Local, Global, and Hybrid Asset-Pricing Models in Heterogeneously Integrated Regions: Evidence from Local Industries

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ABSTRACT

This study evaluates the performance of international asset pricing models across 67 countries in seven global regions, emphasizing the role of financial market integration. We assess six models across local, global, and hybrid frameworks and find that regional and hybrid models consistently outperform purely global ones. Regional models work best in segmented markets, while hybrid models are optimal under partial integration. Several regional factors—especially market, momentum, and size—have grown more globally relevant, indicating convergence in risk pricing. We propose a new metric to rank regional integration, finding North America, Western Europe, and developed Asia-Pacific most integrated, while Latin America, Eastern Europe, and MENA remain segmented. These gaps reflect enduring geopolitical, regulatory, and economic differences.

Key Words: financial market integration; asset-pricing tests; geopolitical risks; regional asset pricing; global asset pricing; market integration; globalization

JEL Classification: G11; G12

1. Introduction

International asset pricing models are central to understanding and predicting the behavior of asset returns in global markets. Accurately specifying the underlying model is essential for key tasks such as portfolio performance evaluation, identifying pricing anomalies and diversification opportunities, as well as estimating the cost of equity capital. A long-standing debate continues over whether global models, local (country- or region-specific) models, or hybrid models that combine both global and local factors are best suited to explain asset returns in diverse international settings. While some studies argue that global models are applicable due to growing financial interdependence (Fama and French, 1998; Hau, 2011), others maintain that regional models better capture local market dynamics, especially in the presence of persistent segmentation (Fama and French, 2012, 2017; Cakici et al., 2013; Blackburn and Cakici, 2020; Umutlu and Bengitoz, 2020). Hybrid models that combine both regional and global factors have gained traction for their ability to reflect partial integration (Bekaert et al., 2009; Hou et al., 2011; Karolyi and Wu, 2018; Qiu et al., 2022; Traut, 2024).

At the core of this debate lies the question of whether global financial markets are truly integrated or whether segmentation, often reinforced by geopolitical divergence and policy barriers, remains the norm. Accurately identifying the degree of regional integration is essential for selecting the appropriate asset-pricing model. Defining regions too broadly, without accounting for political and economic differences, can obscure key distinctions and reduce model accuracy.

In this study, we investigate the performance of six competing factor models—spanning three classes of asset-pricing frameworks: regional, global, and hybrid—across seven distinct geographical regions encompassing 67 countries. We evaluate both the most accurate model class and the top-performing individual factor model in each region, accounting for variations in financial integration that may arise from both economic and geopolitical considerations. Our study introduces the most detailed regional classification in the asset-pricing literature to date. Beyond geography, it reflects countries' development stages, grouping them into North and Latin America; Western and Eastern Europe; and developed and emerging Asia-Pacific. The Middle East and North Africa (MENA), composed exclusively of emerging markets, is also analyzed separately. This framework allows us to group countries with similar levels of market development and financial integration—conditions that are often shaped by their political systems, regulatory environments, and exposure to regional alliances or conflicts (Aiyar et al., 2023; Feng et al., 2023). By maintaining relatively homogeneous levels of integration within regions and allowing variation across regions, we are better positioned to identify the most effective pricing model for each context.

We use industry indices from multiple countries, sorted by size and earnings yield (the inverse of the price-earnings ratio), as test assets. Bekaert et al. (2011) highlight the importance of industry-level data in evaluating market segmentation, suggesting that industries typically share similar risk exposures and growth opportunities due to commonalities arising from similar inputs, production processes, and external market forces. They introduce a market segmentation measure based on the industry-level earnings yield differential relative to world levels. Analyzing returns on size-earnings yield sorted industry portfolios, rather than individual stock returns, enables us to more accurately capture potential deviations from global pricing, while minimizing noise from individual firm-level fluctuations.

Our key findings can be summarized as follows. First, hybrid and regional models significantly and consistently outperform global models across all regions, with global models producing the largest pricing errors. Sub-period analyses of the change in pricing errors show no evidence that global factors are becoming increasingly dominant even in the most recent period, suggesting that full financial integration that is often assumed in global models has yet to be achieved.

Second, local asset returns across regions cannot be explained by a one-size-fits-all model. The top-performing individual factor model varies by region, as does the asset-pricing model class it belongs to. Regional models tend to provide better pricing accuracy in more segmented regions, where local political and economic dynamics dominate. Hybrid models are more appropriate in partially integrated markets, where global forces interact with localized structures. These findings highlight the importance of conducting the study at the regional level and underscore the impact of regional globalization on pricing local assets.

Third, we test the hypothesis that regional factors have become globalized due to the financial integration process by conducting factor-spanning tests. Inspired by Eun et al. (2023), we regress each regional factor on global factors and assess the statistical significance of the adjusted R^2 values. A statistically significant R^2 indicates of a high degree of globalization for the regional factor. The results show that the market factor is the most globalized, followed by momentum and size. The investment factor remains largely regional, with value and profitability factors in between.

Finally, we assess the globalization level of regions, introducing a novel measure for this purpose. In principle, the most globalized regions should exhibit the highest degrees of factor globalization. Therefore, the mean of R^2 values across factors within a region should be higher for more globalized regions and vice versa. Utilizing this metric, we show that North America, Western Europe, developed and emerging Asia-Pacific are the most globalized, supported by deeper political coordination, stronger institutions, and open capital markets. In contrast, MENA, Latin America, and Eastern Europe remain more segmented, reflecting structural vulnerabilities, policy unpredictability, or exposure to geopolitical instability. Changes in the pricing error over sub-periods show that the integration process has progressed in regions such as emerging Asia-Pacific, Latin America, and the Middle East and North Africa, whereas it has been impeded in North America, Western Europe, and developed Asia-Pacific and has even deteriorated in Eastern Europe.

Our study engages with the literature on international asset pricing, which presents differing views on the effectiveness of global versus local models. Fama and French (2012, 2017) pioneered regional asset pricing tests and showed that regional models outperform global models in four geographical regions: North America, Europe, Asia-Pacific, and Japan. Several studies have expanded upon this research by investigating whether local assets in these four regions (Qiu et al., 2022; Karolyi and Wu, 2018) and in other regions (Hollstein, 2022; Blackburn and Cakici, 2020) are priced regionally or globally. However, geographic regions that include both developed and emerging countries face challenges due to heterogeneous responses of countries at different stages of development to global and local shocks, making it difficult to specify a representative factor model for the entire region.[1] Recent studies have addressed this by grouping countries based on development status (Pukthuanthong et al., 2024; Traut, 2024; Zaremba and Maydybura, 2019), but this approach overlooks the geographical pricing effects of continental trade agreements and economic policies.[2]

[1] Prior research suggests that markets in developed countries are more integrated with global financial markets and more likely to respond to global risk factors and markets in emerging regions may remain less integrated, with local factors playing a more significant role in determining asset prices (Bekaert and Harvey, 1995; Harvey, 2000).

[2] The liberalization of regional trade and investment policies, along with reduced barriers to cross-border capital flows, has been facilitated by initiatives such as the North American Free Trade Agreement (NAFTA), the European Union (EU), the Association of Southeast Asian Nations Economic Community (AEC), and the African Continental Free

Against this backdrop, our research enhances the current body of literature in multiple ways. First, this study is the first regional asset-pricing analysis to subdivide geographical regions based on the developmental stages of the countries within them. This approach ensures a homogeneous level of development and, consequently, a uniform degree of globalization within each region, while also allowing the level of globalization to vary across regions. Second, this is the most extensive international asset-pricing study in terms of regional and national coverage. We analyze 64 countries, encompassing developed, emerging, and frontier markets across seven regions characterized by varying degrees of globalization. Third, double-sorted local industry indices based on size and earnings yield are used as the key test assets, as deviations from global pricing can be tracked through the earnings yield differentials of industries, as suggested by Bekaert et al. (2011). Traut (2024) also employs industry indices as test assets in asset-pricing tests but does not sort industries based on earnings yield. Fourth, we expand upon the research of Eun et al. (2023), which analyses the globalization of Fama and French (2015) factors and Carhart's (1997) momentum factor at the country level, by exploring the globalization of these same factors at the regional level. Fifth, we present a novel metric that quantifies the extent of globalization in a region. This quantitative indicator serves to identify regions that offer the highest diversification benefits. Finally, our study helps reconcile the mixed findings in the literature regarding the relative importance of local, global, and hybrid models, demonstrating that the validity of each model class depends on the degree of globalization in local markets. In summary, our findings help clarify the conditions under which global, regional, or hybrid models are most effective, offering practical

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Trade Area (AfCFTA). These efforts have promoted regional integration, leading to increased capital flows, more synchronized market movements, and aligned economic policies. As a result, the correlation between stock markets within regions has strengthened, while differences between regions have also grown.

insights for investors and policymakers navigating a global landscape marked by both financial interdependence and persistent geopolitical diversity.

The rest of the study is structured as follows. The next section describes the data and methodology. Section 3 presents the results. The final section concludes the study.

2. Data and Methodology

This study uses two samples: local industry indices and country indices. The country sample includes 67 country indices, while the local industry sample consists of country-industry indices, with 11 industry indices from each of the 67 countries. A list of the countries, their geographical regions, and industries can be found in Table 1. Both samples are constructed using the Datastream (DS) Global Equity Indices. The industry groups follow the FTSE industry classification benchmark. The countries span seven regions: North and Latin America, Western and Eastern Europe, developed and emerging Asia-Pacific, and MENA. Of the 67 countries in the sample, 45 are emerging or frontier markets, and the remaining are developed countries. The research period covers March 1981 to October 2021.

<Insert Table 1 about here>

We download monthly total return series in US dollars from Datastream for both country-industry and country indices to calculate monthly index returns. We assess the explanatory power of asset-pricing models for the returns on test assets, which serve as left-hand-side (LHS) portfolios in regressions. These test assets are obtained from 3x3 independent double sorts of country-industry indices based on size and EP for each region. The return on a test asset is calculated as the market-cap weighted return of the country-industry indices that constitute the relevant test asset. In international asset pricing tests, local industry indices from various countries can help compare how well a particular asset pricing model performs in different market environments.

Bekaert et al. (2011) emphasize the importance of industry-level data in assessing market segmentation, as industries share common growth opportunities and systematic risks. They introduce a market segmentation measure based on the industry-level EP differential relative to global levels. A larger EP differential indicates greater local market influence, reflecting higher segmentation. By analyzing returns on size-EP sorted industry portfolios rather than individual stock returns, we more accurately capture departures from global pricing while simultaneously reducing noise from firm-level changes. Moreover, global investors often build portfolios that are tilted toward specific industries, either due to their preferences or investment strategies. Local industry indices are an effective way to model these portfolios in an asset pricing test because they represent the types of investments many real-world investors would hold.

To compute the regional and global market factors for the asset-pricing tests, we use value-weighted returns of country indices within specific regions and across the entire sample, respectively. The weights are based on market value, so we also download monthly market capitalizations for the country indices. To calculate index returns over the risk-free rate, we use the one-month US Treasury Bill rate, obtained from Kenneth French's data library, as the monthly risk-free interest rate.[3]

To form other risk factors for asset-pricing models, we download monthly data on market capitalization, price-to-earnings ratio, earnings before interest and tax (*EBIT*), total assets, and shareholders' equity of country-industry indices from Datastream. The market capitalizations are used to create the small-minus-big factor (Subsection 2.2 details the construction of all factors.). The other datasets help construct variables such as earnings-to-price ratio (*EP*), investment, and operating profitability, which serve as sorting variables in bivariate portfolio sorts of country-

[3] French's data library is accessible through the following link:
https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

industry indices. For example, EP (the inverse of the price-to-earnings ratio) is used to form the high-minus-low factor. The investment variable (*INV*) is calculated as the change in total assets from months t-2 to t-1, divided by total assets in month t-2, and is used to form the conservative-minus-aggressive factor. Operating profitability (*OP*) is the ratio of EBIT in month t-1 to book equity in month t-1, which is used to construct the robust-minus-weak factor. Finally, the intermediate-term momentum (*MOM*), which is the cumulative return from months t-12 to t-2, is the sorting variable for the winner-minus-loser factor (Bali, Cakici, and Whitelaw, 2011).

2.1. Competing Asset-pricing Models

We evaluate the pricing ability of six asset-pricing models, which are widely used in the finance literature. The performance of each individual factor model is assessed for each region across three classifications of asset-pricing models. These three classifications are as follows: (i) global asset pricing models, which include only global factors derived from country-industry indices across all regions; (ii) regional asset pricing models, which use regional factors obtained from the region-specific data; and (iii) hybrid asset pricing models, which combine both regional factors and global factors that are orthogonal to the regional factors. As a result, for each region, we estimate three versions (regional, global, and hybrid) of each of the six asset-pricing models. In total, we estimate 126 asset-pricing models (18 models for each of the seven regions).

The first asset pricing model we test is the Capital Asset Pricing Model (CAPM), which posits that expected returns depend solely on the movements of the market portfolio. We estimate regional, global, and hybrid versions of CAPM as follows:

$$R_{it} - R_{ft} = \alpha_{CAPM(R)} + \beta_{MKT(R)} MKT(R)_t + \varepsilon_{(R)t} \tag{1a}$$

$$R_{it} - R_{ft} = \alpha_{CAPM(G)} + \beta_{MKT(G)} MKT(G)_t + \varepsilon_{(G)t} \tag{1b}$$

$$R_{it} - R_{ft} = \alpha_{CAPM(H)} + \beta_{MKT(R)} MKT(R)_t + \beta_{MKT(GO)} MKT(GO)_t + \varepsilon_{(H)t} \quad (1c)$$

where R_{it} is the return on test asset *i*, which is one of 3x3 Size-*EP* portfolios, for month *t*, and R_{ft} represents the risk-free rate for month *t*. Eq. (1a) shows the regional version of CAPM, where $MKT(R)_t$ is the regional market factor, calculated as the value-weighted excess returns of country indices in a specific region. In the global version, represented by Eq. (1b), $MKT(G)_t$ is the global market factor, computed as the value-weighted excess returns on country indices from all regions. The hybrid version, shown in Eq. (1c), includes both the regional market factor, $MKT(R)_t$, and the global market factor orthogonal to the regional market factor, $MKT(GO)_t$, in the regression specification. *MKT(GO)* represents the residuals from the regression of *MKT(R)* on *MKT(G)*. The intercept terms $\alpha_{\text{CAPM(R)}}$, $\alpha_{CAPM(\text{G})}$, and $\alpha_{\text{CAPM(H)}}$ correspond to the regional, global, and hybrid versions of CAPM, respectively.

The second model we test is Fama and French's (1993) 3-factor (FF3) model. This model extends the CAPM by incorporating two additional factors that capture size and value effects.

$$R_{it} - R_{ft} = \alpha_{FF3} + \beta_{MKT} MKT_t + \beta_{SMB} SMB_t + \beta_{HML} HML_t + \varepsilon_t \quad (2)$$

where SMB_t (small-minus-big) denotes the difference between the excess returns on portfolios of country-industry indexes with the smallest and biggest market capitalization in month *t*, and HML_t (high-minus-low) represents the difference between the excess returns on portfolios of country-industry indices with the highest and lowest *EP*. Similar to the CAPM, regional, global, and hybrid forms of Eq. (2) will be estimated using purely regional factors, purely global factors, and both regional and orthogonalized global factors for each of the six asset-pricing models.

