.26%

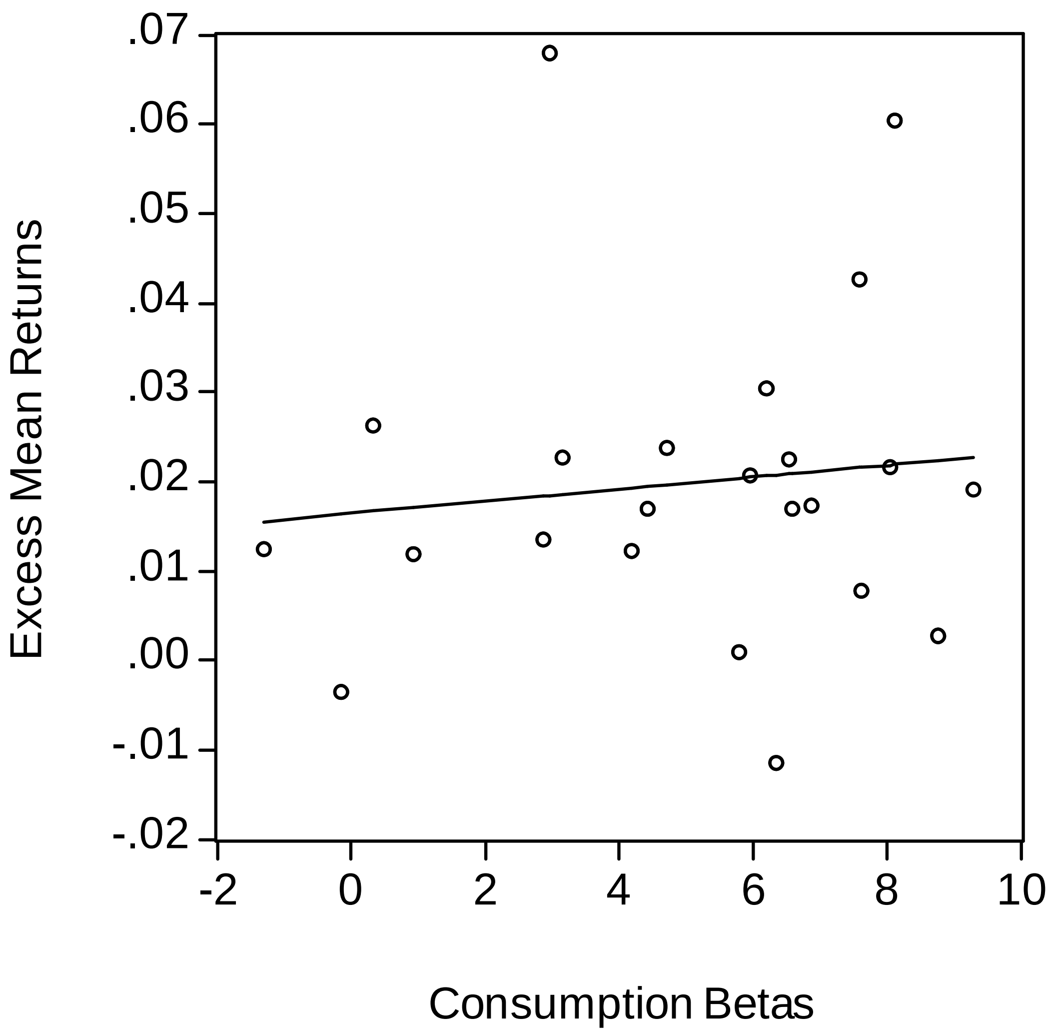
6. Graphs

Sample 1988-2002

- **ICAPM**

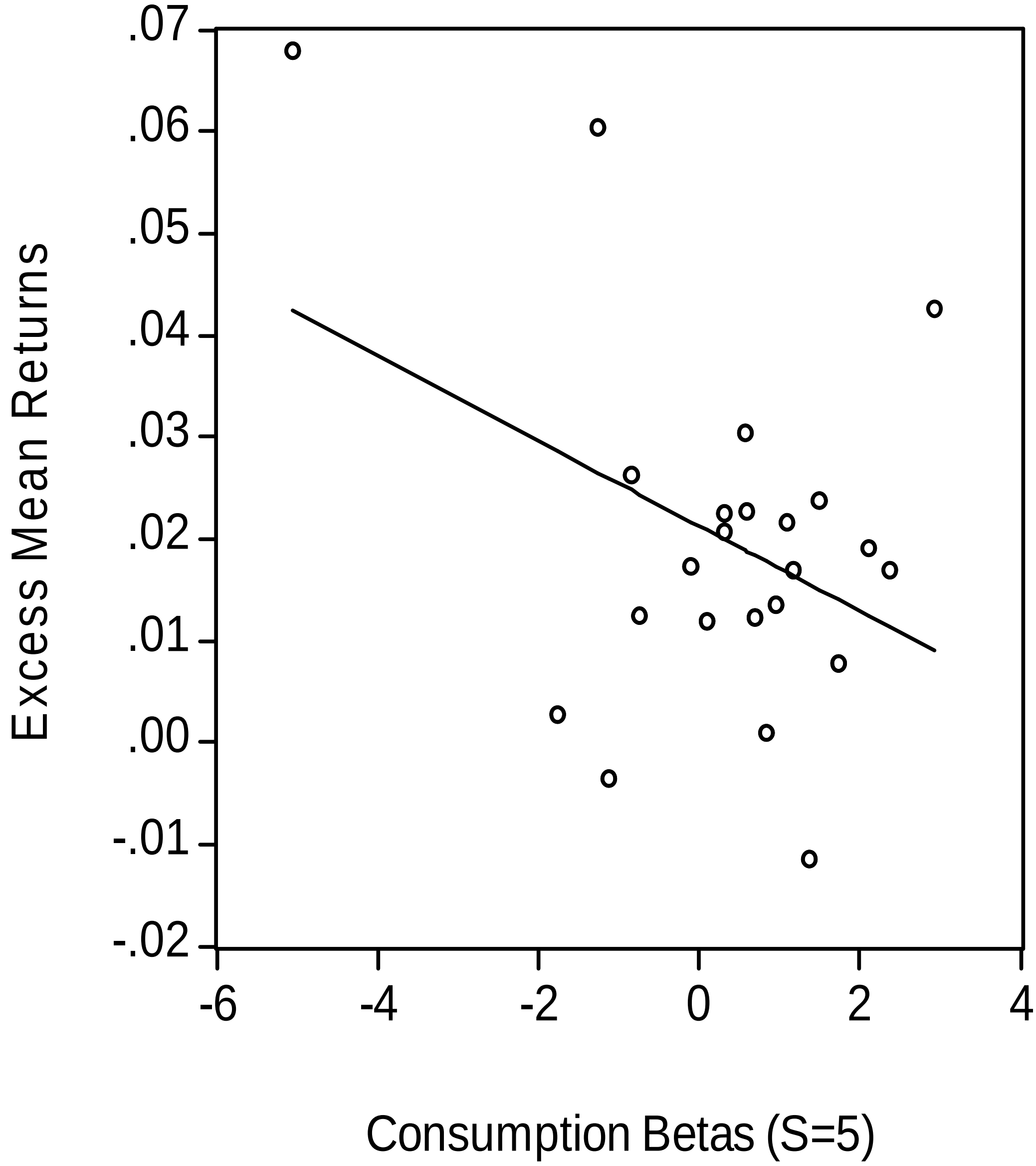


- **CCAPM**



