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Structural Change and Asset Pricing in Emerging Markets*

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Résumé / Abstract

Dans cet article, nous montrons l'importance d'utiliser des tests de changement structurel dans le contexte des marchés boursiers en émergence. Les modèles de valorisation des actifs financiers utilisés dans ce contexte sont en général des modèles conditionnels à facteurs fondés sur des facteurs à caractère international tels les rendements excédentaires sur le marché mondial des actions, les écarts de taux captant la prime de risque et la prime de terme, ainsi que d'autres variables visant à mesurer les fluctuations du cycle économique mondial. Nous montrons que dans de nombreux pays, bien que nous ne puissions pas rejeter les modèles en fonction des tests de suridentification habituels de distribution chi-carré, nous les rejetons en fonction des tests de changement structurel, notamment lorsque nous utilisons des facteurs internationaux. Nous trouvons des résultats beaucoup plus favorables aux modèles et une plus grande stabilité lorsque nous testons un CAPM local avec des portefeuilles ordonnés selon la taille. Un effet de taille persiste toutefois dans certains pays.

This paper documents the importance of testing for structural change in the context of emerging markets. Typically, asset pricing factor models for emerging markets are conditioned on world financial market factors such as world equity excess returns, risk and maturity spreads as well as other variables designed to capture world business cycle fluctuations. We show that for many countries, while we cannot reject the model according to one usual chi-square test for overidentifying restrictions, we reject it on the basis of structural change tests, especially when international factors are considered. Much better support and greater stability are found when a local CAPM is tested with size-ranked portfolios. Some evidence of a small-size effect persists for some countries.

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1 Introduction

Investors and the financial press have in the last few years paid considerable attention to the new equity markets that have emerged around the world. This new interest has undoubtedly been spurred by the large, and in some cases huge returns offered by these markets. Fundamental asset pricing models such as the CAPM and the APT tell us that high expected returns ought to be associated with high measures of risk with respect to a number of risk factors. One would therefore want to identify the set of fundamental sources of risk that affect the returns in these emerging markets. Two different views can be taken when searching for these factors: one can consider that these markets are segmented and concentrate on local risk factors to explain local returns, or one can adopt the perspective of an international investor diversifying his portfolio worldwide. If enough investors diversify internationally their portfolios and markets move towards integration, expected returns in one country will be well described by the country's world risk exposure, defined as the covariance of the country's returns with the world market portfolio. This is the view taken by Harvey (1991, 1995) in two recent studies, one on industrialized countries, the other on emerging markets.[1]

In both studies, the author adopts a dynamic factor asset pricing model in which the risk loadings are measured with respect to the world market return in excess of a risk-free asset return. Moreover, these risk loadings are allowed to vary through time. This feature is clearly essential in the context of emerging markets where the internal dynamics underlying the country's returns index along with unstable macroeconomic and political conditions can bring considerable variation in the factor loadings. This variability is brought into the model by the projection of both the country's returns and the world returns on a set of variables deemed to be in the information set of investors. However, the coefficients of these projections are maintained constant over the sample period. In other words, the returns are linked to these information variables through a stable relationship. This assumption can be seriously questioned in a model for emerging markets since many reasons can be invoked for the presence of structural changes. Market liberalization measures can be introduced at one or various points in the sample, drastic political or economic policy changes can take place, or new institutions can be set in place. In this context, one would like to have a test

[1]Bekaert and Harvey (1995, 1996) develop models of the conditional mean and conditional variance of returns which allows for time-varying influences of both local and world factors. These models address some of the issues that are discussed in this paper.

for the stability of the projection coefficients on the different variables.

In this paper, we apply tests for structural stability to two leading conditional factor models: (1) a conditional CAPM model similar to Harvey (1991, 1995); (2) conditional factor models on a set of size portfolios for each country. The second model can be viewed as a refinement of the first. These models have been estimated via the generalized method of moments (GMM) procedure discussed in Hansen (1982). The success of the model fit is judged according to GMM-based criteria. In particular, one tests whether the overidentifying restrictions imposed by the model agree with the data. The fundamental problem is that overidentifying restriction tests are not designed to diagnose whether a model provides a stable time invariant relationship between the return and the information variables. Technically speaking, one can easily face a situation where a model's overidentifying restrictions are not rejected, while the projection parameters of returns on the information set vary through time. Indeed, the method of moments approach will conceal the time variation in these coefficients as the GMM estimator will converge to some sort of sample average.[2] It may parenthetically be noted that such observations are not confined to the context of emerging markets, as shown for instance by Ghysels (1996) for US and other stock markets.

The first model is tested on the stock market index returns of each emerging market with respect to a world index. The conditional factor models on size portfolios in each country have a two-fold purpose: (1) uncover whether a local conditional CAPM holds in each country, in other words test if the markets are segmented, or (2) if foreign factors also play a role, and therefore conclude that emerging markets are semi-integrated. For the CAPM model, it is to the best of our knowledge the first test of this central theory in finance in the context of emerging markets. This is the reference model with which to compare the results obtained with the US markets both in terms of acceptance or rejection of the model and of the presence of anomalies such as the small size effect.

Our results show that models relating the emerging market index or portfolio returns to world or US returns are in general unstable, while local models relating size portfolio returns to the local market portfolio are stable and surprisingly supportive of the CAPM theory in about half of the countries, while the size anomaly appears in others.

In section 2 we briefly describe the dynamic asset pricing models inspired by Harvey (1991, 1995) and Ferson and Korajczyk (1995) and

[2]In an econometrics jargon this means that overidentifying restrictions tests do not have (local asymptotic) power against alternatives characterized by parameter variation. This is formally shown in Ghysels and Hall (1990a). They also provide several examples using the consumption-based CAPM.

we discuss the structural change test. The empirical results for the various models appear in section 3. The paper concludes with section 4.

2 Asset Pricing and Structural Change Analysis[3]

For the purpose of our discussion, we will use a simplified version of the conditional CAPM:

$$E\left[r_{it+1}\left|Z_t\right.\right] = \beta_{it} E\left[r_{Mt+1}\left|Z_t\right.\right] \tag{2.1}$$

where r_{Mt+1} denotes the excess return from t to $t+1$ on the market portfolio and r_{it+1} the excess return on any asset or portfolio of assets i. The variable Z_t belongs to the information set of the agent and β_{it} is the time-varying market beta of portfolio i. This time variation of market betas is documented in Harvey (1989), Ferson and Harvey (1991, 1995) and Ferson and Korajczyk (1995). The conditional CAPM model defines the market beta as the ratio of the conditional covariance of the portfolio return with the market return to the variance of the market return:

$$\beta_{it} = \frac{E\left[\left(r_{Mt+1} - E\left[r_{Mt+1}\left|Z_t\right.\right]\right)\left(r_{it+1} - E\left[r_{it+1}\left|Z_t\right.\right]\right) \mid Z_t\right]}{E\left[\left(r_{Mt+1} - E\left[r_{Mt+1} \mid Z_t\right]\right)^2 \mid Z_t\right]} \tag{2.2}$$

The expectations are obtained via the projection equations:

$$\begin{aligned} E\left[r_{it+1}\left|Z_t\right.\right] &= \delta_i Z_t \\ E\left[r_{Mt+1}\left|Z_t\right.\right] &= \delta_M Z_t \end{aligned} \tag{2.3}$$

From (2.2) we learn that two fixed parameters, namely δ_M and δ_i, together with Z_t, r_m and r_i determine the time variation in β_{it}.

The question we are interested in is whether this particular (or any other) characterization of β_{it} is adequate and does not yield a systematic mispricing of risk factors. Combining equations (2.1) and (2.3) we can write the asset pricing equation as follows:

$$r_{it+1} = \beta_{it}\delta_M Z_t + u_{it+1} \tag{2.4}$$

[3]In this section we follow some of the analysis in Ghysels (1996).

where $Eu_{it+1}Z_t = 0$. If the restrictions of the conditional CAPM do not hold, so that beta risk is inherently misspecified, we obtain as a generic alternative:

$$r_{it+1} = \tilde{\beta}_{it}\tilde{\delta}_{Mt}Z_t + \tilde{u}_{it+1} \tag{2.5}$$

with $E\tilde{u}_{it+1}Z_t = 0$ and $\tilde{\beta}_{it} \neq \beta_{it}$ is obtained from (2.2) replacing δ_M by $\tilde{\delta}_{Mt}$ and δ_i by $\tilde{\delta}_{it}$.[4]

To know whether the conditional CAPM is the source of modelling error, we describe in the remainder of this section a particular strategy which appears natural when time variation of parameters is the main concern and focus of the model. The time varying betas can be misspecified either (1) because of the chosen instrument Z_t; (2) because of its functional form $\beta(\cdot)$ or (3) a combination of both. Instead of trying different instruments and investigating alternative functional forms the analysis in Ghysels (1996) focused directly on a key assumption which drives time varying beta models. One rather explicit way of testing whether (2.1) is an adequate model in the pricing of asset returns amounts to testing the hypothesis:

$$H_o : \begin{cases} \tilde{\delta}_{Mt} = \delta_M & \forall t = 1,..,T \\ \tilde{\delta}_{it} = \delta_i & \forall t = 1,..,T \end{cases} \tag{2.6}$$

so that the *sole time variation in beta is that determined by the model.*

It is almost natural to consider hypothesis (2.6) since the original motivation for conditional CAPM models was non-constancy of parameters. Hence, the issue is only satisfactorily addressed when the model for beta no longer involves time varying parameters. Moreover, in the context of emerging markets, this hypothesis comes even more naturally because of the changing economic environment.