The third model we examine is the Fama-French-Carhart 4-factor model (FFC4), which extends the FF3 model by adding the momentum factor introduced by Carhart (1997).

$$R_{it} - R_{ft} = \alpha_{FFC4} + \beta_{MKT}MKT_t + \beta_{SMB}SMB_t + \beta_{HML}HML_t + \beta_{WML}WML_t + \varepsilon_t \quad (3)$$

where WML_t (winner-minus-loser) is the difference between the excess returns on portfolios of country-industry indices with the highest and lowest momentum returns, defined as the cumulative returns from months *t*-12 and *t*-2.

The fourth model is the Fama and French (2015) five-factor model (FF5), which extends the FF3 model by adding two additional factors: profitability (*RMW*, robust-minus-weak) and investment (*CMA*, conservative-minus-aggressive).

$$R_{it} - R_{ft} = \alpha_{FF5} + \beta_{MKT}MKT_t + \beta_{SMB}SMB_t + \beta_{HML}HML_t + \beta_{RMW}RMW_t + \beta_{CMA}CMA_t + \varepsilon_t \quad (4)$$

where RMW_t represents the difference between the excess returns on portfolios of country-industry indices with the highest and lowest *EBIT* values, while CMA_t is the difference between the excess returns on portfolios of country-industry indices with the lowest and highest total asset growth rates for month *t*.

The next model is the four-factor (FF4) model proposed by Fama and French (2017), which replaces the momentum factor with the profitability factor as an alternative to the FFC4 model.

$$R_{it} - R_{ft} = \alpha_{FF4} + \beta_{MKT}MKT_t + \beta_{SMB}SMB_t + \beta_{HML}HML_t + \beta_{RMW}RMW_t + \varepsilon_t \quad (5)$$

The last model tested is the Fama-French-Carhart six-factor model (FFC6) model, which is obtained by adding the momentum factor to the FF5 model.

$$R_{it} - R_{ft} = \alpha_{FFC6} + \beta_{MKT}MKT_t + \beta_{SMB}SMB_t + \beta_{HML}HML_t + \beta_{RMW}RMW_t + \beta_{CMA}CMA_t + \beta_{WML}WML_t + \varepsilon_t \quad (6)$$

2.2. Factor Construction and Asset-Pricing Tests

The six asset-pricing models examined utilize a total of six factors: *MKT*, *SMB*, *HML*, *WML*, *RMW*, and *CMA*. These factors are also referred to as right-hand-side (RHS) variables in factor models, as defined by Fama and French (2012, 2017). For all seven regions, $MKT(R)_t$ represents the value-weighted average returns of all country-industry indices in the relevant region, minus the risk-free rate for month *t*. For global models, the $MKT(G)_t$ is the excess return on the value-weighted portfolio of country-industry indices from all regions. The remaining factors are calculated for each of the seven regions following the methodology of Fama and French (2012, 2017). This methodology involves performing 2x3 double independent sorts on *Size-EP*, *Size-MOM*, *Size-OP*, and *Size-Inv* for the respective factors.

For each region, country-industry indices are sorted by *Size* each month into small and big portfolios, with the small portfolio (S) containing 50% of the lowest market capitalization indices and the big portfolio (B) the remaining indices. A second independent sort based on *EP* divides indices into three portfolios: growth (G), neutral (N), and value (V). This 2x3 sorting creates six portfolios: *SG*, *SN*, *SV*, *BG*, *BN*, and *BV*. Monthly value-weighted returns are calculated for each portfolio.

Next, value-minus-growth returns are computed for small and big portfolios. The small (big) value-minus-growth returns are defined as $HML_S = SV – SG$ ($HML_B = BV – BG$). The *HML* factor is the equal-weighted average of HML_S and HML_B. The size factor based on the *EP* ratio, SMB_{EP}, is the equal-weighted average return of the three small index portfolios (*SV*, *SN*, *SG*) minus the average return of the three big index portfolios (*BV*, *BN*, *BG*). The 2x3 *Size-EP* sorts and factor construction are performed monthly for each region. The computation of the *WML*, *RMW*, and

CMA factors follows a similar process, with the second sort based on the *MOM*, *OP*, and *INV* values of the indices, respectively.

The summary statistics of the monthly regional and global factors are presented in Table 2. Both the mean levels and other distributional characteristics, such as the median, standard deviation, minimum, and maximum values, vary significantly across regions. This cross-regional variation in factors provides additional motivation for conducting the study at the regional level.

<Insert Table 2 about here>

We use the Gibbons-Ross-Shanken (1989) (GRS) test to examine whether the returns on the test assets (LHS variables) are fully explained by the risk factors (RHS variables). The alpha of each test asset is estimated by regressing test asset returns on the factors of the tested asset-pricing model. The intercept term, or alpha, from this regression, shows the portion of the portfolio returns that cannot be explained by the risk factors. If the tested asset-pricing model contains a suitable combination of risk factors to explain portfolio returns, it should leave no significant alpha. The GRS test examines the null hypothesis that the intercepts of all nine test assets are jointly equal to zero. Rejecting the null hypothesis means that the risk factors in the model fail to capture the time variation in excess returns for some test assets. Conversely, if the null hypothesis is not rejected, it indicates that the combination of the risk factors in the model adequately explains the returns.

As an alternative performance measure, we also use the average absolute value of the intercepts ($A|\alpha_i|$). Since a well-specified model should produce no significant alpha, any deviation of alpha from zero is regarded as a price error. Hence, the lower the $A|\alpha_i|$, the smaller the pricing error, and the better the performance of the asset-pricing model.

The final measure of portfolio performance used is the adjusted R^2, which serves as a goodness-of-fit measure for a given model. Asset-pricing models with stronger explanatory power are expected to generate higher adjusted R^2 values. Overall, these three performance measures complement each other, enhancing the reliability of the inferences.

3. Results

3.1. Comparison of Competing Factor Models' Performances across Regions

First, we focus on the results for North America (NA). In Panel A, the regional asset-pricing models show that none of the six models can reject the null hypothesis of zero alphas for all test assets, with p-values ranging from 0.12 to 0.46. In Panel B, global models reject the null hypothesis for half of the factor models, suggesting that purely global models perform poorly in NA. The model with the lowest $A|\alpha_i|$ and the highest AR^2 is the Hybrid FFC6 model, which yields an $A|\alpha_{FFC6}|$ of 0.13% and AR^2 of 0.75. The superior performance of the hybrid models in North America shows that global factors, which are orthogonal to regional factors, provide additional information beyond what is captured by the regional factors alone. Incorporating global factors into the factor set alongside regional factors helps mitigate pricing errors. These results suggest that North America is not fully integrated, but rather partially integrated, consistent with the partial integration theories of international asset pricing.

<Insert Table 3 about here>

Next, we analyze Western Europe (WEU). In Table 3, the null hypothesis of zero alphas is rejected for all models in all three asset-pricing test classes, indicating that no model fully explains asset returns in WEU. Pricing errors are largest for global models, while hybrid and regional models show similar performance, both delivering an average $A|\alpha_i|$ of 0.14%, outperforming global models.

For Eastern Europe (EEU), Panel A of Table 3 shows that only two regional factor models, FF3 and FFC4, have nonsignificant GRS F-statistics, implying that they are capable of pricing assets in EEU. The GRS statistics and corresponding p-values for global and regional models in Panels B and C show that these models fail to explain asset returns. Among the regional models, FF3 produces the lowest pricing error. EEU and WEU differ in the relative influence of global factors. In EEU, only regional factors contribute to pricing efficiency. The addition of global factors in hybrid models actually boosts model intercepts, thereby undermining pricing efficiency. These findings indicate that EEU exhibits greater segmentation compared to WEU and lacks effective integration with global markets.

In developed Asia-Pacific (AP DEV), regional models surpass global models, exhibiting an average $A|\alpha_i|$ of 0.22%, in contrast to 0.30% for global models. Incorporating global factors into hybrid models further reduces pricing errors, as Avg$A|\alpha_i|$ drops to 0.21% and AvgAR^2 rises to 0.63. The hybrid FF3, FF4, and FF5 models are the best performers for AP DEV. These findings highlight the significant role global factors play in explaining asset returns, with hybrid models improving pricing efficiency compared to regional models.

For emerging Asia-Pacific (AP EM), hybrid models also yield the smallest pricing errors on average, indicating that both regional and global factors are important in asset pricing in this region as well. However, all six individual models show statistically significant GRS statistics. This means that the tested models leave sizeable alphas with the existing set of factors, rendering them ineffective at accurately modeling asset returns. As a result, further exploration for more tailored models to accurately price assets is needed in AP EM.

In Latin America (LA), the best-performing factor model is the hybrid FFC6 model. Global models perform the worst, with the highest average pricing errors of 0.52%. Both hybrid and regional models show the same average pricing error of 0.16%.

Finally, in the Middle East and North Africa (MENA), regional factors dominate asset pricing. All six regional models generate lower $A|\alpha_i|$s than their global and hybrid counterparts. The regional FFC6 model performs best. Most of the countries in MENA are either emerging or frontier markets, with stock exchanges that are relatively newer and less connected to global markets compared to those in other regions. These markets are still developing and integrating with global markets, which may explain the regional asset pricing observed in this region.

Overall, this subsection highlights that asset returns across different regions cannot be fully explained by a single, universal model. Each region has its unique asset-pricing characteristics, shaped by its degree of market integration. The best-performing individual factor model varies by region. These findings underscore the importance of carrying out the study at the regional level.

3.2. Alpha Gaps between Different Classes of Asset-Pricing Models

The previous subsection evaluated the performance of six asset-pricing models to identify the best-performing model for each region and computed Avg$A|\alpha_i|$ for overall performance. This subsection compares the performance of the three model classes using mean difference tests. We first test the difference between Avg$A|\alpha_G|$ and Avg$A|\alpha_R|$, the averages of $A|\alpha_i|$s for all 54 portfolios (nine size-EP portfolios for each model). Table 4 shows the alpha gap between global and regional models (Avg$A|\alpha_{G-R}|$), along with the t-statistics. We also compute alpha gaps between global and hybrid models (Avg$A|\alpha_{G-H}|$) and regional and hybrid models (Avg$A|\alpha_{R-H}|$)

<Insert Table 4 about here>

Table 4 shows that the average alpha gap between global and regional models (Avg$A|\alpha_{G-R}|$) is positive for all regions, ranging from 0.07% to 0.36%. This indicates that, on average, global models produce higher pricing errors. The gap is statistically significant for all regions except AP EM, where the difference is still positive albeit insignificant (t-stat = 0.22). In all other regions, regional models outperform global models with smaller pricing errors.

The pricing-error gaps between global and hybrid models (AvgA$|\alpha_{G-H}|$) show that hybrid models always outperform global models, with alpha gaps ranging from 0.07% (AP EM) to 0.37% (LA), and highly significant t-statistics across all regions.

Comparing regional and hybrid models (Avg$A|\alpha_{R-H}|$) reveals varying results by region. In NA, AP DEV, and AP EM, regional models yield higher alphas, suggesting hybrid models outperform regional models. This indicates that global factors provide additional information that reduces pricing errors in these regions, supporting partial integration theories (Errunza and Losq, 1985; Alexander et al., 1987). These findings suggest that while these regions are not fully integrated, both global and regional factors influence asset pricing.

Conversely, MENA is the only region with a significantly negative Avg$A|\alpha_{R-H}|$ of -0.04 (t-stat = -3.29), indicating that regional factors alone, when combined with global factors, better explain asset returns. The negative alpha gap suggests global factors do not contribute to asset pricing in this region, supporting the view that MENA is a segmented market where only regional factors matter.

The remaining regions—WEU, EEU, and LA—show no significant difference in AvgA|αR-H| values, indicating that regional and hybrid models perform equally well. Two explanations are possible for this finding. First, global factors may not add value to these regions, as regional factors already provide sufficient information. Second, regional factors may act as proxies for global factors in partially integrated markets, absorbing global influences and making their inclusion redundant. The validity of these explanations depends on the degree of globalization of local factors, which will be further explored in Subsection 3.4 through factor-spanning tests.

3.3. Changes in Alpha Gaps over Time

This subsection examines whether alphas from three asset-pricing model classes change over time. If exposure to global factors has increased with financial integration, we would expect the difference in Avg$A|\alpha_i|$ between global and other models to decrease. To test this, we split the full sample into three subperiods: March 1981 – December 1989 (Subperiod 1), January 1990 – December 2005 (Subperiod 2), and January 2006 – October 2021 (Subperiod 3). We repeat the asset-pricing tests for each subperiod, reporting the Avg$A|\alpha_i|$s in Tables 5, 6, and 7. However, for Subperiod 1, data for EEU, AP EM, LA, and MENA are unavailable, as these regions' stock exchanges were established in the 1990s. Thus, Table 5 presents results only for NA, WEU, and AP DEV.

<Insert Table 5 about here>

<Insert Table 6 about here>

<Insert Table 7 about here>

The average alpha gap between global and regional models for Subperiod 1 (Avg$A|\alpha_{\text{Gap}}|_1$) is the difference between the AvgA|αi|s of the global and regional models in Table 5. This gap is also calculated for Subperiods 2 (Avg$A|\alpha_{Gap}|_2$) and 3 (Avg$A|\alpha_{Gap}|_3$), and presented in the first three columns of Panel A in Table 8. Similarly, the alpha gaps between global and hybrid models are shown in Panel B.

We then examine changes in average alpha gaps across subperiods. A decreasing gap between global and regional (or global and hybrid) models would suggest global factors are becoming more significant, with global models catching up. If there is no convergence, global factors are not gaining importance, indicating poor integration in the region. To assess this, we conduct mean difference tests between average alpha gaps in different subperiods.

Table 8 presents changes in alpha gaps between subperiods, along with t-statistics indicating whether the gaps are statistically different from zero. Panel A shows results for global versus regional models, and Panel B for global versus hybrid models. The change in the alpha gap between Subperiods 3 and 1 is denoted as Avg$A|\alpha_{Gap}|_{3\text{-}1}$ (=Avg$A|\alpha_{Gap}|_{3}$ - Avg$A|\alpha_{Gap}|_{1}$), and similarly for Avg$A|\alpha_{Gap}|_{3\text{-}2}$ (=Avg$A|\alpha_{Gap}|_{3}$ - Avg$A|\alpha_{Gap}|_{2}$) and Avg$A|\alpha_{Gap}|_{2\text{-}1}$ (Avg$A|\alpha_{Gap}|_{2}$ - Avg$A|\alpha_{Gap}|_{1}$). While the sign and significance of Avg$A|\alpha_{Gap}|_{3\text{-}1}$ shows whether global factors gained or lost importance over the entire period, Avg$A|\alpha_{Gap}|_{3\text{-}2}$ and Avg$A|\alpha_{Gap}|_{2\text{-}1}$ reveal if the trend is monotonic or fluctuating

<Insert Table 8 about here>

The first row of Panel A of Table 8 shows that ΔAvg$A|\alpha_{Gap}|_{3\text{-}1}$ for NA is -0.05 with a t-statistic of -1.08, indicating no significant change in the relative importance of global versus regional factors over time. The alpha gap differences between Subperiods 2 and 1, and 3 and 2, are also insignificant, suggesting no fluctuation in the gap. Similar results are found for the NA alpha gap between global and hybrid models, with no narrowing in the full period or within subperiods. These findings suggest that global factors have not gained significant importance recently.