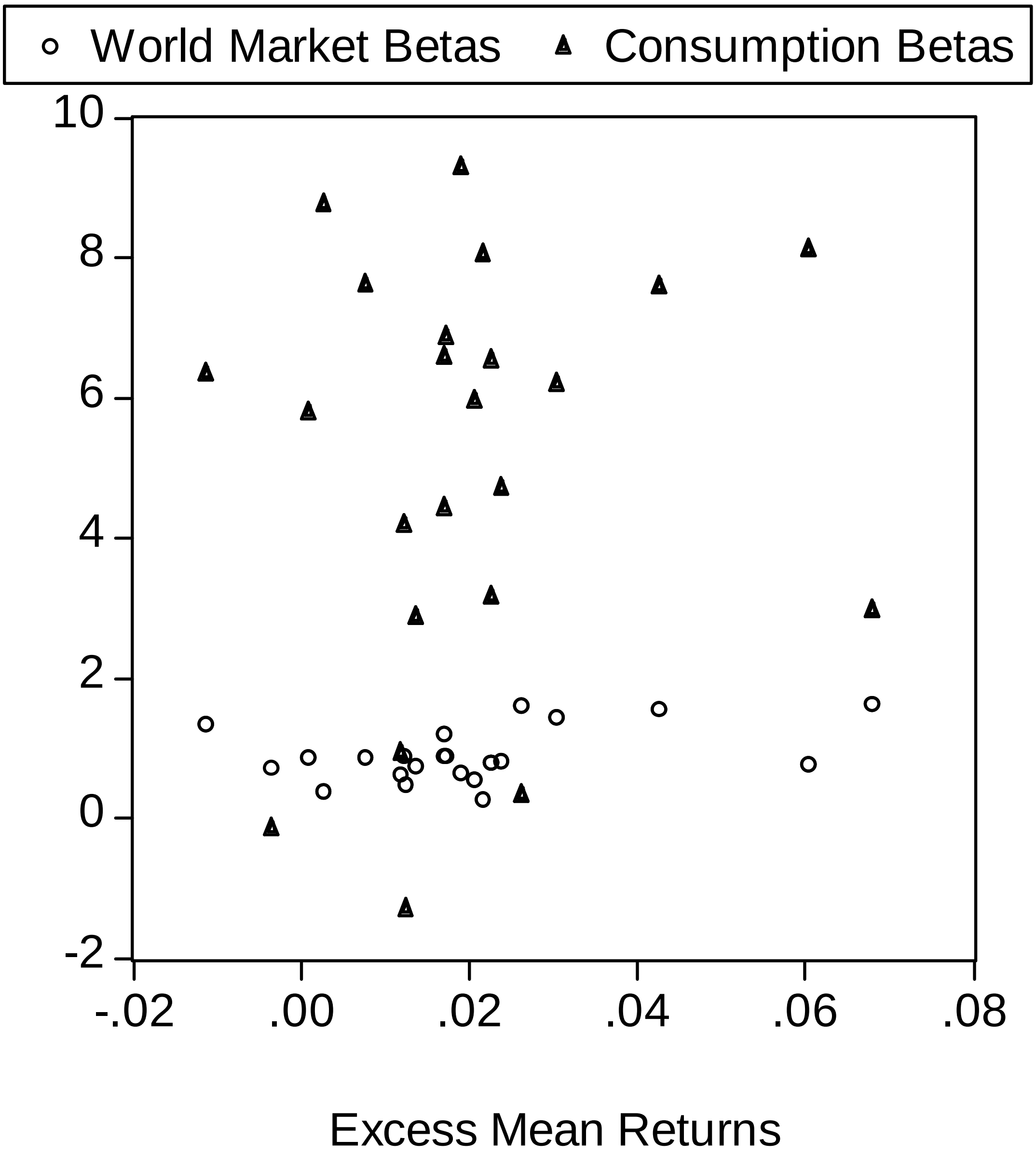
.07
.06
.05
.04
.03
.02
.01
.00
-.01
-.02
Excess Mean Returns
-2
0
2
4
6
8
10
Consumption Betas