Anyone familiar with the empirical evidence may find it surprising that there is a need to test (2.6) because conditional CAPM and APT models for developed and emerging markets alike are typically well supported by the data. To clarify this we have to stress that testing the hypothesis in (2.6) is far more stringent than the usual overidentifying restrictions tests, often called J-statistics, that have been used to diagnose the fit of an asset pricing model like the conditional CAPM. Since

[4] This generic altenative emphasizes the fact that the specification of β_{it} is erroneous. Other sources of misspecification, such as omitted factor risk are, at least for the moment, not considered here. No specific laws for $\tilde{\delta}_{Mt}$ or $\tilde{\delta}_{it}$ and hence $\tilde{\beta}_{it}$ will be used for the moment.

such models are estimated via GMM let us proceed by specifying the moment conditions of the model. Namely, equations (2.2), (2.3), (2.4) and (2.5) together yield that:

$$E\left(\begin{array}{c} r_{it+1}-\tilde{\delta}_{it}Z_t \\ r_{Mt+1}-\tilde{\delta}_{Mt}Z_t \\ \tilde{\delta}_{it}Z_t\left[\left(r_{Mt+1}-\tilde{\delta}_{Mt}Z_t\right)^2\right]-\left(r_{Mt+1}-\tilde{\delta}_{Mt}Z_t\right)\left(r_{it+1}-\tilde{\delta}_{it}Z_t\right)\tilde{\delta}_{Mt}Z_t \end{array}\right)Z_t=0 \tag{2.7}$$

The formulation in (2.7) represents the set of moment conditions involved in the GMM estimation procedure but does not impose the null hypothesis (2.7) of constant parameters. The models proposed by Bekaert and Harvey (1995, 1996) could be viewed as belonging to this class, but they assume a very specific model for the time variation of the parameters. The estimation of the conditional CAPM imposing fixed parameters δ_M and δ_i while the data are generated by (2.7) will yield GMM parameter estimates $\overline{\delta}_M$ and $\overline{\delta}_i$ which are some sort of sample averages of the underlying $\tilde{\delta}_{Mt}$ and $\tilde{\delta}_{it}$. Ghysels and Hall (1990b) show formally that overidentifying restrictions tests based on the moment conditions such as those in (2.7) but evaluated at fixed parameter estimates $\overline{\delta}_M$ and $\overline{\delta}_i$ have a tendency *not* to reject the model. This problem is not just a theoretical curiosity. Indeed, we will provide numerous examples where this situation occurs in empirical asset pricing models. Hence, the usual diagnostic tests to judge the validity of a model are not adequate to detect systematic mispricing of asset returns because of erroneous beta dynamics.

How do we go about testing for structural invariance of the model, i.e. verify whether (2.6) holds? As one can imagine, there are many ways to do this. Probably the simplest is to assume as an alternative that at some point in the sample there is a structural break, like for instance :

$$\widetilde{\delta}_{jt}=\begin{cases}\delta_{j1} & t=1,...,\pi T \\ \delta_{j2} & t=\pi T+1,...,T\end{cases} \qquad j=M,i \tag{2.8}$$

where π determines the fraction of the sample before and after the assumed break point.[5] If the break point πT were known our task would

[5]It is worth noting that in (2.6) all parameters are tested jointly for stability. In several circumstances, however, the parameters involved play different roles and therefore depending on which ones are unstable, a different interpretation should be given. For instance, in the multifactor models which will be discussed later, one has a set of parameters that arise from purely ancillary statistical assumptions regarding projection equations besides parameters with an economic interpretation. To emphasize this distinction we will often conduct tests involving only a subset of the parameter vector. For the moment, however, we will proceed with discussing tests involving the entire vector.

be relatively easy to perform. Estimating δ_{j1} and δ_{j2} and comparing both estimates to see whether they are significally different would be one way to proceed, which is often referred to as a Chow test. Unfortunately, in the present context we do not really want to assume π known. In recent years several procedures have been advanced to test the null hypothesis (2.6) against the alternative like (2.8) with unknown break point π. In the Appendix to the paper we provide a detailed description of the econometric procedures that were developed for GMM estimators by Andrews (1993). In the remainder of the section we will explain what these procedures amount to without actually providing any of the technical details. To facilitate our presentation let us denote parameter estimates for δ_{jh} , $h = 1, 2$, $j = i, M$ associated with a particular presumed break point πT as $\widetilde{\delta}_{jh}(\pi)$. Suppose now that we construct for each possible break point π a test for structural change based on $\widetilde{\delta}_{jh}(\pi)$, $h = 1, 2$.[6] Hence, for each break point π we have a Wald-type statistic $W(\pi)$ based on the two estimates before and after the break πT. The idea now is to combine the Wald statistics for all possible break points $\{\mathrm{W}(\pi), \pi \in [.2, .8]\}$ into a single test statistic. This can be done in a variety of ways. A first possibility is to take the maximum over π of all $\mathrm{W}(\pi)$ values, called SupW where Sup stands for supremum. Andrews (1993) suggested this type of test and tabulated its distribution under the null hypothesis appearing in (2.6).

The SupW test may be intuitively appealing as it picks the maximum evidence for a structural break. It is however not the only statistic one can think of. First, it should be noted that we prefer to use the SupLM test, that is to say the supremum Lagrangian Multiplier test rather than the Supremum Wald test simply because the former requires far less computations. Indeed, to calculate the SupLM which is formally presented in equation (A.6) appearing in the Appendix, one does not compute all the parameter estimates $\widetilde{\delta}_{jh}(\pi)$ for each of the subsamples. Instead, the parameter estimates $\overline{\delta}_M$ and $\overline{\delta}_i$ obtained from the full sample are used. This saves an enormous amount of computer time by avoiding all the (nonlinear) GMM parameter estimations. Since a great number of asset pricing models will be tested, computational efficiency has strong appeal. Second, the statistical properties of the SupLM test are at least

[6] We have to leave a certain number of observations at each end of the sample in order to estimate $\widetilde{\delta}_{j1}$ and $\widetilde{\delta}_{j2}$. We can test for instance between $.2T$ and $.8T$. Therefore we have in this particular case 20% of the sample trimmed at each end. The trimming percentage determines how many observations are used to compute the first estimate $\widetilde{\delta}_{j1}(\pi)$ and last estimate $\widetilde{\delta}_{j2}(\pi)$ with $\pi = .2T$ and $\pi = .8T$ respectively. The sample sizes T involved in our empirical applications made 20% a reasonable choice.

as good, if not better, than those of the SupW test (see the Appendix for details).

One may wonder by now why we focus exclusively on tests having a single break point as alternative. Surely, there are many other types of structural instabilities, like for instance cases where there are several breaks or where there are gradual movements in the δ_{ik} parameters. Constructing tests against all possible types of instabilities is simply impossible both statistically and practically. Fortunately, however, the situation is not hopeless because the single unknown break point statistics have power against a large class of parameter instability patterns far beyond what appears explicitly as alternative in (2.8). Therefore, examining (only) single break point tests goes a long way towards our goal.

In the next section, we present the models which will be considered in our empirical study.

3 The Conditional Asset Pricing Models Used for Emerging Markets

To apply our structural stability analysis to asset pricing models for emerging markets, we will consider two sets of models, namely the conditional CAPM in the spirit of Harvey (1991, 1995) and a conditional factor model similar to Ferson and Korajczyk (1995)). The proposed version of the conditional CAPM is the simplest one. It links the expected returns for stock markets in a set of countries to the expected returns on a world market portfolio via their *conditional* beta. It is the model we described in Section 2, except that Z_t does not represent a single variable, but a set of conditioning variables or instruments. This conditional CAPM model states that:

$$E\left[r_{it+1}|\Omega_t\right] = \frac{Cov\left[r_{it+1}, r_{Mt+1}|\Omega_t\right]}{Var\left[r_{Mt+1}|\Omega_t\right]} E\left[r_{Mt+1}|\Omega_t\right] \tag{3.1}$$

where r_{it+1} is the return on the market of country i, r_{Mt+1} the return on the world portfolio and Z_t the available information at time t. To make equation (3.1) operational, we define a set of projections, namely:

$$E\left[r_{it+1}\left|\Omega_t\right.\right] = Z_t'\delta_i \tag{3.2}$$

$$E\left[r_{Mt+1}\left|\Omega_t\right.\right] = Z_t'\delta_M \tag{3.3}$$

where Z_t is a $L \times 1$ vector of instruments and the vectors δ_i and δ_M are (stable) parameter ($L \times 1$) vectors defining the projections. One obtains a set of moment conditions suitable for GMM estimation of δ_i and δ_M via:

$$E \begin{pmatrix} (r_{it+1} - Z_t'\delta) \\ (r_{Mt+1} - Z_t'\delta_M) \\ (u_{Mt+1}^2 Z_t'\delta_i - u_{Mt+1}u_{it+1}Z_t'\delta_M) \end{pmatrix} \otimes Z_t' = 0 \tag{3.4}$$

where $u_{it+1} = r_{it+1} - Z_t'\delta_i$ and $u_{Mt+1} = r_{Mt+1} - Z_t'\delta_M$.

It should be noted that this specification differs from the model in Harvey (1995) when an exactly identified system of equations is specified. Two equations are added to system (3.4) to capture an average pricing error, while $Z_t'\delta_i$ is replaced by $Z_t'k_i$ where k_i are free parameters.[7] Our system of equations (3.4) can be seen as the minimal set of equations required to test a conditional CAPM with projections on economic variables.