For WEU, the insignificant t-statistics in Panel A indicate no significant change in the alpha gap between global and regional models over the entire sample period or within the subperiods.

Similarly, Panel B shows no evidence of global models outperforming hybrid models, suggesting that WEU has not experienced improved integration over time.

In EEU, the alpha gaps have widened significantly in both panels, rather than narrowing, implying that global factors are even losing relevance. This suggests that the global integration process has deteriorated in Eastern European markets.

The results for AP DEV show no improvement in the influence of global factors, with alpha gaps between global and other models remaining statistically unchanged. Therefore, AP DEV has not moved toward full integration.

AP EM and LA are the regions where pure global factors are progressively expanding their impact. Additionally, there is also some evidence that pure global factors are becoming slightly more influential in MENA. These findings indicate that AP EM, LA, and MENA are gradually integrating into global markets.

Overall, each region has its unique integration dynamics. The only common characteristic across all regions is that none have fully integrated, as purely global models still produce higher pricing errors than their regional and hybrid counterparts. While integration is progressing in AP EM, LA, and MENA, it is disrupted in NA, WEU, and AP DEV, and has even deteriorated in EEU.

3.4. Factor Spanning Tests

The analyses so far have mainly relied on the GRS statistic and average absolute alpha as the key performance metrics. These two metrics can also be viewed as indirect measures of financial integration. A reduction in pricing errors from global and hybrid models suggests an increased relevance of global factors in asset pricing, hence reflecting a greater degree of financial integration within the analyzed region. In contrast, the lower the pricing errors from regional models, the higher the importance of local factors and the lower the degree of financial integration.

This section focuses on adjusted R^2 as an alternative metric to assess the degree of financial integration. If markets are fully integrated, global and regional factors should converge, and the regression of regional factors on global ones should yield a significant R^2. In partially integrated or segmented regions, regional and global factors are loosely connected, leading to lower R^2 values. In such cases, a relatively higher R^2 indicates greater globalization of the regional factor and a higher level of financial integration for the region. Conversely, for a factor that remains local in a segmented region, R^2 should not be statistically significant.

Adjusted R^2 as a measure of integration was first introduced by Pukthuanthong and Roll (2009) and later applied by Eun et al. (2023) to assess the globalization of country factors. This study extends their work by testing the hypothesis that regional factors, rather than country factors, have globalized. To do this, we regress each regional factor on all global factors for the corresponding region and examine whether the adjusted R^2 values are statistically significant. More specifically, we conduct the following rolling regressions with a 60-month window length from March 1981 to October 2021, resulting in 402 regressions:

$$MKT(R)_{it} = \alpha_{i,MKT} + \beta_{i,MKT(R)}^{MKT(G)} MKT(G)_t + \beta_{i,MKT(R)}^{SMB(G)} SMB(G)_t + \beta_{i,MKT(R)}^{HML(G)} HML(G)_t + \beta_{i,MKT(R)}^{RMW(G)} RMW(G)_t + \beta_{i,MKT(R)}^{CMA(G)} CMA(G)_t + \beta_{i,MKT(R)}^{WML(G)} WML(G)_t + \varepsilon_{i,MKT,t} \quad (7)$$

$$SMB(R)_{it} = \alpha_{i,SMB} + \beta_{i,SMB(R)}^{MKT(G)} MKT(G)_t + \beta_{i,SMB(R)}^{SMB(G)} SMB(G)_t + \beta_{i,SMB(R)}^{HML(G)} HML(G)_t + \beta_{i,SMB(R)}^{RMW(G)} RMW(G)_t + \beta_{i,SMB(R)}^{CMA(G)} CMA(G)_t + \beta_{i,SMB(R)}^{WML(G)} WML(G)_t + \varepsilon_{i,SMB,t} \quad (8)$$

$$HML(R)_{it} = \alpha_{i,HML} + \beta_{i,HML(R)}^{MKT(G)} MKT(G)_t + \beta_{i,HML(R)}^{SMB(G)} SMB(G)_t + \beta_{i,HML(R)}^{HML(G)} HML(G)_t + \beta_{i,HML(R)}^{RMW(G)} RMW(G)_t + \beta_{i,HML(R)}^{CMA(G)} CMA(G)_t + \beta_{i,HML(R)}^{WML(G)} WML(G)_t + \varepsilon_{i,HML,t} \quad (9)$$

$$RMW(R)_{it} = \alpha_{i,RMW} + \beta_{i,RMW(R)}^{MKT(G)} MKT(G)_t + \beta_{i,RMW(R)}^{SMB(G)} SMB(G)_t + \beta_{i,RMW(R)}^{HML(G)} HML(G)_t + \beta_{i,RMW(R)}^{RMW(G)} RMW(G)_t + \beta_{i,RMW(R)}^{CMA(G)} CMA(G)_t + \beta_{i,RMW(R)}^{WML(G)} WML(G)_t + \varepsilon_{i,RMW,t} \quad (10)$$

$$CMA(R)_{it} = \alpha_{i,CMA} + \beta_{i,CMA(R)}^{MKT(G)} MKT(G)_t + \beta_{i,CMA(R)}^{SMB(G)} SMB(G)_t + \beta_{i,CMA(R)}^{HML(G)} HML(G)_t + \beta_{i,CMA(R)}^{RMW(G)} RMW(G)_t + \beta_{i,CMA(R)}^{CMA(G)} CMA(G)_t + \beta_{i,CMA(R)}^{WML(G)} WML(G)_t + \varepsilon_{i,CMA,t} \quad (11)$$

$$WML(R)_{it} = \alpha_{i,WML} + \beta_{i,WML(R)}^{MKT(G)} MKT(G)_t + \beta_{i,WML(R)}^{SMB(G)} SMB(G)_t + \beta_{i,WML(R)}^{HML(G)} HML(G)_t + \beta_{i,WML(R)}^{RMW(G)} RMW(G)_t + \beta_{i,WML(R)}^{CMA(G)} CMA(G)_t + \beta_{i,WML(R)}^{WML(G)} WML(G)_t + \varepsilon_{i,WML,t} \quad (12)$$

where $MKT(R)_{it}$, $SMB(R)_{it}$, $HML(R)_{it}$, $RMW(R)_{it}$, $CMA(R)_{it}$, and $WML(R)_{it}$ are the regional factors for *MKT*, *SMB*, *HML*, *RMW*, *CMA*, and *WML* for region *i* in month *t*; $MKT(G)_{it}$, $SMB(G)_{it}$, $HML(G)_{it}$, $RMW(G)_{it}$, $CMA(G)_{it}$, and $WML(G)_{it}$ are their global counterparts. The βs show the regression coefficients for the relevant explanatory variable (denoted by the superscript) and the relevant dependent variable (denoted by the subscript).

Eun et al. (2023) showed that adjusted R^2 and *F*-statistic of rolling regressions are related to each other, as shown by Eq. (13):

$$R^2 = 1 - \frac{1}{1+F*\frac{k}{n-k-1}} * \frac{n-1}{n-k-1} \quad (13)$$

where *n* (= 60 months) represents the number of observations in each 60-month rolling window regression and *k* (= 6 factors) denotes the number of factors in the regression. The *F*-statistic follows an F-distribution with degrees of freedom *k* and *n–k–1*. Using this relationship, Eun et al. (2023) test the significance of R^2. For instance, the *F* value at a 5% significance level for degrees of freedom 6 and 53 (=60-6-1) is 2.275. Substituting 2.275 for F in Eq. (13) yields an R^2 of 0.115. Hence, any R^2 greater than or equal to 0.115 is significant at a 5% significance level and suggests a globalized regional factor. We apply this method to determine the significance of R^2 values from the rolling regressions.

The results are presented in Table 9, which shows the time-series mean of R^2s, the proportion of significant R^2s (at the 5% significance level) across all 60-month rolling window regressions, as well as the time-trend slope coefficients of R^2s and their corresponding t-statistics for each regional factor. The bottom two rows indicate the cross-region average of mean R^2s and the proportion of significant R^2s at the 5% significance level.

Regional *MKT* has the highest cross-region average of mean R^2 of 0.7561, followed by *MOM* (0.2869), *SMB* (0.2166), *HML* (0.1830), *RMW* (0.1393), and *CMA* (0.0682). Thus, *MKT*, *MOM*, *SMB* are the most globalized factors, whereas *HML*, *RMW*, and *CMA* are comparatively less globalized on average. The cross-region average of the proportion of significant R^2s mirrors this ranking. *MKT* has the highest proportion of 0.9983, followed by *MOM* (0.8116), *SMB* (0.7161), *HML* (0.5809), *RMW* (0.5226), and *CMA* (0.2868). Regional *MKT* was almost fully globalized over the whole research period, as 99.83% of the rolling regressions yielded a significant R^2. Regional *MOM* and *SMB* also exhibited strong globalization for the vast majority of the research period, with proportions of 81.16% and 71.61%, respectively. Regional *HML* and *RMW* were globalized for over half of the research period, indicating some evidence of the globalization of these factors. However, regional *CMA* with a proportion of 28.68% remained largely local for most of the study period, showing the least degree of globalization.

<Insert Table 9 about here>

Next, we examine the time trend in globalization, measured by the R^2 for each factor across each region. The t-statistics of the time-trend slope coefficients in Table 9 reveal that *MKT* demonstrates a significant positive time trend for most of the regions. Exceptions are AP DEV and LA, where the time-trend slope coefficients for *MKT* are not statistically significant. Figure 1, illustrating the time-series R^2s, further confirms that the degree of globalization of regional *MKT* has generally increased in recent periods for regions with a significant positive trend. Thus, *MKT* has become even more globalized in most regions.

Another consistent finding is the insignificant time trend slope for *CMA*, with the only exceptions being Latin America and North America. Figure 1 also highlights the uniform level of globalization for *CMA* throughout the study period. For most of the time, *CMA* was not globalized, as its R^2 values remained below the 5% threshold. Additionally, Figure 1 shows no upward trend in recent periods, indicating that regional *CMA* has not advanced toward globalization. For other regional factors, aside from *MKT* and *CMA*, no clear patterns emerge in their R^2 values. The trend of globalization for these factors varies by region.

<Insert Figure 1 about here>

Finally, we examine the globalization of regions rather than the globalization of factors. The most globalized regions should, in principle, exhibit the highest levels of factor globalization. Thus, the average of mean R^2 values across factors within a region serves as an indicator of that region's overall level of globalization. Building on this idea, this study is the first to offer the cross-factor average of mean R^2s as a measure of financial integration for regions. The last column in Table 8 shows that the regions with the highest cross-factor average of mean R^2s are AP DEV (0.3437), WEU (0.3343), and NA (0.2994), indicating that global factors explain a large proportion of the regional factors in these regions, reflecting their high level of financial integration. In contrast, MENA (0.2134), LA (0.2118), and EEU (0.24.76) exhibit the lowest cross-factor averages, suggesting that global factors fail to explain much of the regional factors and indicating a more segmented (less globalized) structure. Lastly, AP EM, with a median R^2 value of 0.2750, falls between the highly globalized and segmented regions.

These results help clarify the previously inconclusive alpha-based findings regarding integration in the WEU, EEU, and LA regions. In these regions, the alpha-based portfolio performance tests in Subsection 3.2 showed that both hybrid and global models perform similarly well. This made it difficult to determine why global factors do not enhance pricing efficiency in hybrid models. As discussed earlier, this could be due to either the irrelevance of global factors or the dual role of globalized local factors. If the former is true, it suggests a lower degree of globalization in the region. If the latter holds, it implies a higher degree of globalization.

The R^2 values from the factor-spanning tests reveal that the local factors in WEU are highly globalized. WEU has the second-highest cross-factor average of mean R^2 across all regions, indicating that regional factors capture the information embedded in global factors and effectively serve as proxies for them. Thus, the comparable pricing performance of regional models to hybrid models in WEU can be attributed to the dual role played by these globalized local factors. In contrast, the degree of globalization of regional factors in LA and EEU is relatively low. LA has the lowest cross-factor average, while EEU ranks third lowest. As a result, hybrid models in these regions do not outperform regional models, as global factors are less relevant. Consequently, LA and EEU (along with MENA) are more segmented compared to other regions.

Upon reviewing the asset-pricing test findings in Tables 3 and 4 alongside the regional integration levels outlined in this subsection, it becomes evident that regional models are more effective in segmented markets, while hybrid models perform better in partially integrated markets. These findings closely align with the theoretical implications of market integration and segmentation in international finance, as well as the theories of partial integration or mild segmentation in international asset pricing.

3.5. Robustness Tests

We test if the portfolio weighting scheme impacts our results by rerunning asset-pricing tests with equal-weighted portfolios instead of value-weighted ones. We also conduct subperiod analyses with equal-weighted portfolios to check if the original findings continue to hold.

3.5.1. Equal-weighted Portfolios

The results for equal-weighted test assets in Table 10 show that the results for NA remain consistent regardless of the portfolio weighting scheme. Specifically, regional models deliver an Avg$A|\alpha_i|$ of 0.12%, lower than the 0.21% of global models. The hybrid models produce the lowest Avg$A|\alpha_i|$ of 0.11%, outperforming both regional and global models. The Hybrid FFC6 and FFC4 models again have the lowest pricing errors. These results mirror those observed with value-weighted portfolios, indicating robustness across different weighting schemes.

The equal-weighted results for WEU in Table 10 indicate a discrepancy from value-weighted results in one aspect. All hybrid and regional models, except CAPM and FF3, have nonsignificant GRS values, indicating that the remaining four models effectively represent returns. As a result, none of the six asset-pricing models sufficiently explains returns on big assets, whereas four models adequately capture returns on small assets. Despite this, the equal-weighted results align with the value-weighted results, both supporting the finding that hybrid and regional models outperform global models.

The equal-weighted results for EEU, AP DEV, AP EM, and MENA in Table 10 are similar to the value-weighted results in Table 3. However, the equal-weighted results for LA demonstrate that regional models perform better than or as well as hybrid models. This suggests that asset size affects the relevance of global factors. For value-weighted portfolios, which are overrepresented by bigger, more integrated country-industry portfolios, global factors are more important. In contrast, for equal-weighted portfolios dominated by smaller assets, regional factors overshadow global factors. Therefore, including global factors alongside regional ones does not enhance pricing efficiency for smaller Latin American assets. The exposure of Latin American assets to global factors depends on their size. Global factors matter more for larger, integrated country-industry indices, while smaller, segmented portfolios are less influenced by them. Analysis of individual factor models shows that the hybrid FFC6 model is optimal for bigger assets, while the regional FFC6 model is the best model for smaller Latin American assets.