q **CCAPM (S=5)**

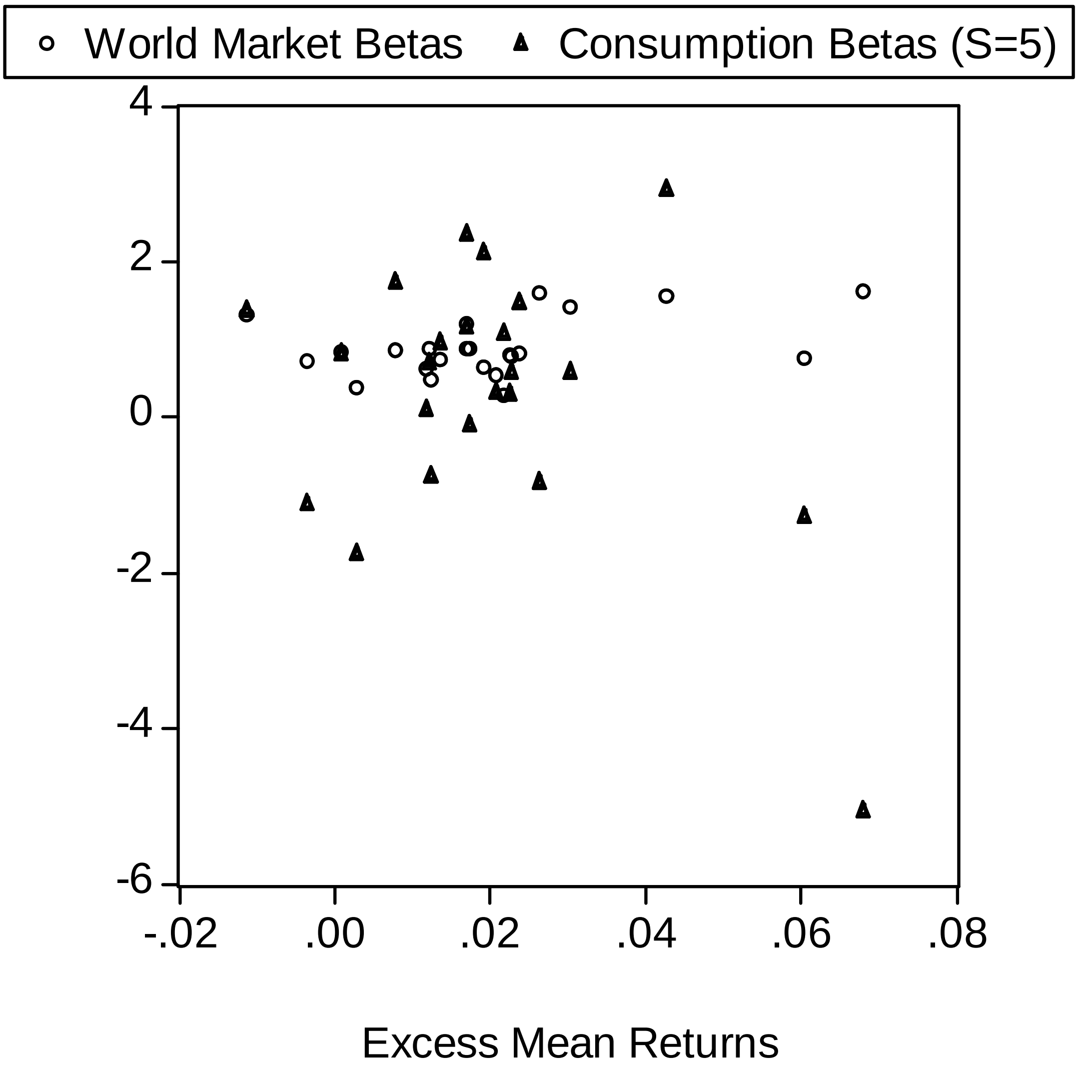


.07
.06
.05
.04
.03
.02
.01
.00
-.01
-.02
Excess Mean Returns
-6
-4
-2
0
2
4
Consumption Betas (S=5)