We also consider a factor model where the asset returns r_{it+1} represent the returns on a set of size portfolios and where we will use either the local market portfolio alone as a factor (the segmentation hypothesis) or the local market portfolio in conjunction with external factors (the semi-integration hypothesis). This model is a conditional factor model similar to Ferson and Korajczyk (1995) who undertook a very thorough empirical investigation of risk and return for the U.S. using a multifactor conditional APT. The setup is very similar to the conditional CAPM described above except that the moment conditions are a bit more elaborate because of the presence of a set of portfolios and factors. The set of moment conditions is defined as follows:

$$E \begin{bmatrix} r_{it+1} - Z_t'\delta_i \\ \left(F_{t+1}' - Z_t'\gamma_i\right)' \\ \left(F_{t+1}' - Z_t'\gamma_i\right)' \left(F_{t+1}' - Z_t'\gamma_i\right)\beta_i - F_{t+1}\left(r_{it+1} - Z_t'\delta_i\right) \end{bmatrix} \otimes Z_t' = 0 \tag{3.5}$$

where F_{t+1}' is a $K \times 1$ vector of factor portfolios, β_i is a $K \times 1$ vector of the betas for portfolio i and Z_t is an $(L \times 1)$ vector of instruments. When using as factors both local and external variables, the overidentification tests of the model can be interpreted as a test for the semi-integration of

[7] This assumes that the conditional beta is a linear function of the information variables Z_t.

the emerging markets. Uncovering instability in this model could mean that the integration of emerging markets into the world market has occurred in various steps and therefore that the weights of the world and local market factors could have changed over time for valuing portfolios. It is important to note here that in contrast to the conditional CAPM, the model defined in (3.5) has parameters which play a very different role. It makes hypothesis testing also more interesting. Indeed, this more elaborate model has the advantage of separating projection equations and asset pricing moment conditions involving conditional betas. In (3.4) the third set of moment conditions does not involve any new parameters while in (3.5) the third set involves explicitly parameterized betas. The parameters δ_i and γ_i arise from purely ancillary statistical assumptions. Their instability means we have misspecified the projection equations. The instability of β_i, however, has a very different meaning and implication. These are the most interesting parameters from an asset pricing perspective.

4 Empirical Results

The dynamic asset pricing models described in Section 3 will be estimated for the following set of emerging markets: Argentina, Brazil, Chile, Mexico, India, Korea, Thailand, Greece, Jordan and Zimbabwe. The returns on each country's index or sets of portfolios were computed from the data provided in the Emerging Market Data Base (EMDB) of the International Finance Corporation which is part of the World Bank. For the return series computed with the IFC data bank, the data were available on a monthly basis from January 1976 through December 1992, a total of 204 observations. Some sample moments of the return series for the market indices are shown in Table 1. As reported in Harvey (1995), the emerging markets are characterized both by high expected returns and high volatility. Excess kurtosis is also important in most countries. Except for a few countries, there is also a fair degree of predictability based on past information, as indicated by the Box-Ljung statistic.

The purpose of the tests of conditional factor models is precisely to determine to what extent this predictability is explained by a dynamic factor model, in which the conditional expected return varies through time either because the factor loadings or the price of risk are time-varying, or both. We will analyze below first the results obtained for the conditional CAPM based on the world market portfolio. In this model, the underlying hypothesis is that emerging markets are perfectly integrated. In the next two specifications tested, we abandon this hypothesis and turn to a set of size sorted portfolios to test whether the local market index suffices as a factor to explain the portfolio returns. If it is the case, we will conclude to a segmentation of the markets. If other external factors along with the local market index covary significantly with the portfolio returns, we will infer that a semi-integration of the emerging markets is more likely. To assess all models, we will look not only at the J-test for overidentifying restrictions as all studies based on GMM estimation do, but also at the Sup LM stability test described in Section 2.

Let us first start with the conditional CAPM specification that makes the rather strong assumption that emerging markets are integrated with world financial markets. To estimate the conditional model in (3.4), we need to specify a set of instruments. Harvey (1991) used the following instruments: (1) a constant, (2) a January dummy, (3) lagged r_{Mt}, (4) the return on a 90-days T-Bill minus that of a 30-days one, (5) the Moody Baa yield minus the Aaa one and (6) the dividend yield on the S&P500 minus the 30-days T-Bill return. The instruments used were taken from the Center for Research in Security Prices (CRSP) or from the Fama bond files on CRSP. All details can be found in the original work by Harvey (1991). Harvey (1995) used the same instruments except the January dummy to test a similar model on emerging markets.[8]

The results are presented in Table 2. The J-statistics testing the overidentifying restrictions (a total of 6 since we have 18 moment conditions and 12 parameters to estimate) are reported in the first column of Table 2. For all the countries, the model is not rejected at the usual 5% level based on the $\chi^2(6)$ distribution for the J-statistic.[9] According to the Sup LM test however, there is most of the time at least one stability test rejecting the null. The two exceptions are Argentina and Korea which pass both sets of tests, even though the first country has undergone periods of economic upheaval during the sample period chosen, and regulatory reforms have affected the second. On the other hand, Brazil provides a very good example of our contention. It has one of the lowest J-statistic, but as is the case with India, the rejections with structural stability tests are numerous and strong.

The previous model considered as assets of interest the market portfolio for each of the individual countries in our sample. To proceed further, we consider a conditional CAPM using as assets for each coun-

[8] The sampling period for our instruments ends in 1989:05. Our estimations are therefore based on 161 observations, starting in January 1976.

[9] Harvey (1995) rejects the model for all countries but, as mentioned before, this test is different from ours. He does not test as such overidentifying restrictions since his model is just identified.

try a set of three portfolios formed according to the capitalization value of the individual firms in the IFC databank. The market portfolio is represented by the country indices that we used as assets before. This simple test of the CAPM theory in emerging markets has to the best of our knowledge not yet been performed and appears to be the reference model one would like to build to compare results with the results obtained in the US markets both in terms of acceptance or rejection of the model and of the presence of anomalies such as the small size effect. We first start using only country-specific or local factors, then we add two US factors (the Treasury bill rate and the Standard and Poor's index) to the previous model to see if there is any additional explanatory power for these factors, which will tend to show that emerging markets are semi-integrated to the US market.

In Table 3, we report the stability results for each projection coefficient (the δs for the market portfolio and the γs for the size portfolio), as well as for the corresponding δ and γ groups of coefficients and β, the covariance between each size portfolio returns and the market portfolio returns over the variance of the market portfolio returns. Since the particular specification selected assumes a constant β, the stability test is of particular economic interest because it assesses whether the risk measure of the portfolio in question has been stable or not over the sample period considered. For all the estimations, the instruments selected are a constant, the lagged market portfolio return, the dividend-price ratio calculated from the same ratio for the individual stocks included in the portfolio, and the exchange rate with the US dollar of each particular currency.

As a general assessment of the results, we can say that the p-values obtained for the J-test are surprisingly supportive of this simple CAPM model and that the model shows remarkable stability over almost all portfolios in all countries. The values estimated for β, which are reported in Table 4, are all reasonable, highly significant and in line with the CAPM prediction in four of the ten countries (Chile, Mexico, Greece, Zimbabwe). There is some evidence of a small size effect in the rest of the countries. The beta values for the small or medium firm portfolios are greater than the beta value of the high capitalization portfolio, implying higher expected returns in equilibrium than observed. In terms of p-value of the J-test, Zimbabwe gets both the lowest value of 0.21 and the highest one of 0.87. The beta Sup LM tests in table 3 show remarkable stability. Except for a few strong rejections for small and medium size portfolios in Korea and Thailand, one cannot reject the absence of structural change in the risk measure of the portfolios. For the other parameters, we observe the same overall stability with a few exceptions, especially in Thailand. According to these results, one would not reject the segmentation of the emerging markets, although to be rigorous about it one should test the orthogonality of the residuals with respect to US or other world factors. We do not perform these tests, but in the next section, we add two US factors to the local market portfolio and test the semi-integration hypothesis.

Table 5 reports the estimation results while Table 6 presents the stability results for each projection coefficient (the δs for the US Treasury bill rate, the γ_1s for the S&P index returns, the γ_2s for the size portfolio), as well as for β_1, the covariance between each size portfolio returns and the market portfolio returns over the variance of the market portfolio returns, and β_2 and β_3, the corresponding measures of risk for the US Treasury bill and S&P factors.

The betas estimated for the local market portfolio are very close to the values estimated in the previous model and bear the same strong statistical significance as before, but in addition the betas for the Treasury bill factor are often significantly different from zero. The beta estimated for the S&P factor is usually negligible in magnitude and one cannot reject most of the time the equality to zero of this parameter. The p-values of the J-test increase significantly for most portfolios in most countries, often to values greater than 90%. The big difference with the previous model comes however from the stability test results. Almost no beta is now stable with respect with the instruments selected. This is consistent with Ghysels (1996) for the coefficients associated with the US factors, and understandable for the beta of the size portfolio since now we project the local market portfolio both on local information variable and on US variables. In terms of semi-integration of the emerging markets, we can conclude that even if there often seems to be a role for the US Treasury bill factor (representing the risk-free asset factor proxying possibly for consumption growth), the main source of risk in emerging markets remains the aggregate risk included in the local market portfolio.