3.5.2 Subperiod Analysis with Equal-weighted Portfolios

Subperiod analyses using equal-weighted portfolios, shown in Tables A1, A2, and A3 in the Online Appendix, confirm the results in Tables 5, 6, and 7. For all regions, global pricing models produce the highest pricing errors. In developed regions with greater financial integration, hybrid models combining regional and global factors perform as well as or better than regional models. Conversely, regional models are more effective in emerging regions, where local pricing has a stronger influence due to financial segmentation.

4. Conclusion

This study evaluates the performance of six factor models across three classes of asset-pricing frameworks—regional, global, and hybrid—within seven distinct regions encompassing 67 countries. We also assess the extent of globalization among regional factors and the level of regional market integration. A key finding is that no region has achieved full financial integration, as global models consistently generate the highest pricing errors across all regions. This outcome highlights the importance of region-specific characteristics such as economic structure, institutional development, and political and regulatory alignment in shaping how assets are priced locally.

Our region-specific results reveal that the best-performing individual factor models vary significantly. The hybrid FFC6 model performs best in North and Latin America, while the regional FF3 model is most effective in Eastern Europe. In developed Asia-Pacific, hybrid versions of FF3, FF4, and FF5 models perform well, whereas in MENA, the regional FFC6 model delivers the strongest results. Notably, none of the six tested models fully explains asset returns in Western Europe and emerging Asia-Pacific, highlighting the need for future research into alternative factor models for these regions. At the broader model-class level, hybrid models perform best in North America and both developed and emerging Asia-Pacific regions, while regional models show superior results in MENA. In regions such as Latin America, Eastern Europe, and Western Europe, hybrid and regional models perform similarly.

To measure regional integration more systematically, we introduce a novel metric based on the cross-factor average of R^2 values from factor-spanning regressions. This measure confirms that North America, Western Europe, and developed Asia-Pacific are currently the most integrated regions, likely due to stronger institutional frameworks, capital market openness, and regional policy coordination. Meanwhile, MENA, Latin America, and Eastern Europe remain relatively segmented, influenced by political risk, regulatory divergence, or limited access to global capital flows.

Subperiod analyses reveal important trends in financial integration. Integration appears to be advancing in emerging Asia-Pacific, Latin America, and MENA. In contrast, integration progress has slowed in North America, Western Europe, and developed Asia-Pacific, and appears to be deteriorating in Eastern Europe. Our analysis also shows that market, momentum, and size factors are relatively global, while others such as investment remain largely regional. Value and profitability factors fall somewhere in between.

The findings of this study carry several important implications. First, pricing anomalies detected using global models may not represent true inefficiencies but rather stem from model misspecification, especially in regions with political or institutional barriers to integration. Second, less-integrated markets offer potential diversification benefits, as they are more likely to exhibit pricing deviations due to local risks and limited exposure to global pricing forces. Third, selecting the appropriate factor model can improve the estimation of the equity cost of capital and lead to better-informed investment decisions. Overall, our study highlights the continued relevance of regional and hybrid models in an international landscape. As financial globalization evolves amid geopolitical shifts, investors and researchers must remain attuned to the uneven pace of integration and its implications for pricing global and local assets.

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Table 1. Region, Country, and Industry List

This table presents the seven geographical regions examined, encompassing 67 countries. The country-industry indices represent the eleven industries listed in the final column from each country.

North America	Western Europe	Eastern Europe	Asia-Pacific Developed	Asia-Pacific Emerging	Latin America	MENA	Industries
Canada	Austria	Bulgaria	Australia	China	Argentina	Bahrain	Basic Materials
USA	Belgium	Croatia	Hong Kong	India	Brazil	Egypt	Consumer Discretionary
	Denmark	Cyprus	Japan	Indonesia	Chile	Israel	Consumer Staples
	Finland	Czech Rep	New Zealand	Malaysia	Colombia	Jordan	Energy
	France	Estonia	Singapore	Pakistan	Mexico	Kuwait	Financials
	Germany	Greece		Philippines	Peru	Morocco	Health Care
	Ireland	Hungary		Russia		Nigeria	Industrials
	Italy	Lithuania		South Korea		Oman	Real Estate
	Luxemburg	Malta		Sri Lanka		Qatar	Technology
	Netherlands	Poland		Taiwan		Saudi Arabia	Telecommunication
	Norway	Romania		Thailand		South Africa	Utilities
	Portugal	Slovakia		Vietnam		UAE	
	Spain	Slovenia					
	Sweden	Turkiye					
	Switzerland						
	UK						

Table 2. Summary Statistics for Monthly Risk Factors

This table reports the summary statistics of the regional risk factors for North America (NA), Western Europe (WEU), Eastern Europe (EEU), Asia-Pacific Developed (AP DEV), Asia-Pacific Emerging (AP EM), Latin America (LA), Middle East and North America (MENA), as well as for the global (GLOBAL) risk factors over March 1981–October 2021. The risk factors are constructed from 2x3 portfolios independently sorted on the market capitalization and earnings-to-price ratio in the vein of Fama and French (2015, 2017). Each month, country-industry indices are sorted on market capitalization and divided into two portfolios: Big and Small. Then, indices are independently sorted on earnings-to-price ratio, profitability, investment, and momentum separately and divided into three portfolios. The independent 2x3 sorts on *Size* and *EP*, *OP*, *Inv*, and *Mom* generate six value-weighted portfolios for each month. *HML* is the equal-weighted average of the high minus low *EP* values from small and big indices; *RMW* is the equal-weighted average of the robust minus weak *OP* values from small and big indices; *CMA* is the equal-weighted average of the conservative minus aggressive *Inv* values from small and big indices; *MOM* is the equal-weighted average of the winner minus losers *Mom* values from small and big indices. *SMB* is the equal-weighted average of the returns on the twelve small index portfolios minus the equal-weighted average of the returns on the twelve big index portfolios. Lastly, *MKT* is the value-weighted country returns for each region or the global market minus the one-month US Treasury bill rate. The reported mean, median, standard deviation (*Std.*), maximum (*Max*), and minimum (*Min*) values of factors are based on monthly average percent returns in $US.

	MKT					SMB					HML				
	Mean	Median	Std.	Max	Min	Mean	Median	Std.	Max	Min	Mean	Median	Std.	Max	Min
NA	0.62	0.87	4.39	17.58	-21.00	-0.11	-0.32	2.51	7.93	-9.78	0.22	0.18	3.85	20.22	-14.20
WEU	0.70	0.90	5.18	29.20	-21.43	0.25	0.19	1.91	7.33	-6.21	0.36	0.31	2.79	12.42	-10.38
EEU	1.22	0.91	9.28	68.49	-31.72	0.31	0.48	5.03	14.42	-35.68	0.76	0.51	5.59	33.92	-23.07
AP DEV	0.53	0.63	5.58	24.90	-17.23	0.20	0.32	3.45	13.11	-15.26	0.45	0.47	5.32	22.68	-22.50
AP EM	1.17	1.17	6.77	28.43	-26.14	0.73	0.49	3.85	23.10	-10.18	0.51	0.40	5.62	27.37	-29.50
LA	1.23	1.56	7.47	23.93	-30.18	0.00	0.11	4.41	18.10	-14.65	-0.03	0.14	4.77	15.21	-20.68
MENA	0.80	1.04	6.86	18.79	-27.49	0.30	0.29	3.26	10.99	-13.43	0.59	0.21	5.00	26.21	-22.21
GLOBAL	0.65	0.89	4.33	13.95	-20.34	0.36	0.33	2.38	8.66	-7.60	0.39	0.27	2.60	9.54	-10.68

	MOM					RMW					CMA				
	Mean	Median	Std.	Max	Min	Mean	Median	Std.	Max	Min	Mean	Median	Std.	Max	Min
NA	0.46	0.49	4.42	25.17	-17.42	0.08	0.22	2.96	12.34	-11.29	-0.02	-0.17	4.34	21.42	-17.42
WEU	0.52	0.50	3.98	13.51	-20.04	0.27	0.30	2.18	9.46	-12.06	-0.04	-0.22	2.58	9.92	-10.55
EEU	0.92	1.13	8.78	33.14	-35.40	0.77	0.85	8.48	52.48	-52.23	-0.78	0.05	9.86	53.52	-46.54
AP DEV	0.26	0.55	5.79	24.84	-44.72	0.18	0.21	3.49	15.32	-14.87	-0.21	-0.27	5.14	21.80	-31.39
AP EM	0.39	0.81	6.23	27.82	-29.08	0.15	0.40	4.42	18.30	-18.26	0.13	-0.23	6.33	24.19	-22.69
LA	0.22	0.59	5.60	24.66	-20.01	0.09	0.33	4.59	14.80	-16.11	0.63	0.38	6.81	32.90	-21.80
MENA	0.68	0.75	5.69	25.89	-22.67	-0.06	0.07	4.61	13.23	-19.02	-0.65	-0.01	6.79	27.94	-38.81
GLOBAL	0.58	0.87	3.97	12.02	-25.23	0.31	0.36	2.10	9.24	-7.88	-0.12	-0.15	3.16	10.29	-10.84

Table 3. The Results of Asset-pricing Tests for the Value-weighted Portfolios

This table reports summary results of six different asset-pricing models— spanning three classes of models: regional, global, and hybrid—for value-weighted 3x3 *Size-EP* test assets. The results are reported for seven different regions, which are North America (NA), Western Europe (WEU), Eastern Europe (EEU), Asia-Pacific Developed (AP DEV), Asia-Pacific Emerging (AP EM), Latin America (LA), and the Middle East and North Africa (MENA). The six asset pricing models examined are the capital asset pricing model (CAPM), Fama and French (1993) three-factor (FF3) model, the Fama and French (1993) and Carhart (1997) four-factor (FFC4) model, Fama and French (2015) five-factor (FF5) model, a four-factor model (FF4) that adds the profitability factor to the FF3 model, a six-factor model (FFC6) that adds the momentum factor to the FF5 model. The monthly value-weighted excess return on each of the nine test assets is regressed on the relevant value-weighted risk factors over the period March 1981–October 2021. Panel A (B) shows results from regional (global) risk factors only. Panel C represents the results from the hybrid models that include both regional factors and global factors that are orthogonal to regional factors. Gibbons, Ross, and Shanken's (1989) F statistic (*GRS*) and its p-value (*p*) are used to test whether the alphas from nine test assets are jointly equal to zero for each model. In addition, $A|\alpha_i|$ is the average absolute alpha of nine test assets in percent; AR^2 is the average of test assets' adjusted R^2; and Avg$A|\alpha_i|$ (AvgAR^2) shows the cross-sectional average of the $A|\alpha_i|$s (AR^2s) across six asset-pricing models.

	ICAPM				FF3				FFC4				FF5				FF4				FFC6				Avg	Avg
	GRS	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	$A\|\alpha_i\|$	AR^2
Panel A. Regional Models																										
NA	1.44	0.17	0.20	0.63	1.56	0.12	0.18	0.75	1.06	0.39	0.14	0.75	1.36	0.20	0.16	0.75	1.47	0.16	0.16	0.75	0.98	0.46	0.14	0.75	0.16	0.73
WEU	4.82	0.00	0.23	0.79	3.55	0.00	0.13	0.86	2.89	0.00	0.11	0.87	3.19	0.00	0.13	0.87	3.19	0.00	0.13	0.86	2.74	0.00	0.11	0.87	0.14	0.85
EEU	3.50	0.00	0.46	0.51	1.61	0.11	0.28	0.61	1.57	0.12	0.29	0.61	1.90	0.05	0.29	0.62	1.89	0.05	0.29	0.61	1.78	0.07	0.31	0.62	0.32	0.60
AP DEV	1.53	0.14	0.37	0.40	1.02	0.42	0.19	0.65	1.02	0.43	0.20	0.66	1.01	0.43	0.19	0.65	1.02	0.42	0.19	0.65	1.05	0.40	0.20	0.66	0.22	0.61
AP EM	6.63	0.00	0.54	0.49	3.68	0.00	0.39	0.64	3.71	0.00	0.40	0.64	3.97	0.00	0.39	0.65	4.02	0.00	0.39	0.65	3.82	0.00	0.39	0.65	0.42	0.62
LA	1.10	0.36	0.22	0.58	1.25	0.27	0.15	0.68	1.16	0.32	0.15	0.68	1.28	0.25	0.15	0.68	1.29	0.24	0.16	0.68	1.19	0.30	0.14	0.68	0.16	0.67
MENA	2.87	0.00	0.44	0.42	1.57	0.12	0.26	0.53	1.44	0.17	0.24	0.54	1.41	0.18	0.23	0.54	1.54	0.13	0.25	0.54	1.14	0.33	0.20	0.55	0.27	0.52
Panel B. Global Models																										
NA	1.58	0.12	0.22	0.51	2.04	0.03	0.23	0.55	1.56	0.12	0.22	0.55	1.77	0.07	0.24	0.55	1.78	0.07	0.24	0.55	1.49	0.15	0.23	0.55	0.23	0.54
WEU	3.47	0.00	0.23	0.63	3.19	0.00	0.28	0.70	3.25	0.00	0.30	0.71	3.44	0.00	0.29	0.70	3.47	0.00	0.29	0.70	3.42	0.00	0.30	0.71	0.28	0.69
EEU	2.19	0.02	0.41	0.27	2.01	0.04	0.52	0.39	1.67	0.10	0.49	0.40	2.55	0.01	0.60	0.40	2.53	0.01	0.60	0.40	2.18	0.02	0.57	0.40	0.53	0.38
AP DEV	2.15	0.02	0.24	0.42	1.68	0.09	0.35	0.49	1.58	0.12	0.33	0.49	1.29	0.24	0.29	0.49	1.32	0.22	0.29	0.49	1.37	0.20	0.29	0.50	0.30	0.48
AP EM	3.29	0.00	0.55	0.31	2.13	0.03	0.42	0.46	1.85	0.06	0.40	0.46	1.74	0.08	0.39	0.46	1.75	0.08	0.39	0.46	1.63	0.10	0.38	0.46	0.42	0.44
LA	0.65	0.75	0.22	0.35	1.86	0.06	0.59	0.45	1.96	0.04	0.66	0.45	1.70	0.09	0.54	0.45	1.64	0.10	0.55	0.45	1.82	0.06	0.60	0.45	0.52	0.43
MENA	2.83	0.00	0.46	0.25	2.22	0.02	0.35	0.32	2.58	0.01	0.41	0.32	2.56	0.01	0.39	0.32	2.60	0.01	0.39	0.32	2.75	0.00	0.42	0.32	0.40	0.31
Panel C. Hybrid Models																										
NA	1.33	0.22	0.18	0.64	1.44	0.17	0.17	0.75	0.93	0.49	0.13	0.75	1.20	0.29	0.15	0.75	1.36	0.21	0.16	0.75	0.83	0.59	0.13	0.75	0.15	0.73
WEU	4.82	0.00	0.23	0.79	3.54	0.00	0.13	0.87	2.89	0.00	0.11	0.87	3.18	0.00	0.13	0.87	3.21	0.00	0.13	0.87	2.75	0.00	0.11	0.87	0.14	0.85
EEU	3.81	0.00	0.49	0.51	1.95	0.04	0.29	0.62	2.01	0.04	0.33	0.62	1.98	0.04	0.30	0.63	2.00	0.04	0.30	0.62	1.99	0.04	0.34	0.63	0.34	0.61
AP DEV	1.44	0.17	0.31	0.49	1.00	0.44	0.18	0.66	0.99	0.45	0.19	0.67	0.98	0.46	0.18	0.66	1.00	0.44	0.18	0.66	1.01	0.43	0.19	0.67	0.21	0.63
AP EM	6.51	0.00	0.57	0.51	2.93	0.00	0.31	0.67	2.83	0.00	0.30	0.67	3.17	0.00	0.31	0.67	3.23	0.00	0.31	0.67	3.05	0.00	0.30	0.67	0.35	0.64
LA	1.10	0.36	0.22	0.58	1.12	0.35	0.15	0.68	1.01	0.43	0.15	0.68	1.10	0.36	0.14	0.69	1.15	0.33	0.15	0.69	1.02	0.43	0.13	0.69	0.16	0.67
MENA	3.06	0.00	0.47	0.43	1.75	0.08	0.30	0.55	1.37	0.20	0.28	0.55	1.63	0.11	0.28	0.56	1.73	0.08	0.30	0.55	1.10	0.37	0.24	0.57	0.31	0.54