q **Intertemporal CAPM**

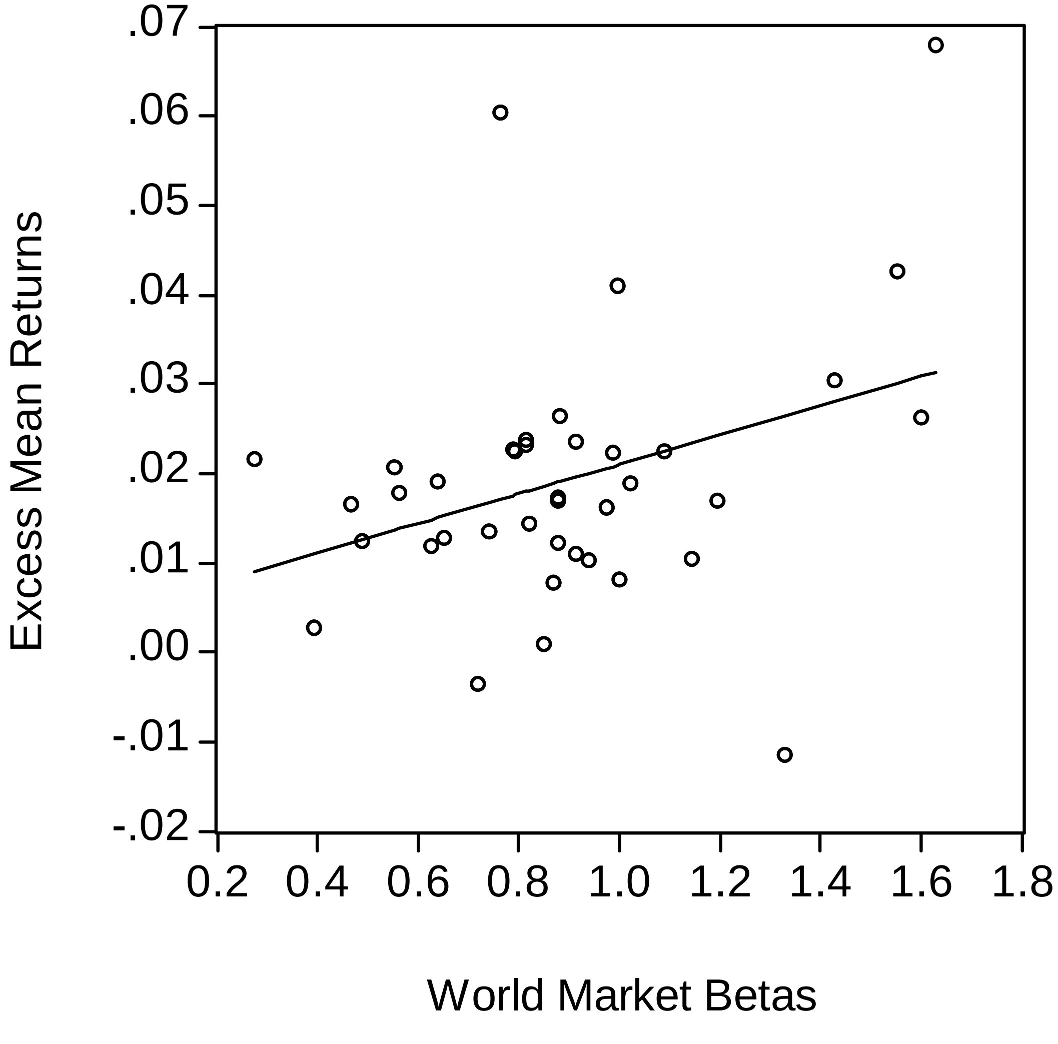


q **Intertemporal CAPM (S=5)**

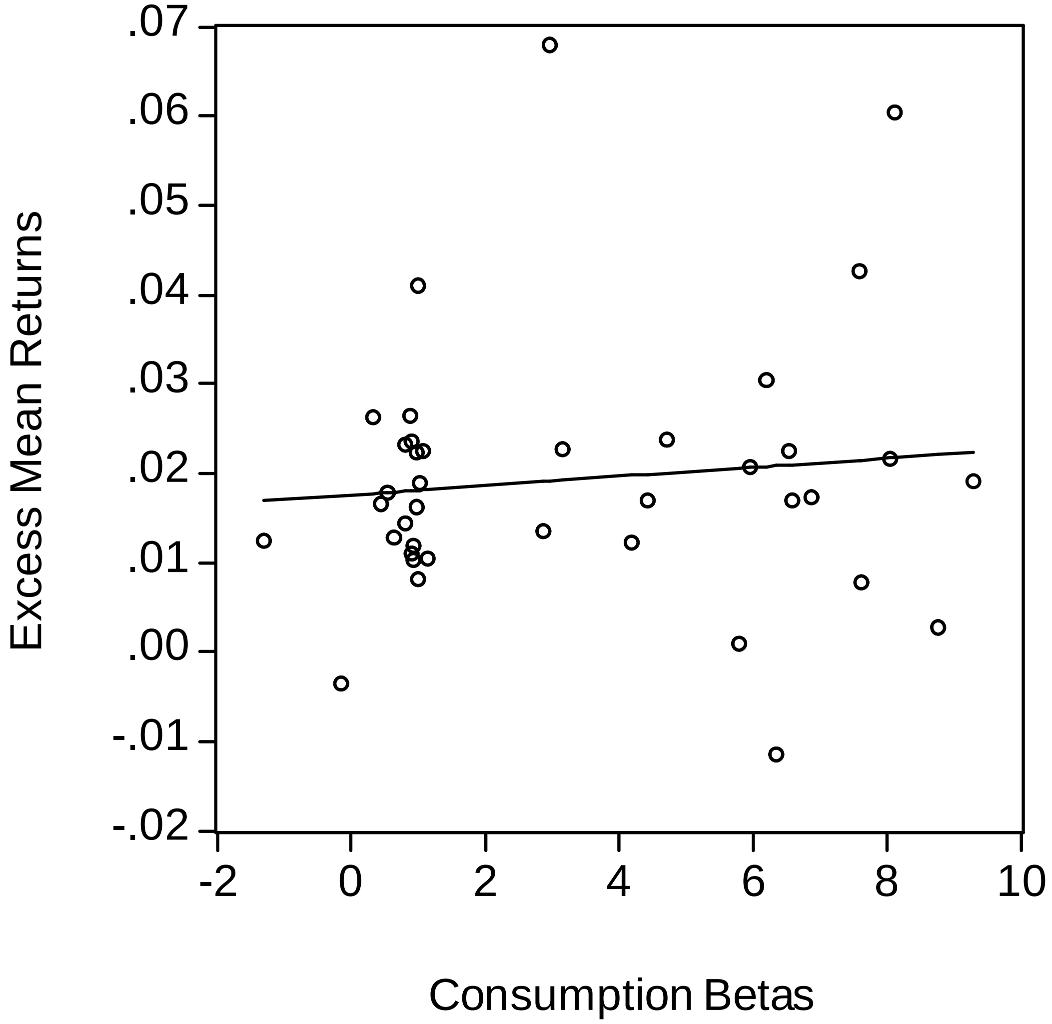


Extended Sample 1988-2002 & 1970&1988

- **ICAPM**



q CCAPM