5 Conclusion

In this paper, we apply tests for structural stability to emerging markets asset pricing factor models. These models have been estimated via the generalized method of moments (GMM) procedure discussed in Hansen (1982). The success of the model fit is judged on the basis of GMM-based criteria. In particular, one tests whether the overidentifying restrictions imposed by the model agree with the data. The fundamental problem is that overidentifying restriction tests are not designed to diagnose whether a model provides a stable time invariant relationship between the return and the information variables. For the conditional world CAPM and the conditional local and US factor model, tests for structural stability of the GMM parameter estimates show that for most countries and portfolios according to the case, although we cannot reject the model on the basis of the overidentifying restrictions criterion, the rejection of the absence of structural change is quite strong. This is quite reasonable if one considers the strong idiosyncracies, both political and economical, that have disrupted these emerging markets in comparison with world events. This rejection means that the model yields a systematic mispricing of risk factors. A much more stable relationship is found however in a simple local CAPM model for size ranked portfolios, although the small size effect appears to be present in a number of countries. It was noted that Bekaert and Harvey (1995, 1996) suggested models with a time-varying structure switching from a segmented to an integrated asset pricing model for emerging market. Their specification relies on explanatory variables which represent the transition. While their model accommodates some of the issues raised in our paper it also opens new questions. Indeed, their specification depends on a specific parameterization for the transition dynamics. Implicitly, it is assumed that the time instability is resolved via this model of transition. Yet, it may well be that their model of switching is misspecified, and unstable, providing a erroneous characterization of the transition dynamics. One way to find this out would be to test the structural stability of the parameters they estimated for the transition scheme. If they are found to be stable then we have satisfactorily resolved (at least empirically) the question of transition from segmented to integrated markets. However, if find that the parameters of the transition model are unstable then we do not have a good model for the emergence of emerging markets. Applying structural stability tests to the models proposed by Bekaert and Harvey is the next step on this research agenda which we leave for further work.

A APPENDIX

In this Appendix we provide a more formal discussion of the tests for structural stability. To set the scene we first note that the models discussed in section 3 can be expressed via a generic set of moment conditions:

$$E\left[m\left(x_{t+1}, \Theta_o\right)\right] = E\left[e\left(y_{t+1}, \Theta_o\right) \otimes Z_t\right] = 0 \tag{A.1}$$

where Z_t is a set of instruments y_t a vector process containing all asset returns, factors, etc. while Θ_o is the parameter vector governing the pricing functions, the projection equations or conditional betas. Equations (3.6), (3.9) (3.10) and (3.11) describe the specific examples considered in the empirical section 4. For the purpose of discussion we shall divide the parameter vector in two subvectors, namely $\Theta_o \equiv (\gamma_o, \delta_o)$. This division allows for cases where we are not always interested in testing the complete parameter vector Θ_o but only a subvector γ_o. We observed in section 2 that this is often done because the parameters involved in the moment conditions play very different roles. This leads to the following null hypothesis:

$$H_o : \gamma_t = \gamma_0 \qquad \forall t \geq 1 \text{ for some } \gamma_0 \epsilon B \subset \mathbb{R}^p. \tag{A.2}$$

When no parameter δ_0 is present, one tests the entire parameter vector; a situation referred to as testing for pure structural change. Otherwise, one tests for partial structural change. The alternative hypothesis consists of a one-time change at some point $\pi \epsilon (0,1)$. Then, with sample size T, the change occurs at πT and can be formulated as:

$$H_{1T}(\pi) : \gamma_t = \begin{cases} \gamma_1(\pi) & \text{for } t = 1, \ldots, \pi T \\ \gamma_2(\pi) & \text{for } t = \pi T + 1, \ldots, T \end{cases} \tag{A.3}$$

for some constants $\gamma_1(\pi), \gamma_2(\pi) \epsilon B \subset \mathbb{R}^p$. As π is assumed unknown or $\pi \epsilon \Pi \subset (0,1)$ a pre-specified subset Andrews (1993) proposed to compute Wald, LM and LR-like tests for all π in Π and consider statistics of the form $g(\{S_T(\pi), \pi \epsilon \Pi\})$ where the statistic $S_T(\pi)$ equals $W_T(\pi), LM_T(\pi)$ or $LR_T(\pi)$ if Wald, LM or LR tests are computed. Andrews and

Ploberger (1994) formulated a unifying framework for the choice of the function g depending upon the alternatives of interest. In particular, consider

$$g\left(\left\{S_T(\pi), \pi\epsilon\Pi\right\}\right) = (1+c)^{p/2} \int_{\Pi} \exp\left[\frac{1}{2}\frac{c}{1+c} T S_T(\pi)\right] dJ(\pi) \tag{A.4}$$

where $J(\pi)$ is a weight function over the values of $\pi\epsilon\Pi$ and c determines the direction for the power of the test. When $c \to \infty$, tests have power against distant alternatives giving greater weight to large structural changes. Such tests are denoted ExpS_T. We did compute the ExpLM_T tests (available upon request), but since they yielded results quite similar to the SupS_T tests we are about to discuss we omitted then to save space.

An alternative design for the function g is of the "sup" form. It corresponds to a case where $c/(1+c)$ is equal to a constant and this constant goes to infinity. Andrews (1993) initially proposed such tests, namely:

$$\underset{\pi\epsilon\Pi}{Sup}\, W_T(\pi)\ \underset{\pi\epsilon\Pi}{Sup}\, LM_T(\pi) \text{ and } \underset{\pi\epsilon\Pi}{Sup}\, LR_T(\pi) \tag{A.5}$$

Of these six test statistics we shall only consider the LM variety. There are two reasons for confining our attention to SupLM (and ExpLM) statistics. First, unlike their Wald and LR counterparts, they only require *one* estimation of the model over the entire sample. Second, based on Monte Carlo simulations Ghysels and Guay (1994) find that the LM statistics have, compared to the Wald and LR tests, very good power properties and show no notable size distortions.

To discuss the tests more formally, let $\hat{V}(\pi)\, i = 1, 2$ be the sample covariance matrices obtains from a standard GMM procedure with heteroskedasticity and autocorrelation consistent covariance matrix estimation [see, e.g., Hansen (1982), Gallant and White (1988), Hall (1993) or Ogaki (1993) for general discussion]. The LM statistic makes use of the full-sample GMM estimator $\left(\hat{\gamma}, \hat{\delta}\right)$ and can be written as:

$$LM_T(\pi) = C_T(\pi)' \left(\hat{V}_1(\pi)/\pi + \hat{V}_2(\pi)/(1-\pi)\right)^{-1} C_T(\pi) \tag{A.6}$$

where $C_T(\pi)$ is computed as

$$C_T(\pi) = [I_q \ - \ I_q] \begin{bmatrix} \pi^{-1}\left(\hat{M}_1'\hat{S}_1^{-1}\hat{M}_1\right)^{-1}\hat{M}_1'\hat{S}_1^{-1} & 0 \\ 0 & (1-\pi)^{-1}\left(\hat{M}_2'\hat{S}_2^{-1}\hat{M}_2\right)^{-1}\hat{S}_2^{-1} \end{bmatrix} \sqrt{T}\overline{m}_T\left(\hat{\gamma}, \hat{\delta}, \pi\right)$$

where $\overline{m}_T\left(\hat{\gamma},\tilde{\delta},\pi\right)$ is the set of moment conditions $m\left(x_{t+1},\gamma,\delta\right)\,\epsilon\,R^q$ stacked according to the sample split at π evaluated at the full sample estimates $\hat{\gamma}$ and $\hat{\delta}$:

$$\overline{m}_T\left(\hat{\gamma},\hat{\delta},\pi\right)=\frac{1}{T}\sum_{t=1}^{\pi T}\left[\begin{array}{c} m\left(x_{t+1},\hat{\gamma},\hat{\delta}\right) \\ 0 \end{array}\right]+\frac{1}{T}\sum_{t=T\pi+1}^{T}\left[\begin{array}{c} 0 \\ m\left(x_{t+1},\hat{\gamma},\hat{\delta}\right) \end{array}\right]$$

while $\hat{M}_i=\hat{M}_i\left(\pi\right)$ is the score function of the sample moment conditions $m\left(x_t,\gamma_1,\delta\right)$ with respect to γ_i for $i=1,2$. Finally, $\hat{S}_i=\hat{S}_i\left(\pi\right)$ is the heteroskedasticity and autocorrelation consistent covariance estimator of the sample moment conditions for $i=1,2$. In our case we simplified the computations, as is typically done by using, the full sample estimates $\hat{M}_i\left(\pi\right)=\hat{M}$ and $\hat{S}_i\left(\pi\right)=\hat{S}$.

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Table 1: Sample Moments of Return Series.

	Argentina	Brazil	Chile	Mexico	India	Korea	Thailand	Greece	Jordan	Zimbabwe
Mean	67.8743	22.0970	36.6650	30.3904	20.2028	21.2641	22.3295	7.4654	10.7468	7.7733
Std. Dev.	103.9108	60.2414	39.5773	44.5639	27.2278	32.3377	25.7566	36.2207	17.8933	34.1728
Skewness	1.9470	0.5151	0.9244	-0.8197	0.6574	0.9835	-0.0955	1.8198	0.3688	.02822
Kurtosis	7.1250	0.9793	3.0661	3.6287	2.1912	1.9125	3.2061	7.2264	0.1873	1.8440
ρ_1	0.0537	0.0287	0.1687	0.2475	0.0789	-0.0012	0.1142	0.1322	0.0003	0.1380
ρ_2	0.0660	-0.0377	0.2604	-0.0739	-0.0994	0.0820	0.1487	0.1789	0.0244	0.1539
ρ_3	0.1180	-0.0362	-0.0117	-0.0391	-0.0323	0.0163	0.0052	0.0282	0.1801	.02447
ρ_4	-0.0503	-0.0670	-0.0330	0.0352	-0.1037	-0.0155	-0.1137	-0.0572	0.0036	0.1675
ρ_5	-0.0502	-0.0411	0.0052	0.1223	0.0130	0.0501	-0.0172	0.0388	-0.0733	0.1109
Box-Ljung Statistic	8.0539	7.3939	37.2628	22.7292	16.8850	5.8281	18.0510	24.2990	18.3117	41.3448
P-Value	0.6236	0.6878	0.00005	0.0118	0.0769	0.8295	0.0541	0.0068	0.0499	0.00001

Table 2: The Conditional CAPM - Emerging MarketsDiagnostics with World Instruments