Table 4. Alpha Gaps between Different Classes of Asset-Pricing Models

This table presents the results of the pairwise mean difference tests for the average values of $A|\alpha_i|$ across regional, global, and hybrid models. The alpha gap between global and regional models denoted as Avg$|\alpha_{G-R}|$, represents the difference between Avg$|\alpha_G|$ and Avg$|\alpha_R|$, which are calculated as the averages of $A|\alpha_i|$ over all 54 portfolios (nine *Size-EP* portfolios for each of the six asset-pricing models) within each model class. The alpha gaps between global and hybrid models (denoted as Avg$|\alpha_{G-H}|$) and between regional and hybrid models (denoted as Avg$|\alpha_{R-H}|$) are also computed. The t-statistics for the tests of mean differences are shown in parentheses.

	Avg$\lvert\alpha_{G-R}\rvert$	t-stat	Avg$\lvert\alpha_{G-H}\rvert$	t-stat	Avg$\lvert\alpha_{R-H}\rvert$	t-stat
North America	0.07	(3.83)	0.08	(4.44)	0.01	(3.19)
Western Europe	0.14	(8.03)	0.14	(7.90)	-0.00	(-1.55)
Eastern Europe	0.21	(3.50)	0.19	(2.70)	-0.02	(-1.02)
Asia-Pacific Developed	0.08	(1.95)	0.09	(2.38)	0.01	(2.79)
Asia-Pacific Emerging	0.01	(0.22)	0.07	(2.61)	0.07	(2.68)
Latin America	0.36	(11.14)	0.37	(11.06)	0.00	(0.42)
Middle East & N. Africa	0.13	(3.54)	0.09	(2.25)	-0.04	(-3.29)

Table 5. Results of Asset-pricing Tests for Subperiod 1: March 1981 - December 1989

This table reports summary results of six different asset-pricing models— spanning three classes of models: regional, global, and hybrid—for value-weighted 3x3 *Size-EP* test assets. The results are reported for seven different regions, which are North America (NA), Western Europe (WEU), Eastern Europe (EEU), Asia-Pacific Developed (AP DEV), Asia-Pacific Emerging (AP EM), Latin America (LA), and the Middle East and North Africa (MENA). The six asset pricing models examined are the capital asset pricing model (CAPM), Fama and French (1993) three-factor (FF3) model, the Fama and French (1993) and Carhart (1997) four-factor (FFC4) model, Fama and French (2015) five-factor (FF5) model, a four-factor model (FF4) that adds the profitability factor to the FF3 model, a six-factor model (FFC6) that adds the momentum factor to the FF5 model. The monthly value-weighted excess return on each of the nine test assets is regressed on the relevant value-weighted risk factors over Subperiod 1: March 1981–December 1989. Panel A (B) shows results from regional (global) risk factors only. Panel C represents the results from the hybrid models that include both regional factors and global factors that are orthogonal to regional factors. Gibbons, Ross, and Shanken's (1989) F statistic (*GRS*) and its p-value (*p*) are used to test whether the alphas from nine test assets are jointly equal to zero for each model. In addition, $A|\alpha_i|$ is the average absolute alpha of nine test assets in percent; AR^2 is the average of test assets' adjusted R^2; and Avg$A|\alpha_i|$ (AvgAR^2) shows the cross-sectional average of the $A|\alpha_i|$s (AR^2s) across six asset-pricing models.

	ICAPM				FF3				FFC4				FF5				FF4				FFC6				Avg	Avg
	GRS	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	$A\|\alpha_i\|$	AR^2
Panel A. Regional Models																										
NA	0.41	0.93	0.14	0.64	0.49	0.87	0.13	0.77	0.47	0.89	0.12	0.77	0.64	0.76	0.14	0.77	0.54	0.84	0.13	0.77	0.67	0.73	0.15	0.77	0.13	0.75
WEU	2.01	0.05	0.41	0.66	1.82	0.08	0.34	0.77	1.37	0.21	0.28	0.78	2.00	0.05	0.34	0.78	2.03	0.04	0.34	0.77	1.53	0.15	0.29	0.78	0.33	0.76
EEU																										
AP DEV	1.30	0.27	0.89	0.27	1.90	0.09	1.02	0.62	2.13	0.05	1.04	0.62	1.30	0.28	0.82	0.65	1.36	0.25	0.83	0.65	1.44	0.22	0.89	0.65	0.91	0.58
AP EM																										
LA																										
MENA																										
Panel B. Global Models																										
NA	0.32	0.97	0.16	0.37	0.29	0.97	0.25	0.48	0.26	0.98	0.22	0.49	0.35	0.95	0.27	0.48	0.29	0.97	0.26	0.48	0.31	0.97	0.22	0.50	0.23	0.47
WEU	1.31	0.24	0.40	0.43	1.32	0.24	0.45	0.60	1.24	0.28	0.45	0.60	1.40	0.20	0.44	0.61	1.45	0.18	0.45	0.60	1.33	0.23	0.46	0.61	0.44	0.58
EEU																										
AP DEV	1.75	0.10	0.78	0.22	1.39	0.22	0.89	0.36	1.36	0.23	1.06	0.37	1.66	0.12	0.91	0.38	1.42	0.20	0.90	0.37	1.68	0.12	1.05	0.38	0.93	0.35
AP EM																										
LA																										
MENA																										
Panel C. Hybrid Models																										
NA	0.40	0.93	0.13	0.64	0.38	0.94	0.09	0.77	0.38	0.94	0.09	0.77	0.63	0.77	0.12	0.78	0.48	0.88	0.10	0.78	0.58	0.81	0.12	0.78	0.11	0.75
WEU	2.06	0.04	0.40	0.66	1.73	0.09	0.33	0.77	1.29	0.25	0.27	0.78	1.86	0.07	0.34	0.78	1.89	0.06	0.33	0.78	1.41	0.20	0.29	0.78	0.33	0.76
EEU																										
AP DEV	1.34	0.25	0.89	0.27	1.41	0.23	0.89	0.62	1.57	0.17	0.89	0.63	1.06	0.42	0.83	0.65	1.13	0.37	0.83	0.64	1.21	0.33	0.84	0.66	0.86	0.58
AP EM																										
LA																										
MENA																										

Table 6. The Results of Asset-pricing Tests for Subperiod 2: January 1990 - December 2005

This table reports summary results of six different asset-pricing models— spanning three classes of models: regional, global, and hybrid—for value-weighted 3x3 *Size-EP* test assets. The results are reported for seven different regions, which are North America (NA), Western Europe (WEU), Eastern Europe (EEU), Asia-Pacific Developed (AP DEV), Asia-Pacific Emerging (AP EM), Latin America (LA), and the Middle East and North Africa (MENA). The six asset pricing models examined are the capital asset pricing model (CAPM), Fama and French (1993) three-factor (FF3) model, the Fama and French (1993) and Carhart (1997) four-factor (FFC4) model, Fama and French (2015) five-factor (FF5) model, a four-factor model (FF4) that adds the profitability factor to the FF3 model, a six-factor model (FFC6) that adds the momentum factor to the FF5 model. The monthly value-weighted excess return on each of the nine test assets is regressed on the relevant value-weighted risk factors over Subperiod 2: January 1990–December 2005. Panel A (B) shows results from regional (global) risk factors only. Panel C represents the results from the hybrid models that include both regional factors and global factors that are orthogonal to regional factors. Gibbons, Ross, and Shanken's (1989) F statistic (*GRS*) and its p-value (*p*) are used to test whether the alphas from nine test assets are jointly equal to zero for each model. In addition, $A|\alpha_i|$ is the average absolute alpha of nine test assets in percent; AR^2 is the average of test assets' adjusted R^2; and Avg$A|\alpha_i|$ (AvgAR^2) shows the cross-sectional average of the $A|\alpha_i|$s (AR^2s) across six asset-pricing models.

	ICAPM				FF3				FFC4				FF5				FF4				FFC6				Avg	Avg
	GRS	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	$A\|\alpha_i\|$	AR^2
Panel A. Regional Models																										
NA	0.81	0.61	0.21	0.52	0.74	0.67	0.20	0.69	0.37	0.95	0.12	0.70	0.62	0.77	0.16	0.70	0.68	0.73	0.17	0.70	0.35	0.95	0.12	0.70	0.16	0.67
WEU	5.54	0.00	0.30	0.73	4.29	0.00	0.15	0.84	4.37	0.00	0.16	0.85	4.15	0.00	0.16	0.84	4.19	0.00	0.16	0.84	4.21	0.00	0.16	0.85	0.18	0.83
EEU	3.72	0.00	0.90	0.40	2.03	0.04	0.65	0.49	1.90	0.06	0.66	0.50	2.14	0.03	0.68	0.50	2.01	0.04	0.65	0.50	2.02	0.04	0.70	0.51	0.71	0.48
AP DEV	1.69	0.10	0.52	0.32	1.39	0.20	0.27	0.59	1.29	0.25	0.26	0.60	1.56	0.13	0.28	0.60	1.59	0.12	0.29	0.60	1.47	0.16	0.28	0.61	0.32	0.55
AP EM	8.80	0.00	0.77	0.53	5.65	0.00	0.45	0.66	5.40	0.00	0.47	0.66	6.29	0.00	0.46	0.66	6.41	0.00	0.47	0.66	5.99	0.00	0.47	0.66	0.51	0.64
LA	0.45	0.91	0.28	0.50	0.69	0.72	0.33	0.61	0.62	0.78	0.32	0.61	0.86	0.57	0.33	0.62	0.72	0.69	0.33	0.62	0.77	0.64	0.33	0.62	0.32	0.60
MENA	1.34	0.23	0.56	0.34	1.28	0.25	0.51	0.46	1.11	0.36	0.50	0.47	1.26	0.27	0.46	0.47	1.31	0.24	0.51	0.47	0.92	0.51	0.41	0.49	0.49	0.45
Panel B. Global Models																										
NA	0.68	0.73	0.30	0.39	0.58	0.82	0.21	0.44	0.31	0.97	0.20	0.45	0.39	0.94	0.25	0.47	0.39	0.94	0.26	0.46	0.32	0.97	0.25	0.47	0.24	0.45
WEU	2.23	0.02	0.33	0.57	1.16	0.32	0.22	0.63	1.57	0.13	0.28	0.64	1.59	0.12	0.26	0.63	1.59	0.12	0.26	0.64	1.76	0.08	0.29	0.64	0.27	0.63
EEU	2.47	0.01	1.02	0.11	1.67	0.10	0.69	0.24	1.40	0.19	0.60	0.24	1.84	0.06	0.81	0.26	1.86	0.06	0.81	0.26	1.63	0.11	0.72	0.26	0.77	0.23
AP DEV	1.95	0.05	0.47	0.33	1.44	0.18	0.52	0.42	1.35	0.21	0.45	0.43	1.25	0.27	0.41	0.45	1.25	0.27	0.41	0.45	1.31	0.23	0.41	0.45	0.44	0.42
AP EM	3.32	0.00	0.88	0.20	2.74	0.01	0.69	0.41	2.25	0.02	0.60	0.42	2.36	0.02	0.61	0.42	2.32	0.02	0.60	0.42	2.14	0.03	0.59	0.43	0.66	0.38
LA	0.44	0.91	0.27	0.23	1.21	0.29	0.89	0.36	1.30	0.24	1.00	0.37	1.09	0.37	0.84	0.36	1.09	0.37	0.84	0.36	1.16	0.33	0.89	0.37	0.79	0.34
MENA	1.87	0.06	0.74	0.15	1.45	0.17	0.55	0.22	1.62	0.12	0.61	0.23	1.76	0.08	0.62	0.22	1.72	0.09	0.61	0.23	1.89	0.06	0.64	0.23	0.63	0.21
Panel C. Hybrid Models																										
NA	0.81	0.61	0.21	0.52	0.68	0.73	0.19	0.69	0.34	0.96	0.10	0.70	0.59	0.81	0.16	0.70	0.65	0.75	0.17	0.70	0.31	0.97	0.10	0.70	0.16	0.67
WEU	5.55	0.00	0.30	0.73	4.35	0.00	0.16	0.85	4.44	0.00	0.17	0.85	4.22	0.00	0.17	0.85	4.30	0.00	0.17	0.85	4.26	0.00	0.17	0.85	0.19	0.83
EEU	3.69	0.00	0.90	0.40	2.06	0.04	0.66	0.50	2.19	0.03	0.70	0.50	2.03	0.04	0.70	0.51	2.00	0.04	0.67	0.51	2.09	0.04	0.74	0.52	0.73	0.49
AP DEV	1.74	0.08	0.54	0.39	1.44	0.17	0.27	0.61	1.38	0.20	0.27	0.62	1.54	0.14	0.27	0.62	1.61	0.12	0.28	0.62	1.49	0.16	0.29	0.62	0.32	0.58
AP EM	8.75	0.00	0.77	0.54	4.72	0.00	0.47	0.67	4.34	0.00	0.48	0.67	5.11	0.00	0.48	0.67	5.33	0.00	0.49	0.67	4.82	0.00	0.49	0.67	0.53	0.65
LA	0.57	0.82	0.28	0.51	0.76	0.65	0.32	0.61	0.66	0.74	0.30	0.61	0.93	0.50	0.33	0.62	0.80	0.62	0.31	0.62	0.83	0.59	0.31	0.62	0.31	0.60
MENA	1.40	0.20	0.58	0.35	1.35	0.22	0.54	0.47	1.11	0.36	0.53	0.48	1.44	0.18	0.49	0.49	1.44	0.18	0.56	0.48	0.99	0.46	0.45	0.51	0.52	0.46

Table 7. The Results of Asset-pricing Tests for Subperiod 3: January 2006 - October 2021

This table reports summary results of six different asset-pricing models— spanning three classes of models: regional, global, and hybrid—for value-weighted 3x3 *Size-EP* test assets. The results are reported for seven different regions, which are North America (NA), Western Europe (WEU), Eastern Europe (EEU), Asia-Pacific Developed (AP DEV), Asia-Pacific Emerging (AP EM), Latin America (LA), and the Middle East and North Africa (MENA). The six asset pricing models examined are the capital asset pricing model (CAPM), Fama and French (1993) three-factor (FF3) model, the Fama and French (1993) and Carhart (1997) four-factor (FFC4) model, Fama and French (2015) five-factor (FF5) model, a four-factor model (FF4) that adds the profitability factor to the FF3 model, a six-factor model (FFC6) that adds the momentum factor to the FF5 model. The monthly value-weighted excess return on each of the nine test assets is regressed on the relevant value-weighted risk factors over Subperiod 3: January 2006–October 2021. Panel A (B) shows results from regional (global) risk factors only. Panel C represents the results from the hybrid models that include both regional factors and global factors that are orthogonal to regional factors. Gibbons, Ross, and Shanken's (1989) F statistic (*GRS*) and its p-value (*p*) are used to test whether the alphas from nine test assets are jointly equal to zero for each model. In addition, $A|\alpha_i|$ is the average absolute alpha of nine test assets in percent; AR^2 is the average of test assets' adjusted R^2; and Avg$A|\alpha_i|$ (AvgAR^2) shows the cross-sectional average of the $A|\alpha_i|$s (AR^2s) across six asset-pricing models.