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Excess Mean Returns
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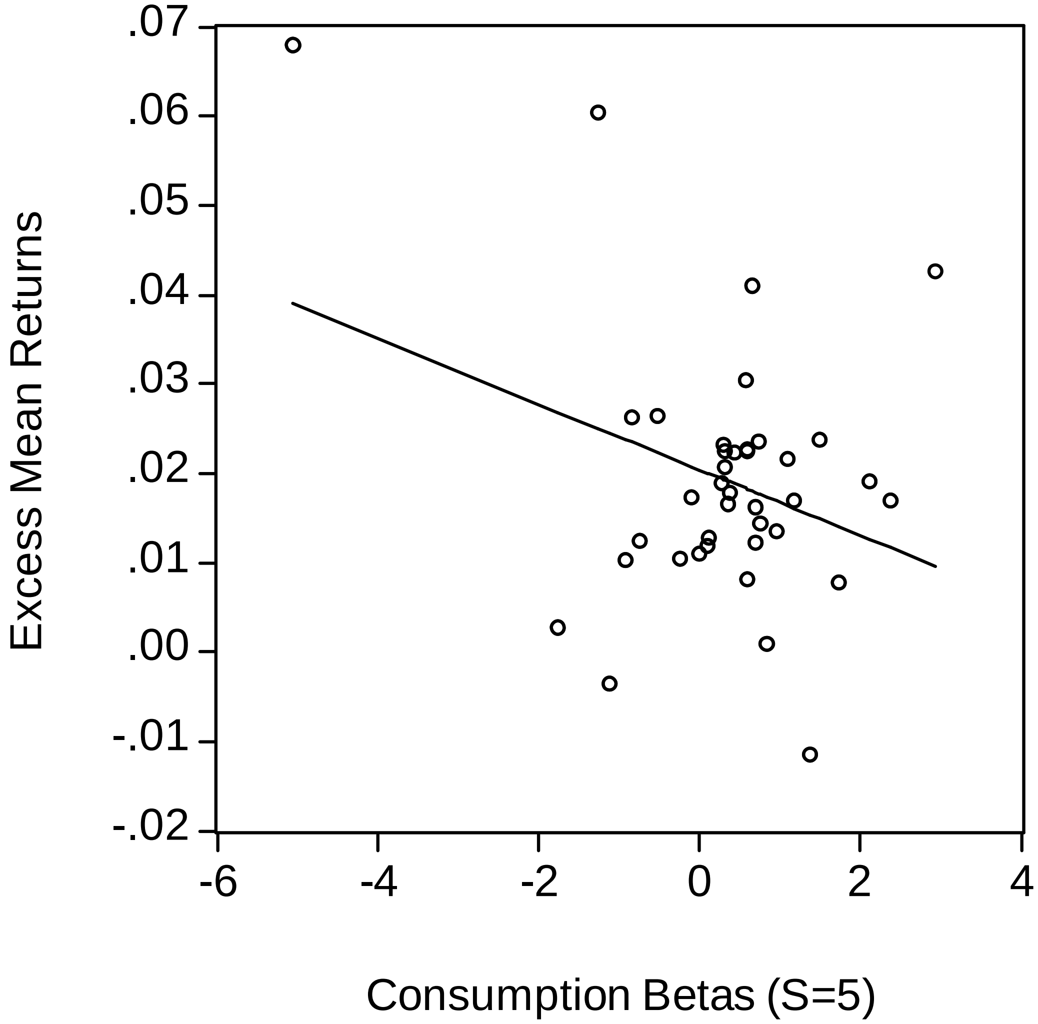
0
2
4
6
8
10
Consumption Betas