Instruments		Constant	Lagged World Return	January Dummy	Interest Rate Spread	Junk Bonds	Dividends
COUNTRY	J-TEST (5% Critical value =12.59)	SUP LM	SUP LM	SUP LM	SUP LM	SUP LM	SUP LM
Argentina	3.5688	9.5287	8.5790	8.1818	4.8013	7.6818	6.2336
Brazil	3.3926	13.2218**	5.6805	20.9140***	8.3974	18.1527***	10.7788*
Chile	10.5428	8.1861	5.3439	12.2564**	5.0811	9.2745	6.0753
Mexico	10.1450	7.7388	14.7600**	6.6796	5.9201	7.3595	5.8875
India	7.6840	11.2601*	6.4645	32.3183***	6.5852	13.7746**	4.7744
Korea	6.3982	3.8077	8.2291	5.5253	6.0839	4.2891	5.1788
Thailand	9.7024	19.8124***	5.5793	5.5830	12.4156**	17.2510***	14.4494**
Greece	10.6309	5.2694	1.9250	2.7006	8.9113	5.5747	6.1169
Jordan	1.1829	8.9548	16.2460***	7.9352	18.9565***	8.8759	7.5951
Zimbabwe	10.4414	3.3198	4.9794	2.8015	6.4141	3.2601	7.8708

* : 10% ** : 5% *** : 1%

Notes: Data are taken from the IFC Emerging Markets Data Base. The instruments are the same as in Harvey (1991) and are defined as follows: Lagged World Return is the excess return on the MSCI world index, the interest rate spread is the return for holding a 90-days US Tbill for 1 month less the return on a 30-days Bill, the Junk bond instrument is the yield on Moody's Baa rated bonds less the yield on Moody's Aaa rated bonds, the dividend instrument is the dividend yield on the S & P 500 stock index less the return on a 30-days T-Bill.

Table 3: Sized-Sorted Portfolios and Local Conditional CAPM. Sup LM Statistics

	Argentina			Brazil			Chile			Korea		
	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
J-Test (ρ-value)	2.8292 (0.4187)	3.3825 (0.3363)	1.0364 (0.7924)	1.5552 (0.6696)	3.6957 (0.2963)	2.4627 (0.4821)	2.7651 (0.4293)	5.1104 (0.1639)	0.9606 (0.8108)	1.7197 (0.6326)	2.1606 (0.5398)	4.1450 (0.2462)
δ_{ALL}	9.0267	6.3565	4.0856	3.6137	9.7680	10.008	6.2101	9.6974	9.3647	7.2878	13.3701	3.0729
δ_1	2.5409	3.4513	1.6820	1.4656	2.5445	8.0050 *	4.7136	2.8047	2.1945	0.8402	2.1419	1.5670
δ_2	5.5693	2.3374	1.5157	1.3854	1.9506	4.4374	1.6839	7.5225 *	8.2684 *	5.1781	3.1006	1.7717
δ_3	3.3084	3.5896	1.8058	0.5050	7.7186 *	2.9454	4.9925	5.5509	2.2218	2.4261	6.8347	1.6697
δ_4	0.2881	0.3826	1.0552	3.1143	3.2208	1.5463	6.1003	3.6770	4.9170	1.0917	1.9449	1.7542
γ_{ALL}	10.8479	5.7808	3.5979	10.1144	4.8671	7.0362	8.1169	14.4437 *	7.5934	11.4990	5.1826	4.4512
γ_1	1.8374	3.0444	1.0697	4.1029	0.7537	5.4768	3.8729	2.1324	3.8534	3.0013	2.7003	1.2539
γ_2	7.5742 *	2.0609	1.3916	5.7359	2.1763	5.3890	1.0311	8.4925 *	4.2528	2.1148	1.8471	2.8065
γ_3	3.5264	3.4179	1.3430	5.3639	0.9138	1.3858	4.0146	4.0291	1.7654	1.3136	3.9031	1.5019
γ_4	0.1472	0.1428	1.0158	2.3121	2.7279	3.1847	5.4686	3.1558	5.3894	1.7570	2.9657	1.3425
β	2.2243	4.3984	3.7517	4.9353	2.1323	4.4162	0.9354	2.3069	1.6992	1.6040	12.79 ***	4.9797

*: 10% **: 5% ***: 1%

Notes: The columns "Low", "Medium" and "High" reflect size classifications for each country. The δ, γ and β parameter (vectors) are defined by equation (2.21). The index "ALL" corresponds to joint tests for the entire vector while index i=1,2,3,4 reflect individual coefficient tests. The δ coefficients represent projections for the market portfolio and γ for the size portfolio. The four instruments are local ones: a constant, lagged market returns, dividend-price ratio and exchange rate (local currency / US$).

Table 3 (continued): Sized-Sorted Portfolios and Local Conditional CAPM. Sup LM Statistics

	Mexico			India			Thailand		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
J-Test (ρ-value)	2.8348 (0.4178)	2.0242 (0.5674)	4.3164 (0.2293)	4.1218 (0.2486)	1.2539 (0.7401)	2.4898 (0.4771)	2.4393 (0.4864)	4.0717 (0.2538)	3.2135 (0.3599)
δ_{ALL}	14.3788 *	4.4288	6.7121	5.8186	8.7227	7.2795	14.3023	12.5514	16.4528 **
δ_1	4.1387	1.1340	1.2606	1.4963	1.5098	3.8475	9.6918 **	5.4571	1.9999
δ_2	6.6964	2.0458	3.3015	1.7787	1.9474	4.2260	4.4048	6.5898	8.1595 *
δ_3	3.4565	2.4758	4.2435	5.0162	5.5713	3.4758	1.8408	2.0489	3.0859
δ_4	10.8848 **	0.6630	1.1039	1.0783	1.2880	1.5247	10.1168 **	6.0409	2.5798
γ_{ALL}	10.3581	7.2005	9.4566	6.3635	9.4542	8.3584	18.1198 **	13.4699	14.9622 *
γ_1	3.9064	2.2444	2.3404	1.1914	2.9281	4.6866	10.5747 **	6.0444	3.0913
γ_2	2.5708	3.2791	3.4830	2.3221	1.5702	4.7462	5.4134	4.7838	8.1678 *
γ_3	4.4469	3.7370	7.4219 *	3.8847	3.9989	3.8582	1.9871	5.3298	2.5232
γ_4	3.9667	0.9312	0.6184	1.1630	1.9740	2.1609	11.3963 **	6.8089	2.7106
β	1.7661	3.1538	5.9439	6.0892	2.0503	6.4365	14.0362 ***	12.9839 ***	1.1867

*: 10% **: 5% ***: 1%

Notes: The columns "Low", "Medium" and "High" reflect size classifications for each country. The δ, γ and β parameter (vectors) are defined by equation (2.21). The index "ALL" corresponds to joint tests for the entire vector while index i=1,2,3,4 reflect individual coefficient tests. The δ coefficients represent projections for the market portfolio and γ for the size portfolio. The four instruments are local ones: a constant, lagged market returns, dividend-price ratio and exchange rate (local currency / US$).

Table 3 (continued): Sized-Sorted Portfolios and Local Conditional CAPM. Sup LM Statistics

	Greece			Jordan			Zimbabwe		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
J-Test (ρ-value)	2.8228 (0.4198)	2.9554 (0.3986)	3.2431 (0.3556)	3.2005 (0.3617)	4.2780 (0.2330)	1.5616 (0.6681)	0.7268 (0.8669)	4.4916 (0.2130)	4.5630 (0.2067)
δ_{ALL}	7.9853	14.8847 *	12.0997	9.1460	6.7598	13.9839	2.9518	7.6223	8.2110
δ_1	4.3634	2.5892	2.5934	0.8842	2.3114	4.9555	0.9206	3.7404	2.1026
δ_2	2.4111	1.4115	9.7781 **	7.7284 *	3.7196	10.4953 **	2.0754	3.1148	5.6685
δ_3	3.6735	1.8954	1.3023	4.9473	5.0186	7.7172 *	0.8634	2.9891	3.4136
δ_4	2.9599	9.9919 **	4.3744	0.6510	2.3663	3.7966	0.2532	6.9343	1.8435
γ_{ALL}	7.4579	16.2720 *	14.2295	12.2726	7.1205	13.2920	13.4453	4.3512	9.0114
γ_1	5.8019	9.8458 **	2.9108	3.6562	1.7465	5.3162	5.5051	2.8821	4.5051
γ_2	1.6056	0.8185	6.4716	6.1326	1.7356	8.0719 *	7.5875 *	1.9939	4.1471
γ_3	4.4885	1.1944	1.6316	1.2125	2.3806	9.3809 **	8.1222 *	3.4686	6.9034
γ_4	2.4385	3.3987	6.0984	1.5215	1.9651	3.9116	8.1184 *	1.0487	4.4086
β	8.9309 **	2.4858	5.4735	4.5428	8.7133 *	3.5330	2.2207	1.3323	1.5677

*: 10% **: 5% ***: 1%

Notes: The columns "Low", "Medium" and "High" reflect size classifications for each country. The δ, γ and β parameter (vectors) are defined by equation (2.21). The index "ALL" corresponds to joint tests for the entire vector while index i=1,2,3,4 reflect individual coefficient tests. The δ coefficients represent projections for the market portfolio and γ for the size portfolio. The four instruments are local ones: a constant, lagged market returns, dividend-price ratio and exchange rate (local currency / US$).