	ICAPM				FF3				FFC4				FF5				FF4				FFC6				Avg	Avg
	GRS	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	$A\|\alpha_i\|$	AR^2
Panel A. Regional Models																										
NA	1.34	0.22	0.28	0.71	1.40	0.19	0.24	0.79	1.27	0.26	0.23	0.79	1.16	0.33	0.22	0.80	1.25	0.27	0.23	0.80	1.12	0.35	0.21	0.80	0.24	0.78
WEU	1.82	0.07	0.14	0.90	1.69	0.10	0.12	0.94	1.89	0.06	0.13	0.94	1.39	0.20	0.11	0.94	1.55	0.14	0.11	0.94	1.63	0.11	0.12	0.94	0.12	0.93
EEU	5.65	0.00	0.29	0.71	5.29	0.00	0.19	0.85	4.92	0.00	0.18	0.85	5.06	0.00	0.19	0.85	5.33	0.00	0.20	0.85	4.75	0.00	0.19	0.85	0.21	0.83
AP DEV	0.98	0.46	0.17	0.73	0.90	0.53	0.14	0.81	0.90	0.52	0.14	0.81	0.96	0.48	0.15	0.81	0.95	0.48	0.15	0.81	0.95	0.49	0.15	0.82	0.15	0.80
AP EM	1.77	0.08	0.27	0.60	1.41	0.19	0.23	0.78	1.39	0.19	0.23	0.78	1.82	0.07	0.23	0.79	1.43	0.18	0.23	0.78	1.80	0.07	0.23	0.79	0.24	0.75
LA	3.16	0.00	0.33	0.66	3.00	0.00	0.25	0.76	3.14	0.00	0.25	0.76	2.86	0.00	0.24	0.76	2.93	0.00	0.24	0.76	3.00	0.00	0.24	0.76	0.26	0.74
MENA	4.80	0.00	0.34	0.58	2.84	0.00	0.21	0.66	2.69	0.01	0.23	0.66	2.74	0.01	0.21	0.66	2.89	0.00	0.21	0.66	2.54	0.01	0.23	0.66	0.24	0.65
Panel B. Global Models																										
NA	1.51	0.15	0.26	0.69	1.87	0.06	0.28	0.70	2.14	0.03	0.29	0.70	1.43	0.18	0.29	0.70	1.51	0.15	0.29	0.70	1.61	0.12	0.29	0.70	0.28	0.70
WEU	2.15	0.03	0.22	0.82	2.49	0.01	0.31	0.86	2.42	0.01	0.26	0.86	2.37	0.01	0.26	0.87	2.16	0.03	0.23	0.86	2.43	0.01	0.25	0.87	0.26	0.86
EEU	2.42	0.01	0.47	0.61	3.54	0.00	0.62	0.73	3.32	0.00	0.62	0.73	3.21	0.00	0.58	0.73	3.08	0.00	0.57	0.73	3.19	0.00	0.59	0.73	0.58	0.71
AP DEV	1.25	0.27	0.19	0.70	1.51	0.15	0.22	0.72	1.79	0.07	0.26	0.73	1.42	0.18	0.20	0.73	1.54	0.14	0.20	0.73	1.63	0.11	0.24	0.73	0.22	0.72
AP EM	0.91	0.52	0.21	0.58	0.81	0.60	0.16	0.65	0.95	0.48	0.18	0.65	0.77	0.65	0.15	0.65	0.85	0.57	0.17	0.65	0.86	0.56	0.17	0.66	0.17	0.64
LA	0.94	0.49	0.34	0.48	1.07	0.39	0.43	0.54	0.88	0.55	0.41	0.54	1.05	0.41	0.41	0.54	0.87	0.56	0.40	0.54	0.97	0.47	0.40	0.54	0.40	0.53
MENA	2.75	0.01	0.31	0.44	2.76	0.00	0.30	0.52	2.49	0.01	0.30	0.52	2.38	0.01	0.28	0.52	2.59	0.01	0.29	0.52	2.20	0.02	0.27	0.52	0.29	0.51
Panel C. Hybrid Models																										
NA	1.33	0.23	0.27	0.72	1.33	0.23	0.24	0.80	1.22	0.29	0.23	0.80	1.07	0.39	0.20	0.81	1.17	0.32	0.22	0.81	1.04	0.41	0.20	0.81	0.23	0.79
WEU	1.80	0.07	0.13	0.90	1.61	0.12	0.12	0.94	1.86	0.06	0.13	0.94	1.28	0.25	0.10	0.94	1.48	0.16	0.11	0.94	1.54	0.14	0.11	0.94	0.12	0.93
EEU	5.62	0.00	0.29	0.73	5.00	0.00	0.22	0.86	4.78	0.00	0.23	0.86	4.87	0.00	0.21	0.86	5.12	0.00	0.21	0.86	4.71	0.00	0.22	0.86	0.23	0.84
AP DEV	0.98	0.45	0.17	0.76	0.99	0.45	0.15	0.82	1.02	0.43	0.15	0.82	1.11	0.36	0.16	0.82	1.08	0.38	0.16	0.82	1.13	0.35	0.16	0.82	0.16	0.81
AP EM	1.76	0.08	0.26	0.66	1.08	0.38	0.19	0.79	1.04	0.41	0.18	0.79	1.31	0.23	0.19	0.79	1.05	0.40	0.18	0.79	1.28	0.25	0.19	0.79	0.20	0.77
LA	3.41	0.00	0.33	0.67	3.17	0.00	0.25	0.76	3.52	0.00	0.25	0.76	2.99	0.00	0.24	0.76	3.09	0.00	0.24	0.76	3.34	0.00	0.24	0.76	0.26	0.75
MENA	4.81	0.00	0.36	0.59	2.44	0.01	0.17	0.68	2.09	0.03	0.17	0.68	2.36	0.02	0.17	0.68	2.49	0.01	0.17	0.68	1.95	0.05	0.17	0.68	0.20	0.67

Table 8. Comparison of Subperiod Results

The first three columns of this table report the average alpha gaps ($\text{Avg}|\alpha_{Gap}|_1$, $\text{Avg}|\alpha_{Gap}|_2$, $\text{Avg}|\alpha_{Gap}|_3$) for Subperiods 1, 2, and 3, respectively. In Panels A and B, $\text{Avg}|\alpha_{Gap}|_t$ represents the average alpha difference between global and regional models and between global and hybrid models, respectively. The table also presents the changes in alpha gaps between two subperiods, along with the associated t-statistics, indicating whether the average alpha gaps in each pair of subperiods are statistically different from zero. The change in the alpha gap between Subperiods 3 and 1 is denoted as $\text{Avg}A|\alpha_{Gap}|_{3\text{-}1}$ and calculated as $\text{Avg}A|\alpha_{Gap}|_3$ - $\text{Avg}A|\alpha_{Gap}|_1$. Similarly, $\text{Avg}A|\alpha_{Gap}|_{3\text{-}2}$ is calculated as $\text{Avg}A|\alpha_{Gap}|_3$ - $\text{Avg}A|\alpha_{Gap}|_2$, and $\text{Avg}A|\alpha_{Gap}|_{2\text{-}1}$ is equal to $\text{Avg}A|\alpha_{Gap}|_2$ - $\text{Avg}A|\alpha_{Gap}|_1$. Subperiod 1: March 1981–December 1989. Subperiod 2: January 1990–December 2005. Subperiod 3: January 2006–October 2021.

	Avg $|\alpha_{Gap}|_1$	Avg $|\alpha_{Gap}|_2$	Avg $|\alpha_{Gap}|_3$	ΔAvg $|\alpha_{Gap}|_{3\text{-}1}$	t-stat	ΔAvg $|\alpha_{Gap}|_{3\text{-}2}$	t-stat	ΔAvg $|\alpha_{Gap}|_{2\text{-}1}$	t-stat
Panel A: Global versus Regional									
NA	0.10	0.08	0.05	-0.05	-1.08	-0.04	-1.27	-0.01	-0.38
WEU	0.11	0.09	0.13	0.03	0.95	0.04	1.54	-0.02	-0.64
EEU		0.07	0.37			0.30	3.35		
AP DEV	0.02	0.13	0.07	0.05	0.66	-0.06	-1.36	0.11	1.41
AP EM		0.15	-0.06			-0.21	-4.44		
LA		0.47	0.14			-0.33	-6.99		
MENA		0.14	0.05			-0.08	-1.78		
Panel B: Global versus Hybrid									
NA	0.12	0.09	0.05	-0.07	-1.49	-0.03	-1.25	-0.03	-0.89
WEU	0.12	0.08	0.14	0.02	0.82	0.05	1.92	-0.03	-1.27
EEU		0.04	0.35			0.30	3.03		
AP DEV	0.07	0.12	0.06	-0.01	-0.20	-0.07	-1.44	0.05	0.69
AP EM		0.13	-0.02			-0.16	-2.66		
LA		0.48	0.14			-0.34	-6.87		
MENA		0.10	0.09			-0.02	-0.29		

Table 9. Factor Spanning Tests

This table reports the results of the factor-spanning regressions. For each region, each of the six regional factors is regressed on the global factors using a 60-month rolling window from March 1981 to October 2021. *Mean* is the time-series mean of adjusted R^2 values. *Proportion* represents the proportion of significant adjusted-R^2s (at the 5% significance level) across all 60-month rolling window regressions. In addition, the time-trend slope coefficients for adjusted R^2 and their corresponding t-statistics are reported. The bottom two rows show the cross-region averages of the time-series mean of adjusted R^2 and the proportion of significant adjusted R^2 values at the 5% significance level. The last column shows the average of mean adjusted R^2 values across factors within a region.

Region		Regional Factor						Cross-factor
		MKT	SMB	HML	RMW	CMA	MOM	Avg. Mean
North America	Mean	0.8750	0.1795	0.2066	0.1644	0.0864	0.2847	0.2994
	Proportion	1.0000	0.7363	0.5920	0.5896	0.3731	0.7139	
	Slope	0.0066	0.0051	0.0076	0.0060	0.0032	0.0165	
	t-stat	6.22	2.91	2.63	4.06	2.08	7.99	
Western Europe	Mean	0.8396	0.2300	0.2412	0.1949	0.0418	0.4583	0.3343
	Proportion	1.0000	0.9254	0.6177	0.5571	0.2238	0.9347	
	Slope	0.0049	0.0004	0.0156	0.0140	0.0011	0.0125	
	t-stat	4.70	0.27	7.76	6.91	0.73	4.93	
Eastern Europe	Mean	0.7486	0.1950	0.0867	0.0818	0.0775	0.2958	0.2476
	Proportion	1.0000	0.5848	0.4083	0.3495	0.2145	0.7509	
	Slope	0.0081	0.0077	0.0038	0.0003	-0.0006	0.0102	
	t-stat	3.02	2.10	2.13	0.12	-0.44	1.90	
Asia-Pacific Developed	Mean	0.8074	0.2977	0.3251	0.2218	0.0969	0.3133	0.3437
	Proportion	1.0000	0.6853	0.8907	0.8373	0.4053	0.9787	
	Slope	-0.0014	-0.0153	-0.0066	-0.0015	0.0015	-0.0037	
	t-stat	-0.55	-5.05	-2.62	-0.70	1.04	-1.76	
Asia-Pacific Emerging	Mean	0.6875	0.2109	0.1540	0.1960	0.1074	0.2941	0.2750
	Proportion	0.9883	0.6618	0.6239	0.8309	0.3994	0.8367	
	Slope	0.0071	0.0097	0.0068	0.0030	-0.0034	0.0045	
	t-stat	3.99	2.97	3.38	1.54	-1.91	1.04	
Latin America	Mean	0.7058	0.2117	0.1562	0.0541	-0.0209	0.1638	0.2118
	Proportion	1.0000	0.7525	0.5776	0.2871	0.0198	0.5809	
	Slope	0.0036	-0.0006	0.0070	0.0039	0.0045	0.0139	
	t-stat	1.27	-0.17	3.45	1.92	4.27	6.92	
Middle East and North Africa	Mean	0.6291	0.1913	0.1111	0.0618	0.0883	0.1985	0.2134
	Proportion	1.0000	0.6667	0.3563	0.2069	0.3716	0.8851	
	Slope	0.0130	0.0128	-0.0110	-0.0071	0.0032	-0.0057	
	t-stat	2.46	2.87	-4.39	-5.20	0.96	-2.90	
Cross-region Avg. Mean		0.7561	0.2166	0.1830	0.1393	0.0682	0.2869	
Cross-region Avg. Proportion		0.9983	0.7161	0.5809	0.5226	0.2868	0.8116	