q **CCAPM (S=5)**



.07
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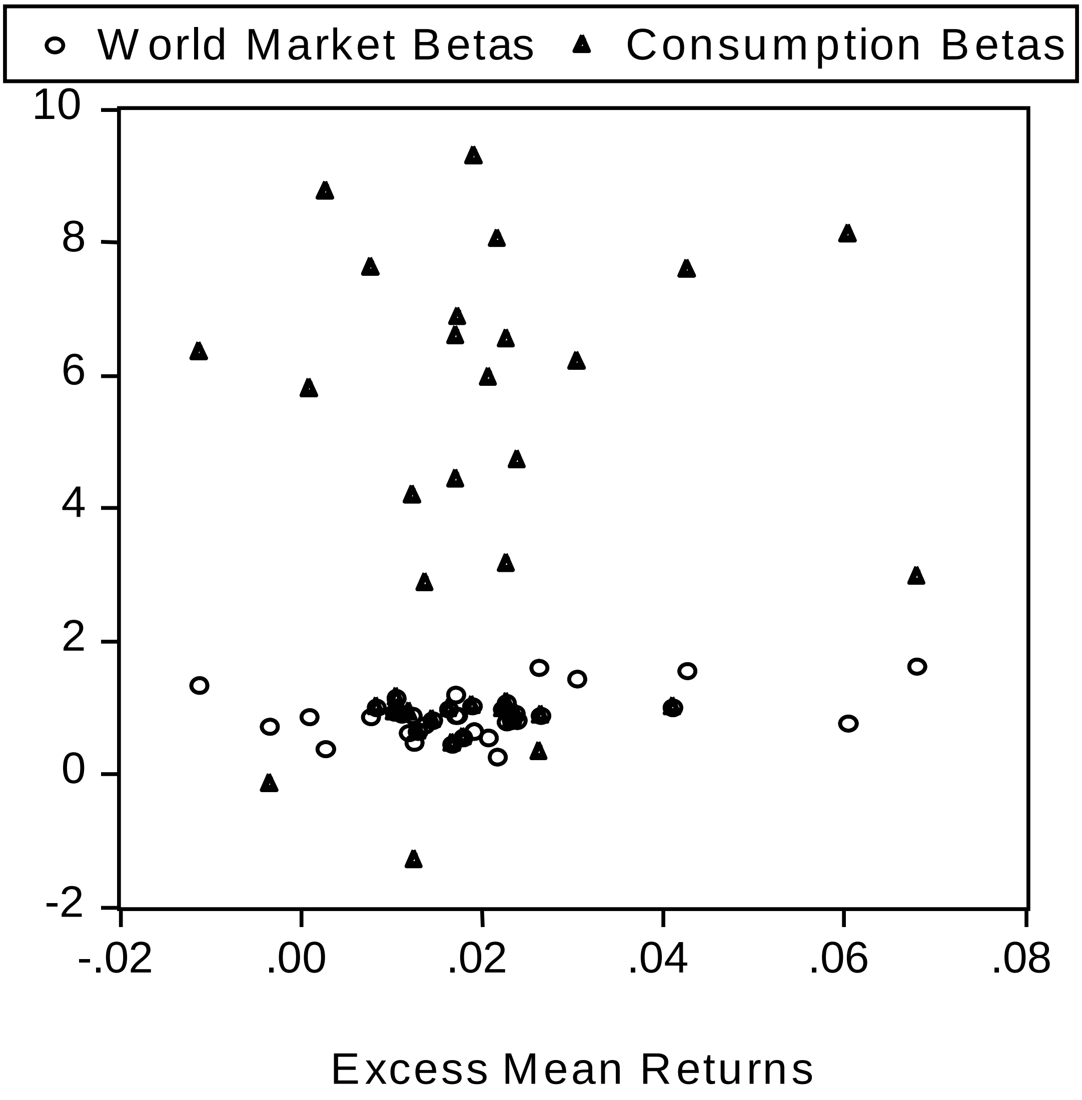
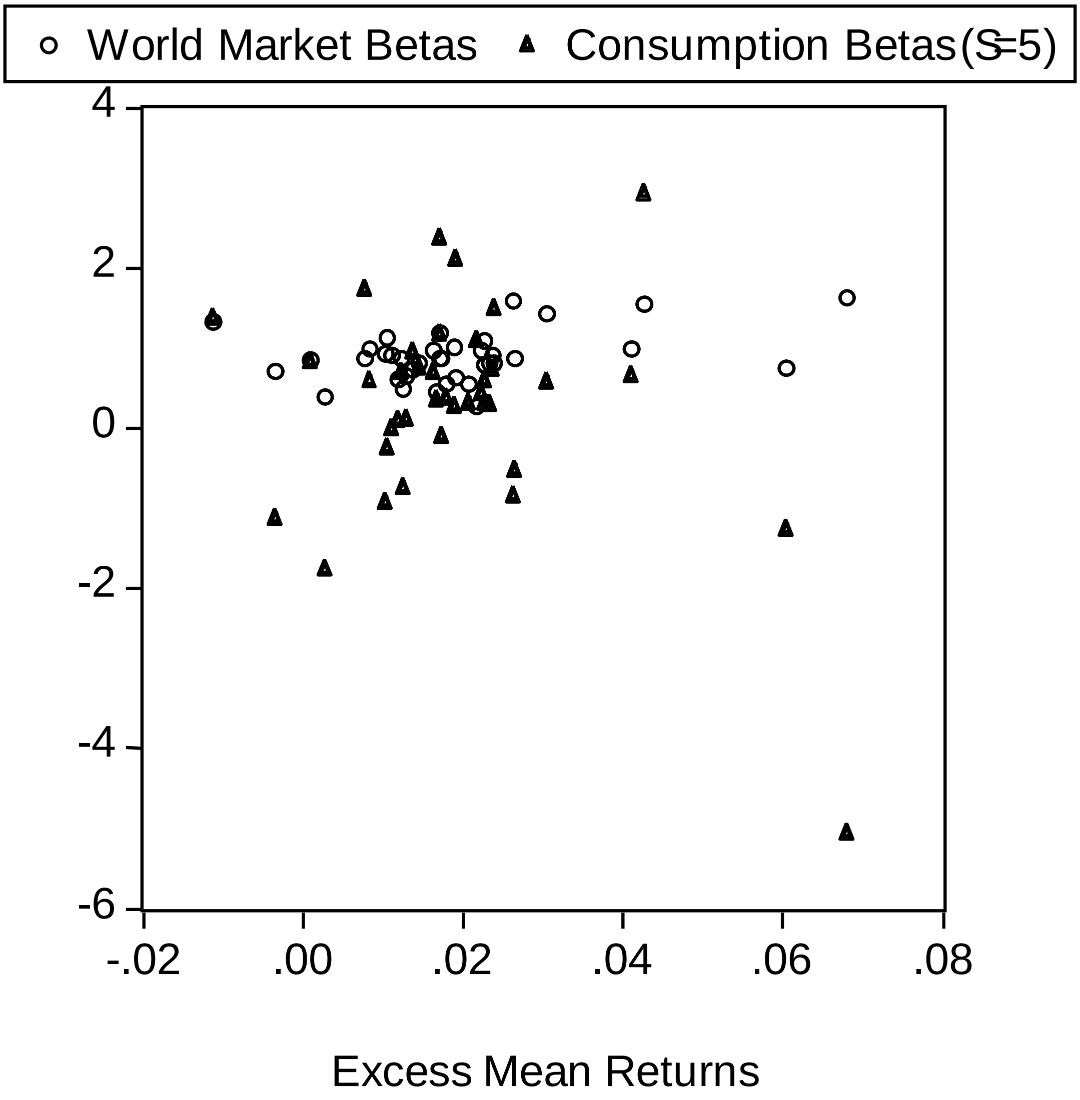
Excess Mean Returns
-6
-4
-2
0
2
4
Consumption Betas (S=5)