Table 4: Local Factor only - Emerging Markets Beta Estimates				
		Low	Medium	High
Argentina	Mean Excess Return	0.0863	0.0742	0.0733
	Estimates	0.9931	1.0096	0.9868
	t-statistics	17.9505 ***	13.8476 ***	18.0052 ***
Brazil	Mean Excess Return	0.0214	0.0413	0.0305
	Estimates	0.8043	0.8692	0.8334
	t-statistics	10.2836 ***	10.3986 ***	15.0118 ***
Chile	Mean Excess Return	0.0183	0.0280	0.0376
	Estimates	0.8458	0.9569	1.0488
	t-statistics	14.0004 ***	22.5047 ***	30.5322 ***
Korea	Mean Excess Return	0.0111	0.0188	0.0177
	Estimates	0.9555	0.8565	1.0246
	t-statistics	14.5874 ***	25.3095 ***	52.2570 ***
Mexico	Mean Excess Return	0.0262	0.0281	0.0281
	Estimates	0.7796	0.9066	1.0440
	t-statistics	10.4039 ***	22.2280 ***	23.7472 ***
India	Mean Excess Return	0.0068	0.0110	0.0156
	Estimates	0.9408	0.8393	1.0356
	t-statistics	18.0429 ***	22.5687 ***	35.7327 ***
Thailand	Mean Excess Return	0.0042	0.0189	0.0154
	Estimates	1.0516	1.0847	1.0012
	t-statistics	12.6958 ***	23.9927 ***	23.3806 ***
Greece	Mean Excess Return	-0.0024	0.0122	0.0043
	Estimates	0.5324	0.7060	1.0853
	t-statistics	8.7231 ***	14.7976 ***	18.0748 ***
Jordan	Mean Excess Return	-0.0026	0.0088	0.0071
	Estimates	0.7126	0.6752	1.0616
	t-statistics	5.7606 ***	5.4148 ***	32.7147 ***
Zimbabwe	Mean Excess Return	0.0018	0.0061	0.0168
	Estimates	0.8061	0.9093	1.0665
	t-statistics	9.6301 ***	11.7193 ***	28.9154 ***

Table 5: Stable Factors in the Conditional APT- Emerging Markets (with Tbills, SP500 and Local Index as Factors) Beta Estimates										
		Argentina			Brazil			Chile		
		Low	Medium	High	Low	Medium	High	Low	Medium	High
β_1	Estimates	1.0551	0.9896	0.9986	0.7652	1.0558	0.9651	0.7749	0.9195	1.0592
	t-statistics	16.52 **	22.49 **	21.01 ***	10.01 ***	12.43 ***	16.10 ***	19.43 ***	33.40 ***	51.06 ***
β_2	Estimates	-1.9747	-2.5964	3.2061	2.0188	20.2229	2.5293	3.6334	0.9874	-0.7825
	t-statistics	-0.55	-0.79	0.92	0.55	3.35 ***	1.94 **	2.64 ***	1.25	-0.88
β_3	Estimates	0.1337	-0.0514	0.2286	0.2612	-0.0195	-0.0166	0.3507	-0.0273	-0.2813
	t-statistics	0.88	-0.29	1.46 *	1.20	-0.08	-0.16	3.82 ***	-0.39	-2.57 ***
		Korea			Mexico			India		
		Low	Medium	High	Low	Medium	High	Low	Medium	High
β_1	Estimates	0.9481	0.8391	0.9960	0.8233	0.8730	1.0413	0.8782	0.8279	1.0777
	t-statistics	14.31 ***	25.27 ***	49.42 ***	16.08 ***	21.64 ***	31.50 ***	21.40 ***	18.80 ***	48.42 ***
β_2	Estimates	-4.5298	2.1364	0.6433	0.1975	2.6562	-1.1247	-2.1121	-1.1343	0.3190
	t-statistics	-2.88 ***	3.23 ***	1.09	0.10	1.79 **	-1.11	-3.47 ***	-1.91 **	0.79
β_3	Estimates	-0.0166	-0.0234	-0.0306	-0.0951	0.1025	-0.2419	0.0433	0.0554	-0.0662
	t-statistics	-0.17	-0.35	-0.66	-0.78	0.92	-2.76 ***	0.91	1.81 **	-2.41 ***

*: 10%   **: 5%   **: 1%

Table 5 (continued): Stable Factors in the Conditional APT- Emerging Markets (with Tbills, SP500 and Local Index as Factors)
Beta Estimates

		Thailand			Greece			Jordan		
		Low	Medium	High	Low	Medium	High	Low	Medium	High
β_1	Estimates	-0.2717	-0.0851	0.9784	0.5052	0.6616	0.9739	30.4913	0.5571	1.0487
	t-statistics	-1.74 **	-0.36	50.67 ***	10.43 ***	10.49 ***	34.96 ***	5.47 ***	9.09 ***	51.72 ***
β_2	Estimates	-6.4005	-3.7151	0.8744	1.0244	-2.1384	1.0986	-30.4430	0.6329	-0.2122
	t-statistics	-1.66 **	-0.68	2.45 ***	1.07	-2.05 **	1.71 **	-0.47	0.86	-0.75
β_3	Estimates	0.0698	-0.1303	-0.0198	0.0540	0.0143	-0.0166	-4.8421	0.3172	-0.0556
	t-statistics	0.27	-0.42	-0.86	0.89	0.22	-0.40	-0.82	5.05 ***	-2.94 ***
		Zimbabwe								
		Low	Medium	High						
β_1	Estimates	0.7122	0.8563	1.0252						
	t-statistics	8.85 ***	10.10 ***	26.82 ***						
β_2	Estimates	-0.2225	-0.9877	-0.3131						
	t-statistics	-0.15	-0.59	-0.29						
β_3	Estimates	-0.2722	-0.1477	0.1921						
	t-statistics	-1.75 **	-1.61 *	3.45 ***						

*: 10%　　**: 5%　　***: 1%

Table 6: Stable Factors in the Conditional APT - Emerging Markets. With Tbills, SP500 and Local Index as Factors. Sup LM Statistics

	Argentina			Brazil			Chile		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
J-test	25.70 (0.37)	15.44 (0.91)	16.27 (0.88)	12.97 (0.97)	28.60 (0.24)	12.36 (0.98)	14.42 (0.94)	18.24 (0.79)	9.24 (1.00)
δ_{ALL}	99.60 ***	13.17	72.43 ***	8.95	27.75 **	105.48 ***	378.21 ***	776.48 ***	57.78 ***
δ_1	13.25 ***	3.42	9.29 **	1.28	15.78 ***	51.69 ***	81.98 ***	507.62 ***	8.40 *
δ_2	32.91 ***	2.22	33.65 ***	2.29	2.47	72.87 ***	47.92 ***	516.74 ***	15.57 ***
δ_3	34.07 ***	0.35	19.54 ***	2.86	5.24	22.92 ***	76.08 ***	408.79 ***	24.09 ***
δ_4	17.95 ***	2.27	9.06 **	2.28	9.26 **	31.48 ***	63.58 ***	438.29 ***	13.85 ***
δ_5	19.75 ***	6.45	9.99 **	3.52	6.06	5.22	106.27 ***	90.57 ***	15.67 ***
δ_6	17.52 ***	2.88	19.00 ***	2.49	3.26	5.60	87.40 ***	581.94 ***	4.58
δ_7	5.34	3.98	46.69 ***	2.19	7.95 *	52.95 ***	41.48 ***	101.95 ***	10.02 **
δ_8	15.39 ***	4.22	7.73 *	1.81	7.10	49.32 ***	46.43 ***	432.89 ***	13.42 ***
δ_9	32.00 ***	2.95	7.79 *	2.40	7.53 *	38.34 ***	32.11 ***	346.92 ***	7.90 *
$\gamma1_{ALL}$	201.46 ***	12.55	98.26 ***	16.19	21.54	131.77 ***	389.79 ***	841.71 ***	57.65 ***
$\gamma2_{ALL}$	189.11 ***	49.57 ***	135.15 ***	42.12 ***	75.24 ***	156.02 ***	479.99 ***	765.36 ***	88.80 ***
$\gamma2_{C1}$	121.59 ***	37.61 ***	109.37 ***	36.13 ***	71.26 ***	64.66 ***	441.99 ***	597.96 ***	57.47 ***
$\gamma2_{C2}$	121.35 ***	14.19	76.58 ***	12.80	17.02	130.52 ***	384.63 ***	549.57 ***	62.81 ***
$\gamma1_1$	14.98 ***	4.04	7.86 *	1.84	12.52 ***	37.10 ***	200.39 ***	512.22 ***	5.07
$\gamma1_2$	62.16 ***	2.76	36.36 ***	1.63	2.90	79.95 ***	30.16 ***	509.25 ***	7.34 *
$\gamma1_3$	11.22 **	0.41	11.88 **	3.54	3.73	49.89 ***	35.06 ***	418.99 ***	27.05 ***
$\gamma1_4$	21.00 ***	3.15	8.26 *	4.08	6.77	35.01 ***	38.22 ***	426.01 ***	18.53 ***
$\gamma1_5$	49.52 ***	4.14	17.99 ***	2.35	6.60	17.77 ***	213.39 ***	98.37 ***	27.04 ***
$\gamma1_6$	6.37	2.29	8.61 *	4.24	4.51	11.38 **	70.35 ***	364.22 ***	6.39
$\gamma1_7$	7.77 *	5.23	62.16 ***	3.04	6.53	83.58 ***	20.38 ***	40.53 ***	9.05 **
$\gamma1_8$	18.29 ***	5.18	7.36 *	4.22	6.72	46.48 ***	36.38 ***	413.07 ***	20.99 ***
$\gamma1_9$	22.10 ***	3.71	7.93 *	5.16	2.66	30.34 ***	30.37 ***	389.66 ***	18.77 ***
$\gamma2_1$	8.85 **	33.42 ***	5.40	34.75 ***	55.36 ***	23.97 ***	154.34 ***	256.94 ***	42.01 ***
$\gamma2_2$	6.56	2.54	41.28 ***	5.93	4.32	28.63 ***	54.71 ***	226.58 ***	12.78 ***
$\gamma2_3$	25.14 ***	6.00	3.34	2.79	15.67 ***	34.86 ***	272.38 ***	57.73 ***	21.96 ***
$\gamma2_4$	15.28 ***	10.97 **	47.00 ***	8.59 *	37.49 ***	9.32 **	78.77 ***	136.63 ***	12.64 ***
$\gamma2_5$	22.07 ***	26.38 ***	9.26 **	31.49 ***	46.75 ***	31.34 ***	135.56 ***	288.40 ***	46.08 ***
$\gamma2_6$	71.34 ***	22.45 ***	15.24 ***	21.30 ***	19.37 ***	15.06 ***	380.15 ***	483.34 ***	16.73 ***
$\gamma2_7$	12.22 **	1.94	3.82	5.65	6.90	31.31 ***	149.52 ***	250.03 ***	7.04
$\gamma2_8$	33.01 ***	3.55	49.91 ***	8.24 *	3.09	40.68 ***	110.85 ***	170.26 ***	19.10 ***
$\gamma2_9$	7.46 *	9.60 **	19.44 ***	8.37 *	3.41	93.65 ***	113.81 ***	315.78 ***	25.91 ***
$\gamma2_{10}$	14.63 ***	7.33 *	28.45 ***	2.63	2.72	65.39 ***	51.79 ***	99.60 ***	15.58 ***
$\gamma2_{11}$	12.41 ***	2.87	3.58	3.81	3.80	42.70 ***	97.25 ***	179.59 ***	8.57 *
$\gamma2_{12}$	2.55	5.24	5.24	1.96	1.59	49.66 ***	174.26 ***	194.41 ***	11.53 **
β_{ALL}	61.81 ***	9.26	109.18 ***	17.83 ***	6.99	57.35 ***	256.09 ***	437.85 ***	52.35 ***
β_1	12.89 ***	3.52	21.93 ***	9.42 **	6.06	35.26 ***	183.44 ***	342.55 ***	18.27 ***
β_2	38.64 ***	8.13 *	33.33 ***	0.87	4.33	39.46 ***	232.60 ***	316.78 ***	41.61 ***
β_3	28.33 ***	2.23	96.35 ***	4.28	5.10	9.82 **	132.83 ***	96.15 ***	14.06 ***