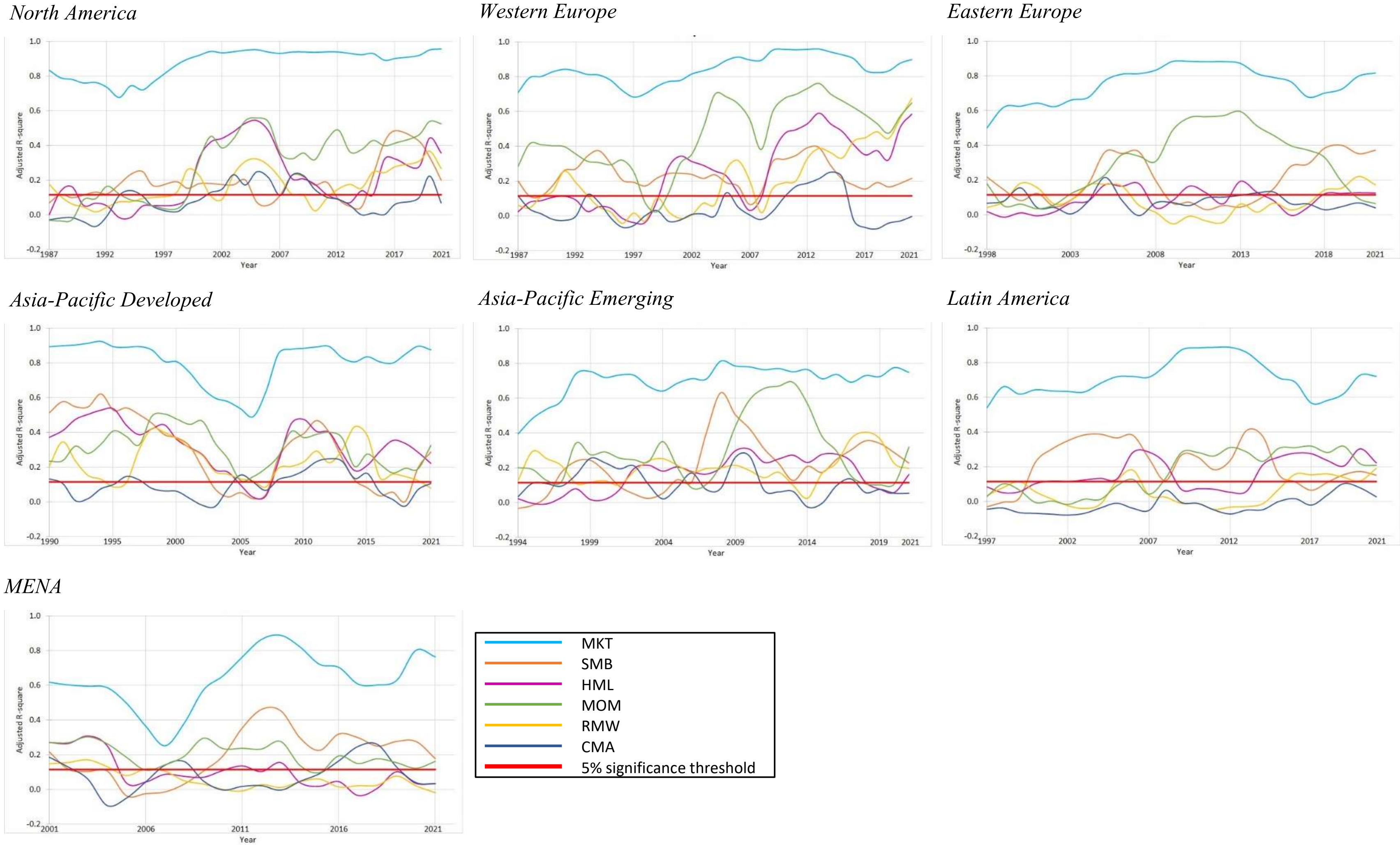
Table 10. The Results of Asset-pricing Tests for Equal-weighted Portfolios

This table reports summary results of six different asset-pricing models— spanning three classes of models: regional, global, and hybrid—for equal-weighted 3x3 *Size-EP* test assets. The results are reported for seven different regions, which are North America (NA), Western Europe (WEU), Eastern Europe (EEU), Asia-Pacific Developed (AP DEV), Asia-Pacific Emerging (AP EM), Latin America (LA), and the Middle East and North Africa (MENA). The six asset pricing models examined are the capital asset pricing model (CAPM), Fama and French (1993) three-factor (FF3) model, the Fama and French (1993) and Carhart (1997) four-factor (FFC4) model, Fama and French (2015) five-factor (FF5) model, a four-factor model (FF4) that adds the profitability factor to the FF3 model, a six-factor model (FFC6) that adds the momentum factor to the FF5 model. The monthly value-weighted excess return on each of the nine test assets is regressed on the relevant equal-weighted risk factors over the period March 1981–October 2021. Panel A (B) shows results from regional (global) risk factors only. Panel C represents the results from the hybrid models that include both regional factors and global factors that are orthogonal to regional factors. Gibbons, Ross, and Shanken's (1989) F statistic (*GRS*) and its p-value (*p*) are used to test whether the alphas from nine test assets are jointly equal to zero for each model. In addition, $A|\alpha_i|$ is the average absolute alpha of nine test assets in percent; AR^2 is the average of test assets' adjusted R^2; and Avg$A|\alpha_i|$ (AvgAR^2) shows the cross-sectional average of the $A|\alpha_i|$s (AR^2s) across six asset-pricing models.

	ICAPM				FF3				FFC4				FF5				FF4				FFC6				Avg	Avg
	GRS	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	$A\|\alpha_i\|$	AR^2
Panel A. Regional Models																										
NA	0.93	0.50	0.16	0.61	0.83	0.59	0.13	0.73	0.76	0.81	0.11	0.73	0.73	0.69	0.12	0.74	0.76	0.65	0.12	0.74	0.57	0.82	0.10	0.74	0.12	0.73
WEU	2.85	0.00	0.20	0.78	1.73	0.08	0.11	0.87	1.53	0.34	0.08	0.87	1.53	0.14	0.11	0.87	1.53	0.13	0.11	0.87	1.09	0.37	0.09	0.87	0.12	0.86
EEU	2.65	0.01	0.45	0.49	1.59	0.12	0.29	0.60	1.59	0.09	0.29	0.61	1.58	0.12	0.30	0.61	1.59	0.12	0.30	0.61	1.65	0.10	0.28	0.62	0.32	0.59
AP DEV	1.97	0.04	0.42	0.41	1.77	0.07	0.21	0.69	1.77	0.09	0.21	0.69	1.77	0.07	0.20	0.69	1.77	0.07	0.20	0.69	1.72	0.08	0.21	0.70	0.24	0.65
AP EM	5.01	0.00	0.50	0.48	3.00	0.00	0.38	0.64	3.14	0.00	0.38	0.64	3.09	0.00	0.38	0.65	3.14	0.00	0.38	0.65	2.94	0.00	0.37	0.65	0.40	0.62
LA	1.32	0.23	0.26	0.59	1.65	0.10	0.23	0.70	1.74	0.14	0.23	0.70	1.68	0.09	0.22	0.70	1.74	0.08	0.24	0.70	1.57	0.12	0.22	0.70	0.23	0.68
MENA	3.44	0.00	0.49	0.42	2.28	0.02	0.31	0.53	2.31	0.02	0.33	0.53	2.08	0.03	0.30	0.54	2.31	0.02	0.31	0.54	2.06	0.03	0.29	0.54	0.34	0.52
Panel B. Global Models																										
NA	1.11	0.35	0.21	0.50	1.47	0.16	0.21	0.53	1.41	0.25	0.20	0.54	1.42	0.18	0.23	0.54	1.41	0.18	0.23	0.54	1.27	0.25	0.21	0.54	0.21	0.53
WEU	2.82	0.00	0.20	0.63	2.35	0.01	0.23	0.71	2.66	0.01	0.24	0.71	2.64	0.01	0.25	0.71	2.66	0.01	0.25	0.71	2.55	0.01	0.25	0.71	0.24	0.70
EEU	2.62	0.01	0.51	0.26	1.98	0.04	0.42	0.40	2.51	0.09	0.37	0.40	2.63	0.01	0.52	0.41	2.51	0.01	0.51	0.41	2.28	0.02	0.46	0.41	0.46	0.38
AP DEV	2.37	0.01	0.25	0.45	1.78	0.07	0.31	0.52	1.36	0.15	0.29	0.52	1.33	0.22	0.25	0.52	1.36	0.21	0.26	0.52	1.29	0.24	0.26	0.52	0.27	0.51
AP EM	3.68	0.00	0.56	0.32	2.23	0.02	0.38	0.48	1.92	0.02	0.35	0.49	1.91	0.05	0.35	0.49	1.92	0.05	0.35	0.49	1.96	0.04	0.33	0.49	0.38	0.46
LA	1.09	0.37	0.27	0.36	1.80	0.07	0.50	0.46	1.72	0.06	0.54	0.46	1.82	0.06	0.48	0.47	1.72	0.08	0.47	0.46	1.86	0.06	0.49	0.47	0.46	0.45
MENA	3.81	0.00	0.52	0.25	2.96	0.00	0.39	0.32	3.23	0.00	0.45	0.33	3.23	0.00	0.44	0.32	3.23	0.00	0.44	0.32	3.48	0.00	0.47	0.33	0.45	0.31
Panel C. Hybrid Models																										
NA	0.88	0.54	0.15	0.61	0.74	0.67	0.12	0.73	0.68	0.88	0.09	0.73	0.65	0.75	0.11	0.74	0.68	0.73	0.11	0.74	0.49	0.88	0.09	0.74	0.11	0.71
WEU	2.85	0.00	0.20	0.78	1.74	0.08	0.11	0.87	1.59	0.31	0.09	0.87	1.58	0.12	0.11	0.87	1.59	0.11	0.11	0.87	1.16	0.32	0.09	0.87	0.12	0.86
EEU	2.94	0.00	0.50	0.50	1.88	0.05	0.35	0.61	1.85	0.04	0.32	0.61	1.83	0.06	0.34	0.62	1.85	0.06	0.34	0.62	1.95	0.04	0.33	0.63	0.36	0.60
AP DEV	1.90	0.05	0.34	0.50	1.75	0.08	0.20	0.70	1.73	0.09	0.20	0.70	1.72	0.08	0.20	0.70	1.73	0.08	0.20	0.70	1.70	0.09	0.20	0.70	0.22	0.67
AP EM	5.02	0.00	0.54	0.50	2.73	0.00	0.29	0.67	2.74	0.01	0.28	0.67	2.72	0.00	0.29	0.67	2.74	0.00	0.29	0.67	2.68	0.01	0.28	0.67	0.33	0.64
LA	1.35	0.21	0.26	0.59	1.71	0.09	0.24	0.70	1.79	0.12	0.24	0.70	1.67	0.10	0.22	0.70	1.79	0.07	0.25	0.70	1.56	0.13	0.22	0.70	0.24	0.68
MENA	3.61	0.00	0.52	0.43	2.57	0.01	0.36	0.55	2.55	0.01	0.35	0.55	2.26	0.02	0.36	0.55	2.55	0.01	0.36	0.55	2.02	0.04	0.31	0.56	0.38	0.53

Figure 1. Time-series Plots of Adjusted R^2 Values Obtained from the Factor-spanning Regressions

For each region, each of the six regional factors is regressed on the global factors using a 60-month rolling window from March 1981 to October 2021. This figure plots the time series of adjusted R^2 values from the regressions for each factor within a region. The threshold line shows the adjusted R^2 value at the 5% significance level. Adjusted R^2 values above the threshold line are considered statistically significant at the 5% level.



Online Appendix

Table A1. Subperiod Results for Equal-weighted Portfolios from March 1981 to December 1989

This table reports summary results of six different asset-pricing models— spanning three classes of models: regional, global, and hybrid—for equal-weighted 3x3 *Size-EP* test assets. The results are reported for seven different regions, which are North America (NA), Western Europe (WEU), Eastern Europe (EEU), Asia-Pacific Developed (AP DEV), Asia-Pacific Emerging (AP EM), Latin America (LA), and the Middle East and North Africa (MENA). The six asset pricing models examined are the capital asset pricing model (CAPM), Fama and French (1993) three-factor (FF3) model, the Fama and French (1993) and Carhart (1997) four-factor (FFC4) model, Fama and French (2015) five-factor (FF5) model, a four-factor model (FF4) that adds the profitability factor to the FF3 model, a six-factor model (FFC6) that adds the momentum factor to the FF5 model. The monthly value-weighted excess return on each of the nine test assets is regressed on the relevant equal-weighted risk factors over the period March 1981–December 1989. Panel A (B) shows results from regional (global) risk factors only. Panel C represents the results from the hybrid models that include both regional factors and global factors that are orthogonal to regional factors. Gibbons, Ross, and Shanken's (1989) F statistic (*GRS*) and its p-value (*p*) are used to test whether the alphas from nine test assets are jointly equal to zero for each model. In addition, $A|\alpha_i|$ is the average absolute alpha of nine test assets in percent; AR^2 is the average of test assets' adjusted R^2; and Avg$A|\alpha_i|$ (AvgAR^2) shows the cross-sectional average of the $A|\alpha_i|$s (AR^2s) across six asset-pricing models.

	ICAPM				FF3				FFC4				FF5				FF4				FFC6				Avg	Avg
	GRS	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	$A\|\alpha_i\|$	AR^2
Panel A. Regional Models																										
NA	0.24	0.99	0.14	0.60	0.33	0.96	0.12	0.75	0.50	0.97	0.12	0.75	0.50	0.87	0.15	0.75	0.50	0.87	0.13	0.75	0.49	0.88	0.15	0.75	0.14	0.73
WEU	1.28	0.26	0.39	0.68	0.54	0.84	0.18	0.79	0.53	0.97	0.12	0.80	0.53	0.85	0.18	0.79	0.53	0.85	0.18	0.79	0.30	0.97	0.12	0.80	0.19	0.78
EEU																										
AP DEV	1.22	0.31	0.80	0.27	2.17	0.05	0.89	0.63	1.61	0.05	0.92	0.63	1.54	0.18	0.77	0.66	1.61	0.15	0.77	0.65	1.49	0.20	0.79	0.66	0.82	0.58
AP EM																										
LA																										
MENA																										
Panel B. Global Models																										
NA	0.32	0.96	0.18	0.36	0.57	0.82	0.30	0.45	0.58	0.86	0.28	0.46	0.67	0.73	0.31	0.46	0.58	0.81	0.30	0.45	0.60	0.79	0.29	0.48	0.28	0.44
WEU	1.10	0.37	0.37	0.46	0.95	0.49	0.40	0.64	1.02	0.58	0.38	0.64	0.99	0.45	0.41	0.64	1.02	0.43	0.41	0.64	0.88	0.55	0.39	0.64	0.39	0.61
EEU																										
AP DEV	1.73	0.10	0.69	0.23	1.45	0.19	0.88	0.37	1.46	0.19	1.06	0.38	1.68	0.12	0.90	0.38	1.46	0.19	0.89	0.38	1.83	0.09	1.08	0.39	0.92	0.36
AP EM																										
LA																										
MENA																										
Panel C. Hybrid Models																										
NA	0.24	0.99	0.13	0.60	0.30	0.97	0.13	0.75	0.44	0.98	0.13	0.75	0.53	0.85	0.14	0.75	0.44	0.91	0.14	0.75	0.43	0.91	0.14	0.75	0.14	0.73
WEU	1.18	0.31	0.37	0.68	0.54	0.84	0.17	0.79	0.54	0.97	0.12	0.80	0.54	0.84	0.17	0.80	0.54	0.84	0.17	0.80	0.29	0.98	0.11	0.81	0.19	0.78
EEU																										
AP DEV	1.26	0.29	0.81	0.28	1.65	0.14	0.84	0.62	1.32	0.16	0.84	0.63	1.23	0.32	0.80	0.66	1.32	0.27	0.81	0.65	1.34	0.27	0.81	0.67	0.82	0.59
AP EM																										
LA																										
MENA																										

Table A2. Subperiod Results for Equal-weighted Portfolios from January 1990 to December 2005

This table reports summary results of six different asset-pricing models— spanning three classes of models: regional, global, and hybrid—for equal-weighted 3x3 *Size-EP* test assets. The results are reported for seven different regions, which are North America (NA), Western Europe (WEU), Eastern Europe (EEU), Asia-Pacific Developed (AP DEV), Asia-Pacific Emerging (AP EM), Latin America (LA), and the Middle East and North Africa (MENA). The six asset pricing models examined are the capital asset pricing model (CAPM), Fama and French (1993) three-factor (FF3) model, the Fama and French (1993) and Carhart (1997) four-factor (FFC4) model, Fama and French (2015) five-factor (FF5) model, a four-factor model (FF4) that adds the profitability factor to the FF3 model, a six-factor model (FFC6) that adds the momentum factor to the FF5 model. The monthly value-weighted excess return on each of the nine test assets is regressed on the relevant equal-weighted risk factors over the period January 1990–December 2005. Panel A (B) shows results from regional (global) risk factors only. Panel C represents the results from the hybrid models that include both regional factors and global factors that are orthogonal to regional factors. Gibbons, Ross, and Shanken's (1989) F statistic (*GRS*) and its p-value (*p*) are used to test whether the alphas from nine test assets are jointly equal to zero for each model. In addition, $A|\alpha_i|$ is the average absolute alpha of nine test assets in percent; AR^2 is the average of test assets' adjusted R^2; and Avg$A|\alpha_i|$ (AvgAR^2) shows the cross-sectional average of the $A|\alpha_i|$s (AR^2s) across six asset-pricing models.