q **Intertemporal CAPM**



q **Intertemporal CAPM (s=5)**



7. References

- Bishop, Thomas: An empirical test of the consumption capital asset pricing model with labor choice, August 2001. University of Michigan.
- Cochrane John: Asset Pricing, 2001. Princeton University.
- Campbell and Cochrane: Explaining the poor performance of consumption-based asset pricing models, July 1999. NBER.
- Elroy Dimson and Massoud Mussavian: Three Centuries of Asset Pricing, London Business School and Salomon Brothers International, January 2000.
- Galy Sebastian: CAPM: Living dead and loving it, July 2001. Concordia University
- Maria Kasch-Haroutounian and Simon Price: International CAPM and the Integration of the Transition Markets of Central Europe into Global Capital Markets, City University of London, March 2000.
- Malliaropoulos Dimitrios: Lecture Notes on Asset Pricing and Portfolio Theory, April 2002. University of Piraeus.
- Parker, Jonathan and Christian Julliard: Consumption Risk and Expected Stock Returns, March 2004. Princeton University and NBER.
- Anne-Sofie, Rasmussen: Estimating the Consumption-Capital Asset Pricing Model without Consumption Data: Evidence from Denmark, March 2004. Aarhus School of Business. Department of Finance.
- Stulz, Rene: Globalization of Equity Markets and the Cost of Capital, March 1999.
- Mika, Vaihekoski: Unconditional international asset pricing models, February 2000. Helsinki School of Economics and Business Administration.