*: 10%   **: 5%   ***: 1%

Table 6 (continued): Stable Factors in the Conditional APT - Emerging Markets. With Tbills, SP500 and Local Index as Factors. Sup LM Statistics.

	Korea			Mexico			India		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
J-test	11.09 (0.99)	15.13 (0.92)	22.12 (0.57)	12.93 (0.97)	12.29 (0.98)	12.13 (0.98)	23.51 (0.49)	17.38 (0.83)	12.67 (0.97)
δ_{ALL}	47.54 ***	422.97 ***	54.72 ***	243.95 ***	1925.0 ***	372.08 ***	35.78 ***	45.36 ***	40.21 ***
δ_1	23.01 ***	34.21 ***	16.25 ***	57.24 ***	281.35 ***	203.46 ***	13.00 ***	10.71 **	3.10
δ_2	38.06 ***	88.50 ***	26.10 ***	24.02 ***	303.84 ***	59.41 ***	28.98 ***	12.63 ***	3.05
δ_3	16.69 ***	181.51 ***	20.79 ***	56.99 ***	785.45 ***	144.72 ***	17.01 ***	12.67 ***	2.58
δ_4	17.11 ***	178.27 ***	21.26 ***	102.78 ***	550.66 ***	101.42 ***	24.94 ***	13.98 ***	2.14
δ_5	7.12	87.05 ***	14.31 ***	55.19 ***	95.89 ***	84.32 ***	19.14 ***	21.41 ***	2.24
δ_6	19.45 ***	295.62 ***	19.67 ***	32.68 ***	634.87 ***	154.06 ***	9.53 **	4.08	8.35 *
δ_7	16.26 ***	177.33 ***	9.06 **	52.47 ***	799.73 ***	131.73 ***	1.89	10.22 **	7.03
δ_8	16.14 ***	170.47 ***	19.60 ***	86.21 ***	249.96 ***	92.77 ***	20.48 ***	6.31	3.27
δ_9	19.20 ***	130.48 ***	10.78 **	107.32 ***	391.43 ***	131.93 ***	11.85 **	5.75	3.84
$\gamma1_{ALL}$	46.08 ***	349.04 ***	61.90 ***	197.06 ***	1962.4 ***	406.85 ***	34.54 ***	48.79 ***	41.56 ***
$\gamma2_{ALL}$	75.85 ***	398.92 ***	107.36 ***	221.93 ***	2056.9 ***	437.29 ***	48.59 ***	66.76 ***	49.86 ***
$\gamma2_{C1}$	48.04 ***	257.74 ***	83.34 ***	175.54 ***	1865.9 ***	265.95 ***	40.27 ***	47.24 ***	43.81 ***
$\gamma2_{C2}$	25.23 ***	258.36 ***	48.49 ***	185.23 ***	1994.3 ***	406.04 ***	16.91	45.89 ***	15.58
$\gamma1_1$	24.36 ***	31.25 ***	17.85 ***	28.94***	620.30 ***	267.43 ***	10.17 **	23.28 ***	4.51
$\gamma1_2$	22.04 ***	199.80 ***	20.87 ***	9.96 **	397.03 ***	32.53 ***	23.74 ***	28.27 ***	9.63 **
$\gamma1_3$	18.87 ***	144.16 ***	16.12 ***	49.46 ***	766.31 ***	281.10 ***	15.09 ***	19.87 ***	3.09
$\gamma1_4$	18.31 ***	152.00 ***	17.18 ***	78.69 ***	1716.6 ***	104.12 ***	19.88 ***	20.67 ***	2.00
$\gamma1_5$	10.30 **	80.00 ***	18.43 ***	64.70 ***	220.93 ***	133.08 ***	11.30 **	15.29 ***	3.10
$\gamma1_6$	17.92 ***	198.03 ***	32.77 ***	44.45 ***	512.01 ***	165.81 ***	8.40 *	8.26 *	7.20 *
$\gamma1_7$	19.23 ***	124.10 ***	4.91	18.48 ***	900.45 ***	208.47 ***	5.51	17.36 ***	9.59 **
$\gamma1_8$	18.97 ***	129.80 ***	18.59 ***	72.46 ***	1674.3 ***	76.29 ***	19.22 ***	11.05 **	2.65
$\gamma1_9$	19.62 ***	133.39 ***	10.96 **	82.43 ***	1584.2 ***	155.07 ***	15.00 ***	8.72 *	2.18
$\gamma2_1$	32.48 ***	194.07 ***	40.53 ***	31.40 ***	195.94 ***	30.95 ***	27.79 ***	21.69 ***	22.93 ***
$\gamma2_2$	4.43	123.66 ***	14.63 ***	42.41 ***	634.55 ***	60.42 ***	6.15	11.90 **	3.36
$\gamma2_3$	15.58 ***	145.59 ***	29.83 ***	82.01 ***	1427.5 ***	150.94 ***	4.44	7.57 *	3.34
$\gamma2_4$	22.35 ***	210.70 ***	13.57 ***	30.75 ***	1690.7 ***	113.96 ***	13.23 ***	7.51 *	29.17 ***
$\gamma2_5$	24.70 ***	175.17 ***	35.77 ***	24.91 ***	831.53 ***	43.51 ***	27.09 ***	13.12 ***	18.35 ***
$\gamma2_6$	12.91 ***	200.20 ***	37.49 ***	107.40 ***	485.63 ***	60.97 ***	14.15 ***	15.53 ***	7.79 *
$\gamma2_7$	17.14 ***	151.37 ***	13.94 ***	39.20 ***	1108.8 ***	45.48 ***	4.42	17.71 ***	4.76
$\gamma2_8$	18.34 ***	142.70 ***	6.55	17.36 ***	1887.4 ***	180.09 ***	6.31	35.36 ***	6.26
$\gamma2_9$	9.31 **	203.93 ***	31.26 ***	134.88 ***	298.40 ***	96.68 ***	7.37 *	11.24 **	4.76
$\gamma2_{10}$	8.86 **	156.50 ***	19.61 ***	78.38 ***	1728.9 ***	9.97 **	8.34 *	32.66 ***	4.24
$\gamma2_{11}$	14.99 ***	124.77 ***	14.01 ***	51.01 ***	718.93 ***	67.47 ***	2.17	17.00 ***	5.93
$\gamma2_{12}$	10.25 **	158.87 ***	16.76 ***	101.97 ***	1386.5 ***	20.68 ***	2.87	5.21	5.91
β_{ALL}	30.42 ***	231.27 ***	45.36 ***	135.64 ***	1524.0 ***	205.01 ***	11.84	26.63 ***	38.56 ***
β_1	17.69 ***	79.36 ***	36.54 ***	11.62 **	1134.8 ***	185.21 ***	9.60 **	24.98 ***	33.65 ***
β_2	16.59 ***	102.61 ***	33.20 ***	123.80 ***	141.84 ***	125.71 ***	3.63	3.75	10.27 **
β_3	13.57 ***	143.83 ***	2.69	42.68 ***	1447.4 ***	161.64 ***	7.79 *	5.68	4.16

*: 10% **: 5% ***: 1%

Table 6 (continued): Stable Factors in the Conditional APT - Emerging Markets. With Tbills, SP500 and Local Index as Factors. Sup LM Statistics.