	ICAPM				FF3				FFC4				FF5				FF4				FFC6				Avg	Avg
	GRS	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	$A\|\alpha_i\|$	AR^2
Panel A. Regional Models																										
NA	0.69	0.72	0.25	0.50	0.47	0.90	0.19	0.67	0.43	0.98	0.13	0.68	0.42	0.92	0.18	0.67	0.43	0.91	0.18	0.68	0.28	0.98	0.13	0.68	0.18	0.65
WEU	1.90	0.06	0.24	0.72	1.14	0.34	0.14	0.84	1.06	0.40	0.14	0.85	1.03	0.42	0.13	0.84	1.06	0.40	0.14	0.84	0.99	0.45	0.13	0.85	0.15	0.82
EEU	2.41	0.01	0.75	0.38	1.10	0.37	0.51	0.49	1.07	0.37	0.49	0.50	1.14	0.34	0.51	0.50	1.07	0.38	0.51	0.50	1.15	0.33	0.49	0.51	0.54	0.48
AP DEV	2.36	0.02	0.57	0.32	2.55	0.01	0.29	0.65	2.60	0.01	0.28	0.66	2.54	0.01	0.29	0.66	2.60	0.01	0.30	0.66	2.44	0.01	0.29	0.66	0.34	0.60
AP EM	5.09	0.00	0.66	0.53	3.02	0.00	0.41	0.66	3.45	0.00	0.43	0.66	3.40	0.00	0.42	0.66	3.45	0.00	0.43	0.67	3.24	0.00	0.43	0.66	0.46	0.64
LA	0.89	0.53	0.31	0.51	1.24	0.28	0.39	0.62	1.36	0.39	0.38	0.62	1.40	0.19	0.39	0.63	1.36	0.21	0.39	0.63	1.23	0.28	0.38	0.63	0.37	0.61
MENA	1.52	0.15	0.73	0.34	1.43	0.18	0.69	0.46	1.43	0.19	0.68	0.46	1.26	0.27	0.66	0.46	1.43	0.18	0.70	0.46	1.20	0.30	0.61	0.47	0.68	0.44
Panel B. Global Models																										
NA	0.87	0.55	0.42	0.38	0.39	0.94	0.18	0.44	0.32	0.95	0.18	0.44	0.34	0.96	0.19	0.46	0.32	0.97	0.19	0.45	0.39	0.94	0.20	0.46	0.22	0.44
WEU	1.65	0.10	0.27	0.56	0.58	0.81	0.19	0.62	0.74	0.56	0.24	0.62	0.74	0.67	0.22	0.62	0.74	0.68	0.22	0.62	0.93	0.50	0.25	0.62	0.23	0.61
EEU	2.78	0.00	1.31	0.11	1.63	0.11	0.65	0.23	1.93	0.17	0.63	0.23	1.93	0.05	0.77	0.25	1.93	0.05	0.77	0.26	1.74	0.08	0.71	0.26	0.81	0.22
AP DEV	2.10	0.03	0.46	0.36	1.55	0.13	0.47	0.47	1.50	0.21	0.41	0.48	1.49	0.15	0.39	0.50	1.50	0.15	0.40	0.50	1.46	0.17	0.39	0.50	0.42	0.47
AP EM	3.02	0.00	0.77	0.20	2.68	0.01	0.59	0.43	2.38	0.01	0.55	0.44	2.43	0.01	0.55	0.44	2.38	0.01	0.55	0.44	2.34	0.02	0.54	0.45	0.59	0.40
LA	0.84	0.58	0.28	0.23	1.40	0.20	0.87	0.37	1.39	0.19	0.92	0.37	1.42	0.19	0.79	0.38	1.39	0.20	0.79	0.37	1.40	0.19	0.83	0.38	0.75	0.35
MENA	2.54	0.01	0.91	0.15	1.82	0.07	0.72	0.22	2.13	0.04	0.77	0.23	2.09	0.04	0.78	0.22	2.13	0.03	0.78	0.23	2.22	0.03	0.80	0.22	0.79	0.21
Panel C. Hybrid Models																										
NA	0.68	0.73	0.25	0.50	0.47	0.89	0.19	0.67	0.45	0.97	0.13	0.68	0.45	0.90	0.18	0.67	0.45	0.91	0.19	0.67	0.29	0.98	0.13	0.68	0.18	0.65
WEU	1.94	0.05	0.24	0.72	1.32	0.23	0.15	0.85	1.23	0.26	0.15	0.85	1.20	0.30	0.14	0.85	1.23	0.28	0.14	0.85	1.18	0.31	0.14	0.85	0.16	0.83
EEU	2.41	0.01	0.75	0.39	1.17	0.32	0.55	0.50	1.09	0.28	0.54	0.50	1.09	0.38	0.52	0.51	1.09	0.38	0.53	0.51	1.15	0.33	0.55	0.52	0.57	0.49
AP DEV	2.48	0.01	0.59	0.41	2.79	0.00	0.29	0.67	2.84	0.00	0.29	0.67	2.72	0.01	0.29	0.67	2.84	0.00	0.29	0.67	2.82	0.00	0.30	0.68	0.34	0.63
AP EM	5.08	0.00	0.66	0.53	2.50	0.01	0.42	0.67	2.77	0.01	0.42	0.67	2.68	0.01	0.43	0.67	2.77	0.00	0.43	0.67	2.56	0.01	0.43	0.67	0.47	0.65
LA	0.97	0.47	0.29	0.51	1.22	0.29	0.38	0.62	1.31	0.40	0.37	0.62	1.33	0.23	0.38	0.63	1.31	0.24	0.38	0.63	1.22	0.29	0.37	0.63	0.36	0.61
MENA	1.70	0.10	0.75	0.34	1.69	0.10	0.73	0.46	1.70	0.14	0.71	0.47	1.54	0.14	0.75	0.47	1.70	0.10	0.75	0.47	1.29	0.25	0.67	0.48	0.73	0.45

Table A3. Subperiod Results for Equal-weighted Portfolios from January 2006 to October 2021

This table reports summary results of six different asset-pricing models— spanning three classes of models: regional, global, and hybrid—for equal-weighted 3x3 *Size-EP* test assets. The results are reported for seven different regions, which are North America (NA), Western Europe (WEU), Eastern Europe (EEU), Asia-Pacific Developed (AP DEV), Asia-Pacific Emerging (AP EM), Latin America (LA), and the Middle East and North Africa (MENA). The six asset pricing models examined are the capital asset pricing model (CAPM), Fama and French (1993) three-factor (FF3) model, the Fama and French (1993) and Carhart (1997) four-factor (FFC4) model, Fama and French (2015) five-factor (FF5) model, a four-factor model (FF4) that adds the profitability factor to the FF3 model, a six-factor model (FFC6) that adds the momentum factor to the FF5 model. The monthly value-weighted excess return on each of the nine test assets is regressed on the relevant equal-weighted risk factors over the period January 2006–October 2021. Panel A (B) shows results from regional (global) risk factors only. Panel C represents the results from the hybrid models that include both regional factors and global factors that are orthogonal to regional factors. Gibbons, Ross, and Shanken's (1989) F statistic (*GRS*) and its p-value (*p*) are used to test whether the alphas from nine test assets are jointly equal to zero for each model. In addition, $A|\alpha_i|$ is the average absolute alpha of nine test assets in percent; AR^2 is the average of test assets' adjusted R^2; and Avg$A|\alpha_i|$ (AvgAR^2) shows the cross-sectional average of the $A|\alpha_i|$s (AR^2s) across six asset-pricing models.

	ICAPM				FF3				FFC4				FF5				FF4				FFC6				Avg	Avg
	GRS	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	*GRS*	*p*	$A\|\alpha_i\|$	AR^2	$A\|\alpha_i\|$	AR^2
Panel A. Regional Models																										
NA	1.39	0.20	0.28	0.70	1.39	0.20	0.25	0.79	1.23	0.24	0.24	0.79	1.13	0.34	0.22	0.80	1.23	0.28	0.24	0.80	1.12	0.35	0.21	0.80	0.24	0.78
WEU	1.35	0.21	0.13	0.90	1.30	0.24	0.12	0.93	1.24	0.26	0.13	0.94	1.20	0.30	0.12	0.94	1.24	0.27	0.12	0.94	1.19	0.31	0.12	0.94	0.12	0.93
EEU	2.18	0.03	0.31	0.70	1.86	0.06	0.22	0.85	1.85	0.08	0.18	0.85	1.84	0.07	0.21	0.85	1.85	0.06	0.21	0.85	1.85	0.06	0.20	0.85	0.22	0.83
AP DEV	1.20	0.30	0.22	0.75	1.12	0.35	0.17	0.83	1.18	0.34	0.17	0.83	1.16	0.32	0.18	0.83	1.18	0.31	0.19	0.83	1.15	0.33	0.18	0.83	0.19	0.82
AP EM	1.22	0.29	0.32	0.60	1.37	0.20	0.21	0.78	1.36	0.20	0.21	0.78	1.52	0.15	0.23	0.79	1.36	0.21	0.21	0.78	1.52	0.14	0.23	0.79	0.23	0.75
LA	1.62	0.11	0.37	0.68	1.40	0.19	0.27	0.79	1.35	0.18	0.27	0.79	1.32	0.23	0.26	0.79	1.35	0.22	0.26	0.79	1.32	0.23	0.26	0.79	0.28	0.77
MENA	3.89	0.00	0.34	0.59	2.32	0.02	0.24	0.69	2.27	0.01	0.26	0.70	2.22	0.02	0.23	0.70	2.27	0.02	0.24	0.70	2.32	0.02	0.26	0.70	0.26	0.68
Panel B. Global Models																										
NA	1.49	0.16	0.26	0.69	1.61	0.12	0.28	0.70	1.37	0.08	0.28	0.70	1.27	0.26	0.27	0.70	1.37	0.21	0.27	0.70	1.35	0.22	0.27	0.70	0.27	0.70
WEU	1.90	0.06	0.24	0.82	2.47	0.01	0.32	0.86	2.24	0.02	0.27	0.86	2.43	0.01	0.27	0.87	2.24	0.02	0.25	0.86	2.43	0.01	0.26	0.87	0.27	0.86
EEU	2.73	0.01	0.41	0.62	4.05	0.00	0.51	0.74	3.51	0.00	0.50	0.75	3.77	0.00	0.47	0.75	3.51	0.00	0.45	0.75	3.54	0.00	0.47	0.75	0.47	0.73
AP DEV	1.33	0.23	0.16	0.72	1.54	0.14	0.18	0.74	1.39	0.10	0.22	0.74	1.29	0.25	0.14	0.74	1.39	0.19	0.16	0.74	1.41	0.19	0.18	0.74	0.18	0.74
AP EM	1.13	0.34	0.25	0.62	1.10	0.37	0.17	0.69	0.89	0.46	0.19	0.68	0.80	0.62	0.15	0.69	0.89	0.53	0.15	0.69	0.76	0.65	0.16	0.69	0.18	0.68
LA	1.43	0.18	0.37	0.51	1.41	0.19	0.40	0.57	1.21	0.36	0.36	0.57	1.41	0.19	0.39	0.57	1.21	0.29	0.36	0.57	1.22	0.29	0.37	0.57	0.38	0.56
MENA	4.03	0.00	0.33	0.46	3.97	0.00	0.33	0.54	3.47	0.00	0.30	0.55	3.25	0.00	0.30	0.54	3.47	0.00	0.30	0.54	3.13	0.00	0.29	0.54	0.31	0.53
Panel C. Hybrid Models																										
NA	1.38	0.21	0.27	0.71	1.35	0.22	0.25	0.80	1.16	0.27	0.23	0.80	1.09	0.37	0.22	0.81	1.16	0.33	0.23	0.81	1.07	0.39	0.21	0.81	0.24	0.79
WEU	1.34	0.22	0.12	0.90	1.22	0.29	0.12	0.94	1.13	0.27	0.12	0.94	1.07	0.39	0.11	0.94	1.13	0.34	0.12	0.94	1.11	0.36	0.11	0.94	0.12	0.93
EEU	2.17	0.03	0.31	0.72	1.89	0.06	0.21	0.85	1.97	0.05	0.20	0.86	1.92	0.05	0.21	0.86	1.97	0.05	0.21	0.86	1.92	0.05	0.21	0.86	0.23	0.84
AP DEV	1.23	0.28	0.22	0.77	1.17	0.32	0.18	0.84	1.25	0.30	0.19	0.84	1.27	0.26	0.20	0.84	1.25	0.27	0.20	0.84	1.27	0.26	0.20	0.84	0.20	0.83
AP EM	1.26	0.26	0.30	0.67	1.62	0.11	0.19	0.79	1.62	0.13	0.19	0.79	1.61	0.12	0.22	0.80	1.62	0.11	0.19	0.80	1.56	0.13	0.22	0.80	0.22	0.78
LA	1.64	0.11	0.37	0.69	1.49	0.15	0.28	0.79	1.44	0.11	0.29	0.79	1.40	0.19	0.27	0.79	1.44	0.18	0.28	0.79	1.52	0.14	0.28	0.79	0.29	0.77
MENA	3.83	0.00	0.35	0.60	1.85	0.06	0.19	0.71	1.85	0.08	0.21	0.71	1.88	0.06	0.19	0.71	1.85	0.06	0.20	0.71	1.84	0.07	0.21	0.71	0.22	0.69