LOW VOLATILITY COUNTRIES (se %)

Table 6a

Model	$\hat{g}_o$	$\hat{g}_w$	$\hat{g}_c$	Adj-R^2	$\chi^2(2)$
CAPM	**1.478**	**0.011**		***-5.26***	
	[0.037]	[0.990]			
C-CAPM	**1.317**		**0.046**	***-0.40***	
	[0.000]		[0.385]		
ICAPM	**1.198**	**0.157**	**0.048**	***-5.76***	1.127
[0.781]	[0.074]	[0.854]	[0.224]		[0.569]

Table 6b

	$\hat{g}_o$	$\hat{g}_w$	$\hat{g}_c$	Adj-R^2	$\chi^2(2)$
C-CAPM					
s=1	**1.038**		**0.175**	***12.61***	
	[0.003]		[0.117]		
s=2	**1.166**		**0.173**	***0.72***	
	[0.005]		[0.291]		
s=3	**1.106**		**0.214**	***4.66***	
	[0.001]		[0.138]		
s=4	**1.153**		**0.396**	***22.99***	
	[0.000]		[0.036]		
s=5	**1.296**		**0.424**	***25.73***	
	[0.000]		[0.002]		
s=6	**1.228**		**0.375**	***21.65***	
	[0.000]		[0.021]		
s=7	**1.237**		**0.387**	***21.07***	
	[0.000]		[0.024]		

Table 5c

Model	$\hat{g}_o$	$\hat{g}_w$	$\hat{g}_c$	Adj-R^2	$\chi^2(2)$
ICAPM					
s=1	**0.958**	**0.108**	**0.176**	***7.86***	2.684
	[0.174]	[0.900]	[0.125]		[0.261]
s=2	**1.214**	**-0.071**	**0.175**	***-4.74***	1.154
	[0.082]	[0.926]	[0.297]		[0.561]
s=3	**1.274**	**-0.264**	**0.227**	***-0.05***	2.717
	[0.041]	[0.706]	[0.123]		[0.257]
s=4	**1.395**	**-0.355**	**0.411**	***19.81***	5.466
	[0.003]	[0.522]	[0.035]		[0.065]
s=5	**1.693**	**-0.576**	**0.460**	***24.34***	6.651
	[0.000]	[0.299]	[0.020]		[0.036]
s=6	**1.676**	**-0.670**	**0.423**	***20.87***	6.462
	[0.001]	[0.327]	[0.020]		[0.039]
s=7	**1.648**	**-0.611**	**0.430**	***19.70***	6.042
	[0.001]	[0.001]	[0.024]		[0.048]

HIGH VOLATILITY COUNTRIES (se %)

Table 6a

Model	$\hat{g}_o$	$\hat{g}_w$	$\hat{g}_c$	Adj-R^2	$\chi^2(2)$
CAPM	**0.564** [0.723]	**1.708** [0.269]		***1.05***	
C-CAPM	**1.317** [0.000]		**0.108** [0.499]	***-3.56***	
ICAPM [0.781]	**1.540** [0.375]	**0.065** [0.760]	**0.557** [0.730]	***-4.58***	1.127 [0.569]

Table 6b

	$\hat{g}_o$	$\hat{g}_w$	$\hat{g}_c$	Adj-R^2	$\chi^2(2)$
C-CAPM					
s=1	**2.573** [0.003]		**-0.051** [0.897]	***-6.11***	
s=2	**2.639** [0.002]		**-0.099** [0.728]	***-5.29***	
s=3	**2.152** [0.000]		**0.153** [0.468]	***-4.30***	
s=4	**2.663** [0.000]		**-0.465** [0.246]	***9.51***	
s=5	**2.527** [0.000]		**-0.588** [0.009]	***21.23***	
s=6	**2.571** [0.000]		**-0.455** [0.267]	***8.77***	
s=7	**2.502** [0.000]		**-0.282** [0.486]	***-7.92***	

Table 6c

Model	$\hat{g}_o$	$\hat{g}_w$	$\hat{g}_c$	Adj-R^2	$\chi^2(2)$
ICAPM					
s=1	**0.656**	**2.274**	**-0.275**	***-2.17***	1.716
	[0.695]	[0.210]	[0.518]		[0.423]
s=2	**0.607**	**2.000**	**-0.181**	***-2.34***	1.525
	[0.705]	[0.235]	[0.506]		[0.466]
s=3	**0.397**	**1.537**	**0.085**	***7.86***	2.880
	[0.601]	[0.108]	[0.611]		[0.237]
s=4	**0.606**	**1.714**	**-0.278**	***13.37***	4.298
	[0.360]	[0.053]	[0.298]		[0.116]
s=5	**1.058**	**1.334**	**-0.560**	***20.67***	18.707
	[0.573]	[0.441]	[0.082]		[0.000]
s=6	**0.824**	**1.586**	**-0.440**	***9.39***	3.986
	[0. 644]	[0.341]	[0.199]		[0.136]
s=7	**0.731**	**1.608**	**-0.259**	***-0.66***	1.546
	[0.669]	[0.327]	[0.439]		[0.462]