	Thailand			Greece			Jordan		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
J-test	13.39 (0.96)	6.20 (1.00)	11.91 (0.98)	11.61 (0.98)	15.07 (0.92)	11.57 (0.98)	9.54 (1.00)	9.80 (1.00)	11.65 (0.98)
δ_{ALL}	14.77	33.24 ***	190.30 ***	336.66 ***	206.49 ***	161.93 ***	157.23 ***	122.29 ***	296.40 ***
δ_1	1.50	2.86	11.17 **	273.85 ***	13.65 ***	66.38 ***	9.83 **	18.84 ***	192.47 ***
δ_2	4.64	3.61	14.32 ***	75.44 ***	194.48 ***	18.31 ***	3.68	37.32 ***	220.10 ***
δ_3	4.13	2.12	4.51	230.78 ***	61.13 ***	63.70 ***	13.37 ***	21.44 ***	94.35 ***
δ_4	3.89	1.87	7.11	96.67 ***	16.05 ***	76.55 ***	12.25 **	27.04 ***	83.68 ***
δ_5	3.46	18.24 ***	49.55 ***	95.25 ***	85.78 ***	34.48 ***	27.67 ***	53.45 ***	16.44 ***
δ_6	5.47	9.06 **	6.42	41.55 ***	50.60 ***	28.49 ***	8.52 *	32.40 ***	172.95 ***
δ_7	9.37 **	5.73	17.68 ***	50.81 ***	96.80 ***	62.58 ***	64.24 ***	11.43 **	94.46 ***
δ_8	4.68	2.10	3.16	61.82 ***	48.56 ***	99.52 ***	13.60 ***	50.61 ***	143.00 ***
δ_9	5.16	2.10	8.97 **	22.79 ***	99.49 ***	30.45 ***	23.15 ***	56.27 ***	165.65 ***
$\gamma1_{ALL}$	31.88 ***	30.32 **	176.85 ***	275.99 ***	202.14 ***	112.74 ***	165.10 ***	132.59 ***	293.16 ***
$\gamma2_{ALL}$	49.06 ***	136.54 ***	176.79 ***	311.98 ***	256.08 ***	172.33 ***	295.17 ***	145.97 ***	324.88 ***
$\gamma2_{C1}$	32.59 ***	131.87 ***	99.72 ***	262.64 ***	240.57 ***	159.29 ***	268.81 ***	108.12 ***	219.15 ***
$\gamma2_{C2}$	31.47 ***	34.33 ***	123.69 ***	275.78 ***	148.97 ***	92.72 ***	90.05 ***	121.21 ***	278.63 ***
$\gamma1_1$	2.74	3.63	13.50 ***	47.25 ***	23.98 ***	67.86 ***	11.07 **	11.13 **	183.05 ***
$\gamma1_2$	5.77	3.88	8.53 *	21.90 ***	53.67 ***	18.73 ***	12.64 ***	81.83 ***	254.32 ***
$\gamma1_3$	10.39 **	7.47 *	5.93	169.33 ***	9.89 **	22.48 ***	11.46 **	17.83 ***	213.50 ***
$\gamma1_4$	9.48 **	7.65 *	5.39	143.14 ***	33.89 ***	18.77 ***	12.00 **	22.63 ***	205.63 ***
$\gamma1_5$	8.37 *	9.12 **	44.14 ***	31.39 ***	29.74 ***	76.96 ***	33.69 ***	50.80 ***	33.43 ***
$\gamma1_6$	21.63 ***	4.46	8.09 *	169.86 ***	54.25 ***	40.42 ***	18.30 ***	36.14 ***	262.04 ***
$\gamma1_7$	11.57 **	17.00 ***	6.86	177.90 ***	111.07 ***	58.89 ***	64.96 ***	27.17 ***	206.40 ***
$\gamma1_8$	6.11	8.77 *	5.45	128.67 ***	63.47 ***	24.50 ***	14.55 ***	43.11 ***	215.66 ***
$\gamma1_9$	4.58	6.26	4.95	134.70 ***	37.23 ***	22.87 ***	14.46 ***	56.49 ***	223.73 ***
$\gamma2_1$	17.48 ***	105.03 ***	44.56 ***	45.68 ***	183.01 ***	105.40 ***	241.68 ***	84.33 ***	105.22 ***
$\gamma2_2$	3.42	19.78 ***	15.17 ***	42.39 ***	49.96 ***	38.62 ***	145.76 ***	17.78 ***	28.07 ***
$\gamma2_3$	8.88 **	16.34 ***	5.07	208.73 ***	46.33 ***	26.33 ***	7.73 *	72.86 ***	117.55 ***
$\gamma2_4$	7.71 *	48.36 ***	26.86 ***	19.97 ***	204.48 ***	14.10 ***	64.65 ***	14.68 ***	51.66 ***
$\gamma2_5$	26.40 ***	91.81 ***	42.27 ***	55.24 ***	180.63 ***	68.63 ***	237.84 ***	67.28 ***	81.42 ***
$\gamma2_6$	11.95 **	86.07 ***	42.57 ***	47.67 ***	118.06 ***	34.41 ***	235.52 ***	54.61 ***	38.32 ***
$\gamma2_7$	9.68 **	8.74 *	3.82	44.38 ***	73.15 ***	18.31 ***	37.92 ***	37.82 ***	184.48 ***
$\gamma2_8$	17.52 ***	4.44	52.21 ***	150.60 ***	35.71 ***	35.17 ***	79.43 ***	42.06 ***	15.72 ***
$\gamma2_9$	14.90 ***	15.02 ***	17.10 ***	62.19 ***	103.73 ***	62.73 ***	2.72	98.41 ***	241.57 ***
$\gamma2_{10}$	6.15	5.00	30.36 ***	50.80 ***	87.21 ***	70.27 ***	4.04	54.71 ***	72.84 ***
$\gamma2_{11}$	12.65 ***	14.72 ***	5.63	56.28 ***	76.31 ***	17.91 ***	33.82 ***	38.29 ***	179.43 ***
$\gamma2_{12}$	5.72	22.46 ***	3.93	57.59 ***	67.00 ***	38.29 ***	40.26 ***	20.84 ***	189.14 ***
β_{ALL}	9.11	22.37 ***	98.15 ***	345.26 ***	140.75 ***	87.37 ***	140.37 ***	107.24 ***	286.23 ***
β_1	4.84	9.46 **	53.27 ***	154.97 ***	30.05 ***	67.79 ***	32.53 ***	103.00 ***	276.38 ***
β_2	2.00	12.01 **	47.91 ***	96.82 ***	80.42 ***	31.55 ***	120.91 ***	30.46 ***	189.78 ***
β_3	7.59 *	10.97 **	4.81	336.89 ***	124.68 ***	61.71 ***	44.14 ***	77.58 ***	163.19 ***

*: 10% **: 5% ***: 1%

Table 6 (continued): Stable Factors in the Conditional APT - Emerging Markets. With Tbills, SP500 and Local Index as Factors. Sup LM Statistics.

	Zimbabwe								
	Low	Medium	High	Low	Medium	High	Low	Medium	High
J-test	15.24 (0.91)	13.61 (0.95)	21.04 (0.64)						
δ_{ALL}	22.67	100.07 ***	36.47 ***						
δ_1	3.14	26.61 ***	7.19 *						
δ_2	8.75 *	15.81 ***	12.62 ***						
δ_3	5.56	40.97 ***	18.99 ***						
δ_4	10.33 **	49.64 ***	24.78 ***						
δ_5	16.40 ***	39.05 ***	17.54 ***						
δ_6	5.99	25.72 ***	2.12						
δ_7	2.84	41.87 ***	2.25						
δ_8	8.85 *	20.61 ***	23.47 ***						
δ_9	6.24	13.58 ***	15.19 ***						
$\gamma 1_{ALL}$	32.32 **	109.89 ***	35.51 ***						
$\gamma 2_{ALL}$	28.26 *	121.38 ***	58.86 ***						
$\gamma 2_{C1}$	26.00 ***	91.28 ***	42.03 ***						
$\gamma 2_{C2}$	14.85	78.55 ***	28.92 ***						
$\gamma 1_1$	3.02	18.96 ***	6.10						
$\gamma 1_2$	19.35 ***	24.60 ***	9.63 **						
$\gamma 1_3$	3.41	84.07 ***	19.61 ***						
$\gamma 1_4$	5.57	91.14 ***	26.51 ***						
$\gamma 1_5$	9.28 **	22.35 ***	14.17 ***						
$\gamma 1_6$	13.15 ***	41.51 ***	9.10 **						
$\gamma 1_7$	15.64 ***	15.62 ***	10.85 **						
$\gamma 1_8$	7.83 *	75.78 ***	23.72 ***						
$\gamma 1_9$	8.71 *	39.27 ***	14.28 ***						
$\gamma 2_1$	6.16	45.91 ***	28.42 ***						
$\gamma 2_2$	5.80	62.29 ***	11.81 **						
$\gamma 2_3$	2.66	28.13 ***	14.92 ***						
$\gamma 2_4$	2.76	60.05 ***	7.19 *						
$\gamma 2_5$	6.62	37.99 ***	21.96 ***						
$\gamma 2_6$	7.42 *	34.15 ***	9.44 **						
$\gamma 2_7$	3.39	13.20 ***	8.05 *						
$\gamma 2_8$	2.98	19.30 ***	5.41						
$\gamma 2_9$	5.09	50.19 ***	4.08						
$\gamma 2_{10}$	8.20 *	36.19 ***	6.32						
$\gamma 2_{11}$	4.70	14.78 ***	10.49 **						
$\gamma 2_{12}$	5.75	10.59 **	11.64 **						
β_{ALL}	15.08 **	78.18 ***	29.72 ***						
β_1	11.60 ***	9.01 **	26.41 ***						
β_2	9.01 **	76.10 ***	8.22 *						
β_3	6.06	18.98 ***	13.55 ***						

*: 10% **: 5% ***: 1%

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